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.

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

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

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

5. **Dr. Grace Premila Victor.,**
   Member
   Associate Professor,
   Bishop Cotton Women's College,
   Field Marshal Kariyappa Road,
   Bengaluru – 560 025

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

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

1. 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, Benguluru.
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.

30/09/2021

Dr. Vijayalaxmi A.H.M. Dr. Madhumathy S. Dr. Asha Jyothi U. H.

Dr. Grace Premila Victor. Dr. Marie Kavitha Jayakaran Dr. Shantha Maria B. V.

Dr. Sangeeta Pandey.

Dr. Usha Devi C,
Chairperson

Dr. USHA DEVI C, M.Sc., Ph.D., FISCA
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

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:HomeScienceTotal 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 whiledoing.
2. Reflect universal and domain-specific values in HomeScience.
3. Involve, communicate, and engage keystakeholders.
4. Preach and practice change as acontinuum.
5. Develop the ability to address the complexities and interface among of self, societal and nationalpriorities.
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 andentrepreneurship.
9. Develop sensitivity, resourcefulness and competence to render service to families, communities, and the nation atlarge.
10. Promote research, innovation and design (product) development favoring all the disciplines in HomeScience.
11. Enhance digital literacy and apply them to engage in real time problem solving and ideation related to all fields of HomeScience.
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 andCommunication

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		Practical	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	• Demonstration • lecture	Formative and Summative Assessment
	OE- 1 Food Preservation	PO-3 PO-8 PO-9	12+/Equivalent Pass	• Demonstration • lecture	Formative and Summative Assessment
2	DSCA2 Fundamentals of Human Development	PO –4 PO –6 PO –8	12+/Equivalent Pass	• Lecture • FieldVisit	Formative and Summative Assessment
	OE-2 TeachingMaterials for Early Childhood Education	PO-1 PO-3 PO-8	12+/Equivalent Pass	• Demonstration • lecture	Formative and Summative Assessment

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 andexcess.
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 **Chapter No. 6.** Nutrition through lifecycle Nutritional requirement, dietary guidelines: Adulthood, Pregnancy, Lactation, Infancy -Complementary feeding, Pre-school, Adolescence, Old age.	**4 hrs** **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.

REFERENCES

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

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 developmentof preserved food products				X	X							
Acquire skills to formulate food basedproducts							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) **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	**8 Hrs**
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	**8 Hrs**
Visit to Fruits and Vegetable processing industry **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** **4 Hrs**
Chapter No. 9 - Hands on experience: Pickle making, Visit to Commercial Pickle Manufacturing/ Food Industry / Wine industry	

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 humandevelopment.
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 differentresearchers.

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 humandevelopment.								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 **Chapter No. 8.** Piaget's cognitive Theory and Erik Erickson's Personality Theory.	**8 Hrs** **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 **Chapter No. 10** Role of Parents and Disciplinary Techniques; Role of siblings, peers and others in the development; Behaviorproblems	**12 Hrs** **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 prenataldevelopment.
2. Organize a lecture/workshop for parents on importance of the nutrition/ Needs of preschoolchildren.
3. Develop an activity to foster cognitive development in schoolchildren

FormativeAssessment	
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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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. NewDelhi:Springer.
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13. Hurlock.B.Elizabeth 'Developmental Psychology – A Life Span Approach' Tata McGraw Hill Publications, New Delhi Latest Edition.3.
14. Suriakanthi. A. (2015) 'Child Development' Kavitha Publications, Gandhigram, 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 learningmaterials.
2. Understand the different teaching methods & materials for earlyyears
3. Understand the different teaching methods & materials developmentally challengedchildren

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 learningmaterials		**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**
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. • 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**

• Printedteachingaids(children'sbooks,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 earlychildhood	**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 andDietetics.

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 indeveloping

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 anddietetics
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	**Moralandethicalawareness/reasoningandResearchskills:**Apply ethical principles and commit to professional ethics and responsibilitiesin 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 andnutrition	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 NutritionTherapy	70	40
	NDP8.1	DSC	Practical	2	Advances in Medical NutritionTherapy	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 careprocess	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 FunctionalFoods	60	40
	NDP9.1	DSC	Practical	2	Nutraceuticals and FunctionalFoods	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 / PediatricNutrition	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/12th Science students	➢ MOOC ➢ Seminar ➢ Assignments ➢ Group ➢ Discussion ➢ Case Studies ➢ Lecture ➢ ICT ➢ Content Review ➢ Audio -VideoMaterials ➢ Demonstration ➢ Field Visits ➢ Hands OnTraining ➢ Observation ➢ On The FieldTraining ➢ Review ➢ Research ➢ Article ➢ Presentations ➢ Nutrition Education Tools And Module Development	Formative and Summative Assessment
	OE 1 Fundamentals of food and health / Health lifestyle and nutrition	PO1 PO2	PUC/12th Science students		Formative and Summative Assessment
II	DSC- 2 Principles of Food Science and Preservation	PO1 PO4 PO6	PUC/12th Science students		Formative and Summative Assessment
	OE- 1 Food safety and Hygiene/ Food Adulteration	PO1 PO4 PO6	PUC/12th Science students		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 andexcess
3. Understand the food composition and concept of energybalance
4. Equip with knowledge and understanding on importance ofwater

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**											

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 andmeasures
2. Methods ofcooking

a. Water – boiling, steaming, pressurecooking
b. Oil- Shallow frying, deepfrying

3. Identification of nutrient richfood
4. Planning and preparation of macro nutrient rich recipesclasses

a. Energy b.Protein

5. Planning and preparation of micro nutrientrecipes

a. Iron b. VitaminA

REFERENCES

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

Date **CourseCo-ordinator** **Subject CommitteeChairperson**

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 onhealth
2. Familiarize with the concept of health and issues of public healthconcern
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**

Health – Definition, Components, Factors influencing health, Dietary guidelines Issues of public concern Malnutrition, Anemia, Vitamin A deficiency, Obesity, Diabetes and Hypertension	

Unit - 4 Foods for health and well being	**11 hours**
Functional foods – Probiotics, prebiotics and phytochemicals Health supplements, processed foods, organic foods Nutrition label – understanding and importance	
Unit - 4 Foods for health and well being	**11 hours**
Functional foods – Probiotics, prebiotics and phytochemicals Health supplements, processed foods, organic foods Nutrition label – understanding and importance	

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; 4thedition.
2. Kathleen Mahan L., Sylnia 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 inhealthand diseases eighthedition.
6. William S.R., Nutrition and Diet Therapy fourth edition C.V. MosCompany.

Date **CourseCo-ordinator** **Subject CommitteeChairperson**

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 andobjective. Cereals & Millets-Production, importance &composition- Cereal Products. Wheat, rice maize, ragi and sorghum. Malting and cooking of cereals, non-enzymatic reactions, Leaving agents. Fermented products, Milling of wheat, Parboiling ofRice, Pulses- composition, toxic constituents and cooking of pulses, variety and processing	

Unit – 2	**14 hours**
Fruits and vegetables – Production composition, pigments, flavors and variety- changes during cooking-enzymatic browning, non-enzymatic browning. Milk and milk products- composition, storage- Processing of milk- Coagulation- Milk products available in India. Egg- structure, composition, storage, grade, quality, selection, Role of egg in food preparation, coagulation.	16hrs
Unit – 3	**14 hours**
Sugar, Jaggery and honey - Composition, different forms of sugar, storage- Behaviors of syrups at different temperatures- Crystallization and caramelization 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) Meat, Fish poultry-structure, composition, storage, Post mortem changes in meat, Curing of meat, Tenderization, Aging of meat, selection, Meat cookery.	
Unit – 4	**14 hours**
Methods of cooking, nutrient loss during cooking Concepts of food safety and standards Food Preservation, food spoilage, method of preservation by low temperature, high temperature, dehydration, food irradiation	

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 foodpreparation.
2. Sensoryevaluation
3. Starch cookery I-microscopic observation of different starches gel formationand gelatinization.
4. Starch cookery II- Rice and Wheat preparation, factors influencingdoughdevelopment and gluten formation.Leavened products, milk cookery-casein formation, curdsetting.
5. Fermented products and pulsecookery.
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 andcaramelization.

9. Leavened products, milk cookery-casein formation, curdsetting.
10. Fermented products and pulsecookery.
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 andcaramelization.

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

References

1. Arora K., Gupta K.V.,Theory ofcooking
2. Bennen Marion. Introductoryfoods
3. Lavies. (1998) Food commodities. Heinemann Ltd,London
4. Lowe Bella Experimentalcookery
5. Norman N Potter, Joseph H Hotchkiss (1999) Food scienceTechnology
6. Peckham. Foundation of foodpreparation
7. Srilakshmi. Food Science. New Age International Publishers, NewDelhi.

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

Date **CourseCo-ordinator** **Subject CommitteeChairperson**

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 onhealth
2. Familiarize with the concept of food safety issues on publichealth
3. Understand the standards, laws and regulations regarding foodsafety

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		Practical	2	Life Cycle Nutrition	25	25
	CNDT 3.2	DSC- 8	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 listedseparately.

Sem.	Title /Name of thecourse	Program outcomes that the course addresses (not more than 3per course)	Pre-requisite course(s)	Pedagogy	Assessment
1	Fundamentals of Nutrition	PO1	PUC / 10+2 with Chemistry or Biology as one optional	• SeminarPresentation • Quiz	Formative and Summative Assessment
	Essentials of Macronutrients	PO1, PO2	PUC / 10+2 with Chemistry or Biology as one optional	• Seminarpresentation • Planninginnovative recipes, Low-cost innovativerecipes	Formative and Summative Assessment
	Food Sanitation, Hygiene	PO4	PUC / 10+2 with Chemistry or Biology as one optional	• Field study incommunity • Visits • Awarenessprograms	Formative and Summative Assessment
	Human Physiology	PO3	PUC / 10+2 with Chemistry or Biology as one optional	• Seminar and Poster presentation • Modelmaking	Formative and Summative Assessment

	Essentials of Micronutrients	PO2	PUC / 10+2 with Chemistry or Biology as one optional	• Seminar presentation, Quiz • Low-costinnovative recipes	Formative and Summative Assessment
2	Food Safety and Security	PO4, PO5	PUC / 10+2 with Chemistry or Biology as one optional	• Visits to fair priceshops • Visits to institutes, Debate • Awarenessprograms	Formative and Summative Assessment

B.SC. CLINICAL NUTRITION AND DIETETICS SEMESTER 1

Course Title: FUNDAMENTALSOFNUTRITION (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 dietrequirements
2. To learn about different methods and principle ofcooking
3. To understand the role of macro nutrients in humannutrition
4. To understand their physiological functions, requirements, and sources of macronutrients
5. To acquire knowledge on food sanitation andhygiene
6. To understand food laws and foodregulations

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**
Understanding terminologies: 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 nutrientneed **Food and nutrient requirements:** 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.	

Unit – 2ENERGY	**14 Hrs**
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. 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	
Unit – 3 FOOD PREPARATION AND HEALTH	**14 Hrs**
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 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	

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 Ljingquist. 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 thediet
2. Understand their physiological functions, requirements, and sources ofmacro 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 thediet	✓														
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: functionsand deficiency,Roleofn-3andn-6fattyacids,TransFattyAcids,dietaryguidelines	
(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 denserecipes
2. Planning and preparation of low energyrecipes
3. Planning and Preparation of low Glycaemic index recepies. load

   Calculation of Glycaemic index andGlycaemic
4. Planning and preparation of high & low fiberrecipes
5. Planning and preparation of protein denserecipes
6. Planning and preparation of low proteinrecipes
7. Planning and preparation of n-3 and n-6 richrecipes

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. **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.	**8 Hrs**
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, developinga 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 itsdeficiencies

3. To understand the concept of water balance and the function of electrolytes in humannutrition

4. To understand the major nutritional problems inpopulations

5. To study the different programs and interventions for improving nutritionalstatus.

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 itsdeficiencies		✓													
To understand the concept of water balance and the function of electrolytes in human nutrition		✓													
To understand the major nutritional problems inpopulations				✓	✓										
To study the different programs and interventions for improving nutritional status				✓	✓										

B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 2

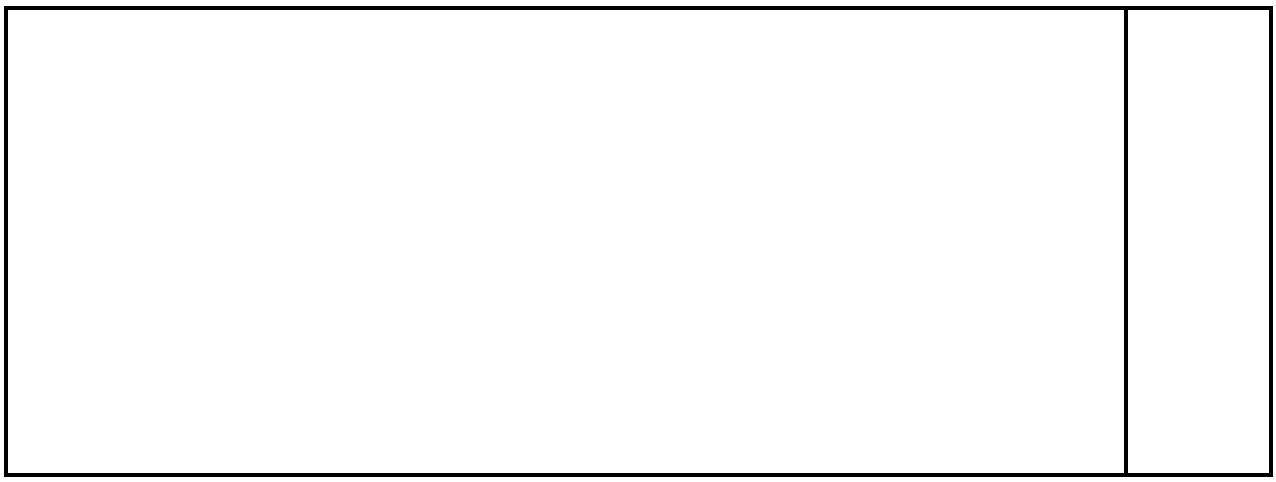
Title of the Course: HUMAN PHYSIOLOGY

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

CONTENT	45 HRS
UNIT 1- Basic Cells and Tissues 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 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.	15 Hrs

Unit – 2 - Organ system **Digestive System -** Digestive system: Review of structure (Physiology) and function - Secretory, Digestive and Absorptive functions. Functionsof 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.Hungerandthirstmechanism.Motilityandhormonesof	15 Hrs
GIT. Regulation of food intake – role of hunger and satiety centers, effect of nutrients. **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. **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 CO_2. Cardiorespiratory changes during exercise and training **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 **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	

Unit – 3	15 Hrs
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. **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, **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 ofaction.	



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 musculartissues
2. Smear preparation of human blood for RBC and WBCcount
3. Estimation of hemoglobin by Sahli- Hellige (Calorimetric) hematinmethod
4. Determination of blood groups and Rhfactor
5. Determination of bleeding time by Duke'smethod
6. Determination of Blood clotting time by Wright'smethod
7. Clinical examination ofurine

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 afterexercises

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

Low-cost innovative recipes	15
Total	40

References

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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 ofmicronutrients
2. Know the role of water and electrolytes in thebody

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 thebody		✓													

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**
– Definition and classification Fat soluble vitamins - Physiological functions, Sources, Requirements, Deficiency and Hypervitaminosis of Vitamin A, D, E and K Water Soluble vitamins – Physiological functions, Sources, Requirements and Deficiency of B Complex Vitamins- Thiamine, Riboflavin, Niacin, Pyridoxine, Folic Acid, Pantothenic Acid, Cyanocobalamin and VitaminC**.** Interaction with other nutrients and its effects.	
Unit – 2 - Minerals	**15 Hrs**
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 Trace Elements - Distribution in the body, Functions, Sources and requirement and Effects of Deficiency of Vanadium, Silicon, Boron, Nickel, Lithium, Lead, Cadmium, Sulphur.	

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 richrecipes
2. Planning and preparation of Vitamin C richrecipes
3. Planning and preparation of Vitamin B complex richrecipes
4. Planning and preparation of Calcium richrecipes
5. Planning and preparation of iron richrecipes
6. Planning and preparation of Folate richrecipes
7. Estimation of iron in foodsources
8. Estimation of calcium inmilk
9. Estimation of vitamin C in foodsources
10. Estimation of vitamin A by calorimetricmethod
11. Estimation of total mineral content in a food sample using mufflefurnace

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

REFERENCES

1. Shubhangaini A Joshi, (2010), Nutrition and Dietetics, with Indian case studies, Tata McGraw-Hill, NewDelhi
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3. Mudambi S.R and Rajagopal M.V (2008) Fundamentals of foods, Nutrition and Diet therapy, 6th revised edition, new age international publications, NewDelhi
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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 andpolicies
2. Know about food safety and foodadulteration

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
Unit –1 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 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 Alimentarious, WTO, JECFA, APEDA, ISO 22000 series, Hazard Analysis Critical Control Point (HACCP): principles of HAACP, 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	**15 Hrs**

Unit - 2	**15 Hrs**
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. Major Nutritional Problems – An overview etiology, prevalence, clinical manifestations, preventive and therapeutic measures for: Macro andmicronutrient deficiencies.	
Unit - 3	**15 Hrs**
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. Health economics and economics of malnutrition- Its impact on productivity and national development, Cost-Benefit, Cost effectiveness, Cost efficiency	

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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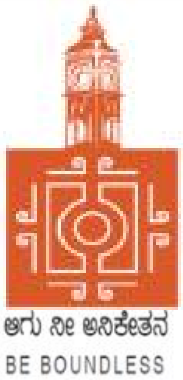
12. Ross, J.; Horton, S. (1998) Economic Consequences of Iron Deficiency. The Micronutrient Initiative, Ottawa,Canada.
13. World Health Organization (1998) World Health Report: Life in the 21st century. Report of the Director General. WHO,Geneva,

Date CourseCo-Ordinator Chairperson



BENGALURU CITY UNIVERSITY

CHOICE BASED CREDIT SYSTEM

(Semester Scheme with Multiple Entry and Exit Options for Under Graduate Course- as per NEP 2020)

Syllabus for Home Science
(III & IV Semester)

2022-23 onwards

Proceedings of the BOS in Home Science (UG& PG) for Bengaluru City University held on 16th September, 2022

A meeting of the BOS in Home Science (UG& PG) for Bengaluru City University held on 16th September, 2022 between 10:30 am to 5:30 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.

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

3. **Dr. Madhumathy S.,**
   Member
   Associate Professor & HOD,
   Department of Early Childhood Care and Administration,
   Smt. V.H.D Central Institute of Home Science,
   Seshadri Road, Bengaluru – 560 001

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

5. **Dr. Grace Premela Victor.,**
   Member
   Associate Professor & HOD,
   Bishop Cotton Women's Christian College,
   Field Marshal Kariyappa Road,
   Bengaluru – 560 025

Name and Designation

6. **Dr. Marie Kavitha Jayakaran.,**
   Member
   Associate Professor,
   Bishop Cotton Women's Christian College,
   Field Marshal Kariyappa Road,
   Bengaluru – 560 025

7. **Dr. Shanta 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 & HOD,
   Food and Nutrition,
   Mount Carmel College (Autonomous),
   No. 58, Palace Road,
   Bengaluru – 560 052

9. **Dr. Komala M**
   Member
   Professor,
   Department of Human Development,
   University of Mysore,
   ManasaGangothri, Mysuru – 570 006

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

- Bishop Cotton Women's Christian College – BA/BSc Home Science as one optional and ND course; and PG in Nutrition and Dietetics
- S B A N M College, Yelahanka - BSc CND

1. The Board reviewed the NEP Home Science UG syllabus of third and fourth semester, made the necessary minor changes in the syllabus and approved the same for the academic year 2022-2023 for all the courses

2. The board also reviewed M.Sc., Nutrition and Dietetics syllabus and made the necessary changes in the matrix and the blown up syllabus of III and IV semester and approved the same for academic year 2022-2023
3. The Board also constitutes the BOE (UG/PG) for approval by the BCU (Annexure-II).
4. The Board included panel of examiners from MCU, School of Home Science, Bishop Cotton Women's Christian College, Mount Carmel College 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.

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

Dr. Vijayalaxmi A.H.M.	**Dr. Madhumathy S.**	**Dr. Asha Jyothi U. H.**
Dr. Grace Premela Victor.	**Dr. Mary Kavitha Jayakiran.**	**Dr. Shanta Maria B. V.**
Dr. Sangeta Pandey.	Prof. Komala M.	

Dr. Usha Devi C,
Chairperson

Dr. USHA DEVI. C., M.Sc., PH.D., FISCA
Chairperson
BOS in Home Science (UG&PG)
Bangalore City University (BCU)
Central College Campus, Bangalore - 01

THE LIST OF THE MEMBERS OF THE BOARD OF STUDIES – FACULTY OF HOMESCIENCE

DR. USHA DEVI. C

DR.VIJAYLAXMI A.H.M

DR. MADHUMATHY. S

DR. SHANTHA MARIA B.V

DR.GRACE PRAMILA VICTOR

DR.ASHA JYOTHI U.H

DR.SANGEETHA PANDEY

DR. KOMALA . M

DR. MARIE KAVITHA JAYAKARAN

Contents

CURRICULAM

OF

BA/BSc HOMESCIENCE

3rd and 4th semester

MODEL

BENGALURU CITY UNIVERSITY

Sub-committee members of B. A/B.Sc. Home Science

1	Dr. Marie Kavitha
2	Dr. Vijaya U Patil
3	Dr. Manjula G. Kadapatti
4	Mrs. Veena Tirlapur
5	Mrs. Anita Bettaiah
6	Mrs. Shobha .S

Government of Karnataka

Curriculum

Program Name	**B.A/B.Sc. Honours**	Total Credits for the Program	**265 Credits**
Discipline Core	**Home Science**	Starting year of implementation	**2021-22**

Program Outcomes: At the end of the program the student should be able to:

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

PO1. Deliver quality tertiary education through learning whiledoing.

PO2. Reflect universal and domain-specific values in Home Science.

PO3. Involve, communicate, and engage keystakeholders.

PO4. Preach and practice change as acontinuum.

PO5. Develop the ability to address the complexities and interface among of self, societal and national priorities.

PO6. Generate multi-skilled leaders with a holistic perspective that cuts across disciplines.

PO7. Instill both generic and subject-specific skills to succeed in the employmentmarket.

PO8. Foster a genre of responsible students with a passion for lifelong learning andentrepreneurship.

PO9. Develop sensitivity, resourcefulness, and competence to render service to families, communities, and the nation atlarge.

PO10. Promote research, innovation, and design (product) development favouring all the disciplines in Home Science.

PO11. Enhance digital literacy and apply them to engage in real time problem solving and ideation related to all fields of Home Science.

PO12. Appreciate and benefit from the symbiotic relationship among the five core disciplines of Home Science – Resource Management, Food Science and Nutrition,

PO13.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	**40**	**60**
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 Name	Course Category	Theory / Practical	Credits	Paper Title	Marks	
						S. A	I.A
3.	HSCT3.1	DSC- A3	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	Fundamentals of Interior Decoration	60	40
4.	HSCT4.1	DSC- A4	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 (100 Credits)							

Note: In Semester 3 open elective has been changed from Income Generating skills to Fundamentals of Interior Decoration

Government of Karnataka

Curriculum

Program Name	**BA/BSc Home Science**		Semester	**Third Sem**
Course Title	**Early Childhood Care and Education (Theory)**			
Course No.	**HSCT3.1**	**DSC A-3**	No. of Credits	**4+2**
Contact hours	**52Hrs**		Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%.

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

1. Explain the importance of early childhood years and significance of intervention programs for early childhooddevelopment.
2. Describe the historical developments – global and Indian including the current programs and policies in ECCE
3. Identify various indigenous (Indian) models of Early Childhood Education and apply it to understand the current early childhood research, theoretical trends, andissues.
4. Analyze curriculum models and pedagogical approaches in early childhoodeducation.
5. Create developmentally appropriate programs for youngchildren.

Content	**52Hrs**
Unit–I Early Childhood Care and Education	**13 Hrs**
Chapter 1 Meaning, Importance and Need for ECCE, Objectives of ECCE.	2 Hrs
Chapter 2- Types of ECCE Programs – Day care, Montessori, Kindergarten, Balwadi, Anganwadi. Mobile Crèche and Play Group	4 Hrs
Chapter 3- Historical overview of Early Childhood Care and Education – Contributions of Western and Indian Educators- Gandhiji, Jijubai Modak, Montessori, Frobel, and John Dewey	5 Hrs
Chapter 4- Policies and Contributions of Agencies to ECCE in India	2 Hrs
Unit -II - Organizational Setup and Material Management	**13 Hrs**
Chapter5: Organizational Setup and Material Management–Place/Building/Space–indoor and outdoor, amenities and facilities for indoor and outdoor, garden, playground ,storage	5 Hrs

Chapter 6: Equipment and Materials required for Play and Learning – Selection and Care of equipment; Equipment needed for Urban and Rural preschools.	4 Hrs
Chapter 7: Curriculum models and Programme Planning – Meaning of curriculum, curriculum models, Programme planning – Principles, Types and Factors influencing Programme planning, Programme evaluation	4 Hrs
Unit -III	**13 Hrs**
Chapter8: ActivitiesforYoungchildreninECCE–Age/Developmentallyappropriateactivities, Art and creative activities, Music and Rhythmic Activities, Mathematic, Language and Communication activities; Nature and ScienceActivities.	5 Hrs
Chapter 9: 3 Rs – Reading readiness, writing readiness and readiness for arithmetic; Literature for Children; Indoor and outdoor Play activities – Role of teacher in planning and implementing the activities.	4 Hrs
Chapter 10: Parent Education and Involvement – Needs and Importance, Methods, Planning, Implementing and Evaluation of parent education program.	4 Hrs
Unit -IV	**13 Hrs**
Chapter 11: Personnel Management – Personnel required in ECCE centre – Selection and recruitment, qualities, roles, duties and responsibilities; Supervision and monitoring, Evaluation of personnel – Cooperation and Coordination of personnel	8Hrs
Chapter 12: Documentation and Financial Management – Importance and Principles of Record keeping, Types of records; Financial allocations and budgetary considerations, budget making and Resource generation avenues	5 Hrs

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

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1 Explain the importance of early childhood years and significance of intervention programs for earlychildhooddevelopment.		X		X	X						X	
2. Describe the historical developments –global and Indian including the current programs and policies in ECCE								X	X		X	
4. Analyze curriculum models and pedagogical approaches in early childhoodeducation.			X	X				X				
5 Create developmentally appropriate programs for young children.			X	X					X			

Pedagogy-Theory

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

Course Title	**Early Childhood Care and Education (Practical)**	Practical Credits	**2**
Course No.	**HSCP3.1**	Contact Hours	**52/13 sessions**
List of Experiments to be conducted			
Unit-I: Visit to Nursery School, Day Care/ Crèches, Anganwadi/ Balwadi – Observe the early childhood education programme and write a report			**4 Hrs**
Unit-II: Plan and prepare teaching aids for physical development, storytelling, creative activities, nature, and science activities			**15 Hrs**
Unit-III: a) Develop low cost and indigenous play materials for cognitivedevelopment b) Prepare a Scrap Book/picture book/ resource book fortoddlers			**6 Hrs**

Unit-IV: a) Plan any one theme based and one non-theme-based programs used in the ECE. b) Design a parent handbook/ brochure to provide information about an early childhood education centre or any topic related to early childhood education.	**5 Hrs**

Pedagogy-Practical:

Formative Assessment :25 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment / Project	5+5
Total	Exam 25 Marks + IA 25 Marks =50

	References	
	1	Agarwal, J. C. (2007). Early childhood care and education: principles and practices. New Delhi:Shipra
	2	Agarwal,S.P.andUsmani,M.(2000).Children'seducationinIndia:fromVedictimestotwentyfirst centuryNew Delhi:Shipra.
	3	OECD. (2004). Curricula and pedagogies in early childhood education and care. Retrieved from http://www.oecd.org/education/school/31672150.pd
	4	Burtonwood, N. (2002). Anthropology, Sociology and the Preparation of Teachers for a culturallyPlural Society. Pedagogy, Culture and Society. 10(3), 367-387.
	5	Clarke, P. (2001). Teaching &learning: the culture of pedagogy. New York: Sage
	6	Kress, J.S., Norris, J. A., Schoenholz, D. A., Elias, M.J., and Seigle, P. (Nov., 2004). Bringing TogetherEducationalStandardsandSocialandEmotionalLearning:MakingtheCaseforEducators. American Journal of Education, 111 (1), pp66-89
	7	Moyles, J. & Hargreaves, L. (1998). The primary curriculum. Learning from international perspectives. London: Routledge
8	National association for the education of young children, July 1998. Learning to read and Write: developmentally appropriate practices for young children. 53 (4), 30-46.	
9.	NCERT (2007). Handbook of arts in education	
10.	Neuman, S., Dwyer, J. &Koh, S. (2007). Child/Home Enguage and literacy observation. Baltimore:Brookes Publishing House.	

Date Signature of Committee Chairperson

Government of Karnataka

Curriculum

Program Name	**BSc Home Science**		Semester	**Third Sem**
Course Title	**Fundamentals of Interior Decoration (Theory)**			
Course No.	**HSCT3.2**	**OE-3**	No. of Credits	**3**
Contact hours	**45 Hrs**		Duration of SEA/Exam	**2Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

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. Appreciate growth and development of interior design and decoration inIndia 2. Enabling students distinguish between Interior decoration and Interiordesign 3. Analyze place of elements and principles in interiordesigning 4. Use of Accessories ininteriors	
Content	**45 Hrs**
Unit–I Interior Design vs. Interior Decoration	
1.1 Interior Design and Interior Decoration: concept and basicdifferences 1.2 Aims of Interior Design: Beauty, Expressiveness andFunctionalism 1.3 Interior decoration in India:History	5 Hrs
Unit -II - Fundamentals in Designing	
21 Design: Definition and classification, Structural and Decorative design – importance and requirements of good structural design. Classification of decorative design- naturalistic, conventional, geometric, andabstract. 22 Elements of Art- Line- meaning and definition, types; Shape and form; Texture – meaning and classification- tactile and visual textures; Light-types	15 Hrs
2.3 Colour –The Prang Colour System, Dimensions of Colour, Colour schemes (related, contrasting), consideration for the choice of colour in different rooms.	15 Hrs

2.4Principlesofdesign-Balance:meaninganddefinition,classification-Rhythm:meaningand definition, types - Emphasis– meaning and definition, types, and methods of achieving - Proportion: meaning and definition, - Harmony: meaning and definition, methods ofachieving.	
Unit -III Accessories in Interiors	
3.1 Accessories: Definition and importance Classification – functional, decorative andboth 3.2 Selection and placement ofaccessories 3.3 Types ofaccessories	10 Hrs

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

Course Outcomes (COs) / Program Outcomes (POs)	**Program Outcomes (POs)**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Know the elements of Art			X		X							
Understand the use of Light in interiors.				X	X							
Acquire skills to formulate colour schemes in interiors.							X	X				
Explore the principles of design							X		X			
Skills in arranging and placement of accessories.					X		X					

Pedagogy

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

References	
1	Gandotra, V., Shukul, M., and Jaiswal, N .(2010-11). Introduction to Interior Design & Decoration. New Delhi: Dominant Publishers and Distributors. (ISBN No.81-7888-295-7)
2	Goldstein., and Goldstein, V. (1967).Art in Everyday Life. New Delhi: Oxford and IBH PublishingCo.
3	Kasu, A.A (2005).Interior Design. Delhi: Ashish Book Centre
4	Mullick P,(2016) Text book of Home Science
5	Seetharaman, P., and Pannu, P.(2010). Interior Design and Decoration.NewDelhi : CBS Publishers& Distributors Pvt. Ltd(ISBN No. 81-239-1192-0).
6	Bhatt,P. (2011). Foundation of Art and Design. Mumbai: The Lakhani Book Depot.
7	Gandotra, V. ,Shukul, M., and Jaiswal, N .(201011). Introduction to Interior Design & Decoration

Date: Subject Committee Chairperson

Government of Karnataka

Curriculum

Program Name	**BSc Home Science**		Semester	**Fourth Sem**
Course Title	**Introduction to Textiles (Theory)**			
Course No.	**HSCT4.1**	**DSC A4**	No. of Credits	**4+2**
Contact hours	**52 Hrs**		Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%.	
Course Outcomes (COs): At the end of the course the student should be able to: 1. Understand the structure and production techniques of various natural and manmade fibers and their physicalproperties. 2. Understand the various conventional and non-conventional techniques of yarnspinning. 3. Demonstrate an understanding of various types of fabric formingmethods. 4. Gain understanding of quality parameters for fiber, yarn andfabrics. 5. To introduce the basic scientific concepts related to processing and production oftextiles.	
Content	**52Hrs**
Unit–I Textile, Yarn and Fabric Construction	**16 Hrs**
Chapter 1 Meaning, Importance and Scope of Textiles, Classification of Natural and Manmade fiber.	2 Hrs
Chapter 2-Properties of Cotton, Silk, Wool, Nylon, Polyester, Classification of Yarns, Yarn Twists and Counts. Manufacturing process of cotton ,silk and nylon.	8 Hrs
Chapter 3- Parts of a Basic Loom – Shuttle, Heddle, Reed, Warp beam & Cloth Beam Basic; Weaving operation – Shedding, Picking, Beating, taking in and Letting off	2 Hrs
Chapter4-BasicWeaves–PlainWeave,BasketWeave,Rib,Twill,Satin,Fancyweaves–Leno, Pile andJacquard.	4 Hrs
Unit -II – Finishing	**12 Hrs**
Chapter 5: Objectives, Classification Finishes - Aesthetic Finishes (Singeing, Bleaching, Mercerization, Tentering, Shrinking, Weighting, Calendaring, Sizing, Embossing and Napping).	7 Hrs

Chapter 6: Finishes for enhancing special character-Functional Finishes (Fireproof, Waterproof, proof, and Mildew proof	5 Hrs
Unit -III Care of Clothing	**6 Hrs**
Chapter 7: Laundering of Cotton, Silk and Wool and Storage	4 Hrs
Chapter 8: Dry Cleaning – Meaning, Methods and Advantages & Disadvantages.	2 Hrs
Unit -IV Processing of Fabric	**18 Hrs**
(a) DYEING **Chapter 9:** Introduction, Principles of dyeing, Methods of dyeing (fiber, yarn, fabric and garment)	5 Hrs
Chapter 10: Synthetic Dyes: (Direct, Azoic, Basic, Vat, Solubilized vat dyes, Sulphur, Acid, Mordant, Reactive and Disperse)	5 Hrs
Chapter 11: Natural Dyes: (Classification, their application and ecological concern)	4 Hrs
(b) PRINTING **Chapter 12:** Introduction to printing and Various methods of Printing-block, roller and screen.	4 Hrs

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

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Understand the structure and production techniques of various natural and manmade fibers and their physical properties.			X	X			X					
Understand the various conventional and non-conventional techniques of yarnspinning.				X				X				
Demonstrate an understanding of various types of fabric forming methods.	X			X				X				
Gain understanding of quality parameters for fiber, yarn, and fabrics.			X	X			X					
To introduce the basic scientific concepts related to processing and production of textiles.			X				X	X				

Pedagogy-Theory

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

Course Title	**Introduction to textiles (Practical)**		Practical Credits	**2**
Course No.	**HSCP4.1**	Contact hours	**52 hrs / 13 Sessions**	

List of Experiments to be conducted

1. Fiber IdentificationTest-

A) Visualtest.

B) Solubilitytest.

C) Burning testand

D) Microscopictest

(Cotton, Silk, Wool, Rayon, Polyester & Nylon fibers)

2. Yarn Identification- Single, Ply, Cord, elastic, Monofilament, Multifilament and SpunYarn

3. Identification of fiber, yarn, weave, print &dyeing-samples

4. Weaving- Making samples of thefollowing:

A) Plain- BasketRibbed.

B) Twill

C) Sateen Warp and WeftFace

5. Dyeing & Printing –Block/stencil/tie &dye/batik

6. Visit to spinning/weaving/dyeing/printingunit

Pedagogy-Practical:

Formative Assessment: 25 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Project	5/5
Total	Exam 25 Marks + IA 25 Marks =50

References	
1	Hollen and Saddler J (1995): Textiles latest Ed., Mac Millan and Co., New York.
2	Mullick P.,(2012), "Text Book of Home Science "Kalyani Publishers. New Delhi.
3	Potter and Cob man "Fiber to Fabric".
4	Dorothy Burhan "A Textile Terminology"
5	Hert K.P." Textiles fibers and their use", IBH Publishing co.
6	Durga.Deulkar "Household Textiles and Laundry" Bangaram L Sons Delhi.
7	Corbman. B. P (2001): Textile Fiber to Fabric, McGraw Hill, New York
8	Peter. R. Lord, (2003). Handbook of Yarn Production, Wood head Publishing Ltd, England.
9	Kothari, V. K, (2010). Progress in Textile Science, Vol I, II and III, IAFL Publications, New Delhi.
10	Seema Sekhri, (2011). Textbook of Fabric Science, Fundamentals to finishing, PHI Learning Private limited, New Delhi.

Date: Subject Committee Chairperson

Government of Karnataka

Curriculum

Program Name	**BSc Home Science**		Semester	**Fourth Sem**
Course Title	**FASHION DESIGNING (Theory)**			
Course No.	**HSCT4.2**	**OE-4**	No. of Credits	**3**
Contact hours	**45 Hrs**		Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

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. To obtain basic knowledge on Fashion and Fashionterminology 2. To acquire conceptual knowledge of elements and principles ofdesign. 3. To enable students to gain knowledge of design, textile design andfashion. 4. To understand the fashion design concept andprocess. 5. To obtain knowledge on fashiondesigners	
Content	**45 Hrs**
Unit–I- Introduction to Fashion	
1.1 Fashion – Definition, Classification,terminologies, 1.2 Fashion cycle, Factor influencing the fashiontrends, 1.3 Fashion psychology andforecasting	5 Hrs
Unit -II- Elements and Principles of Design	
2.1 Introduction to textile, Textileterminology 2.2 Textile fibres and their classification, physical and chemical properties offibres. 2.3 Elements of Design and colour– Definition, Types, Elements, Principles and its application in dressdesign. 2.4 Selection of suitable clothing and design, factors affecting selection of clothing,Clothing of different agegroups.	25 Hrs

Unit -III- Fashion Design	
3.1 Fashion illustration: - Definition, terminology, importance and theories, tools for fashion drawing, sketching principles, Basic human proportion of male andfemale. 3.2 Illustration for apparels using the themes- Casual, formal, ethnic, office wear, winter, summer, andspring 3.3 Fashion Designer – meaning, classification, Designers of National repute	15 Hrs

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

Course Outcomes (COs) / Program Outcomes (POs)	**Program Outcomes (POs)**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Know the Fashion terminology			X		X							
Understand the fashion cycle and factors influencing the fashion trends.				X	X							
Acquire skills in recognizing different fibres.							X	X				
Explore the principles and elements of Art and Design							X		X			
Skills in illustrating apparel using themes.					X		X					

Pedagogy

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

References	
1	Derrick, L. (2018) Fashion Sketchbook: Fashion Sketchbook with figure templates (Fashion Croquis), Create Space Independent Publishing Platform
2	Elaine, S. (2013) The Dynamics of Fashion. 4th Ed. New York: Bloomsbury publication.
3	Patrick, J. I. (2003) Introduction to Fashion Design, London: B.T. Batsford

References	
4	Sharon L. T. and Glazer, S.S. (2017), Illustrating Fashion, 4th Ed. New York: Fairchild Books. The Snap Fashion Sketch Book, Prentice Hall, NewJersey.
5	Stipelman, S. (2017) Illustrating Fashion, 4th Ed. New York: Fairchild Books.
6	Booth,J.E.(1996).PrinciplesofTextileTesting.NewDelhi:CBSPublishers&DistributorsPvt.Ltd.
7	Corbman, P.B. (1983). Textiles: Fibre to Fabric. McGraw-Hill Publishers.
8	Tyagi, A. (2016). Handbook of Fashion and Textile Design.New Delhi: Sonali publication
9	Wynne. A.,(1997).Textiles, The Motivate Series Mcmillain Education Ltd. ,London.

DATE **SIGNATUTRE OF COMMITTEE CHAIRPERSON**

CURRICULAM

OF

BSc -NUTRITION AND DIETETICS

3RD AND 4TH SEMESTER

BENGALURU CITY UNIVERSITY

Sub-committee members of B.Sc. Nutrition and Dietetics

1	Dr. Sangeeta Pandey
2	Dr. Geetha Santhosh
3	Dr. V. Padma
4	Dr Usha Devi C
5	Dr Asha G
6	Mrs Vidhya K

Government of Karnataka

Curriculum

Program Name	**B.Sc. Honours**	Total Credits for the Program	**226 Credits**
Discipline Core	**Nutrition and Dietetics**	Starting year of implementation	**2021-22**

Program Outcomes: At the end of the program the student should be able to:

PO1. 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 anddiseases

PO2. Communication Skills: Learn and apply evidence-based guidelines in the field of dietetics, nutrition counselling, nutrition research laboratory, community

PO3. Critical thinking: Understand the structure and functions of the different organs systems in relation to nutrition

PO4. 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.

PO5. Critical thinking, Communication and problem solving: Comprehend, communicate effectively, plan, design and implement programs in the field of nutrition and dietetics

PO6. Decision making, Analytical and Research skills: Understand and demonstrate the knowledge of food science, food science and quality control in societal and environmental contexts

PO7. Moral and ethical awareness/reasoning and Research skills: Apply ethical principles and commit to professionalethicsandresponsibilitiesinthefieldofnutrition,sports,foodindustryandhealthcare sectors.

PO8. 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

PO9. Analytical and Research skills: Comprehend the knowledge and role of food additives in food industry in relation to its analytical techniques

PO10. Critical thinking, Analysis and Research skills: Understand and apply the concept of nutrients and nutritional science in the evaluation of health and disease

PO11. 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	**30**	**70**
Experiential Learning (Internships etc.)	**30**	**70**

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

Model II A

Semester	Course Name	Course Category	Theory / Practical	Credits	Paper Title	Marks	
						S. A	I.A
III	NDT3.1	DSC- 3	Theory	4	Nutrition through life span	60	40
	NDP3.1		Practical	2	Nutrition through life span	25	25
	NDT3.2	OE-3	Theory	3	Nutritional Assessment/ Traditional Foods and Health	60	40
IV	NDT4.1	DSC- 4	Theory	4	Human Physiology	60	40
	NDP4.1		Practical	2	Human Physiology	25	25
	NDT4.2	OE-4	Theory	3	Nutrition in weight management/ Diet in lifestyle disorder	60	40
Exit Option with Diploma in Nutrition and Dietetics (100 Credits)							

Note: The Discipline core paper of 4th semester has been changed to Human Physiology

Government of Karnataka

Curriculum

Program Name	**BSc Nutrition and Dietetics**		Semester	**Third Sem**
Course Title	**Nutrition through life span (Theory)**			
Course No.	**NDT3.1**	**DSC 3**	No. of Credits	**4+2**
Contact hours	**56 Hrs**		Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

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

1. Gains knowledge and learn to apply the latest in research-based nutrient needs of different lifestages.
2. Relate nutrient needs to developmental stages and plan diets which will adequately meet nutritional requirements.
3. Relate the role of changing metabolism, risk of chronic diseases and impact of functional foods in effectively planning diets foradults.
4. Gains competence on meeting nutrition needs and establishing dietary patterns to promote optimum health and reducing the impact of chronicdiseases.

Content	**56 Hrs**
Unit–I Nutrition during Pregnancy and Lactation	
Pregnancy: Physiological stages of pregnancy b) Effect of Nutritional status on Pregnancy outcome c) Nutritional Requirements d) Guide for eating during pregnancy)Complications of pregnancy and their dietary Implications. **Lactation**: Physiology b) Nutritional Requirements, breast feeding an infant	14 Hrs

utrition during Infancy and Toddlers

a) PhysiologicalDevelopment b) NutritionalRequirements c) Milk for Infants-Composition of human and cow's milk,formulas d) Complimentary foods-weaning pattern, composition, general principles in feeding infants, special feedingproblems **HighRiskInfant**:Assessmentofnutritionalstatus,Nutritionriskfactors,Nutrientneedsofhigh- risk infants, Feeding the high-risk infant. Growth and developmental outcome Nutritional requirements of Toddlers (1-3years)	14 Hrs
Unit -III Nutrition in Childhood and Adolescence	
Nutrition In Childhood Pre-School and School going:a) Growth and Development, b) Nutritional Requirement's, c) Factors influencing food intake, d) NutritionalConcerns. **Adolescence**: a) Growth and Development-Physiologic changes, b) Nutritional Requirements, c) Situations with special needs.	14 Hrs
Unit -IV Nutrition for the Adults and the Elderly	
Nutrition in adults: a) nutrient needs modifications for different activity levels and different income groups. **Nutrient requirements during old Age**: a) Process of Aging, b) Nutrient Requirements, Nutrition Related problems of old Age, Nutrition and Bone health in brief, c) Degenerative diseases, d) Drug-Food and nutrient Reaction.	14 Hrs

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

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
Gainsknowledgeandlearntoapplythelatestinresearch-based nutrient needs of different lifestages.		X										
Relate nutrient needs to developmental stages and plan diets which will adequately meet nutritional requirements.	X											
Relate the role of changing metabolism, risk of chronic diseases and impact of functional foods in effectively planning diets for adults				X								
Gains competence on meeting nutrition needs and establishing dietary patterns to promote optimum health and reducing the impact of chronic diseases.					X					X		

Pedagogy- Lecture, Group discussion, Demonstrations, Hands on training skills

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Project	5+5
Project	10
Total	40 Marks

Course Title	**Nutrition through life span (Practical)**	Practical Credits	**2**
Course No.	**NDP3.1**	Contact hours	**4 Hrs/Week**

List of Experiments to be conducted

1. Planning a day's diet for Pregnant Woman Sedentary, moderate and heavyworker
2. Preparing Complimentary Feeds for Infants-weaning foods (6, 8 month)
   OR
   Preparing Complimentary Feeds for Infants-weaning foods (10, 12 month).
3. Planning and preparation of a day's diet for a pre school going child with special emphasis on Packed Lunches (4-6 yrs)
4. Planning and preparation of a day's diet for a school going child with special emphasis on Packed Lunches (7-9yrs.).
5. Planning and preparation of a day's diet for an adolescent girl (13-15yrs and 16-17yrs).
   OR
   Planning and preparation of a day's diet for an adolescent boy (13-15yrs and 16-17yrs)
6. Planning and preparation of a day's diet for an adult man (sedentary/moderate/ heavyworker)
7. Planning and preparation of a day's diet for an adult woman (sedentary/moderate/ heavyworker)
8. Planning and preparing recipes for a senior citizen:Breakfast/Lunch.
   OR
   Planning and preparing recipes for a senior citizen:Snacks/Dinner

Pedagogy- Lecture, Group discussion, Demonstrations

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	05
Test 2	05
Practical record	10
Participation & Involvement	05
Total	25 Marks

References	
1	Antia, F.P. (2005): Clinical Nutrition and Dietetics, Oxford University Press, Delhi
2	Gordon M Ward law (1999) Perspectives in Nutrition 4th ed.WCB/Mcgraw Hill. International edition.
3	Mahan,L.K.,Arlin,M.T.(2000):Krause'sFood,NutritionandDiettherapy,11th edition, W.B.Saunders Company,London.
4	Passmore, R and Davidson S (1986) Human Nutrition and Dietetics.Living stone Publishers.
5	Robinson,C.H;Lawler,M.R.Chenoweth,W.L;and Garwick,A.E(1986):Normal and Therapeutic Nutrition,17th Ed., Mac Millan PublishingCo
6	Shil's M E, Alfon J A, Shike M (1994) Modern Nutrition In health and Diseases 8th ed.
7	Shubhangini A Joshi (2002): Nutrition and Dietetics2nd edition, Tata Mc Graw-Hill Publishing Company Limited, New Delhi.
8	Srilakshmi,B.(2005):Dietetics,5th edition, New Age International(P) Limited Publishers, New Delhi
9	Vincent Hegarty© (1988, Decissions in Nutrition.Times Mirror/Mosby College Publishing, St.Louis.
10	Williams's (1989): Nutrition and diet Therapy.6th edition. Times Mirror/Mosby College Publishing, St.Louis.
11	Mary Kay Mitchell (2015) Nutrition Across the Life span. Scientific International Pvt ltd,New Delhi

Date: Subject Committee Chairperson

Government of Karnataka

Curriculum

Program Name	**BSc Nutrition and Dietetics**		Semester	**Third Sem**
Course Title	**Traditional Foods & Health (OPEN ELECTIVE) – (Theory)**			
Course No.	**NDT3.2**	**OE 3**	No. of Credits	**3**
Contact hours	**45 Hrs**		Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

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

1. Developing a sound knowledge on diversities of foods in India with focus on traditionalfoods.
2. Develop an understanding of historical and traditional perspective of foods and foodhabits

Content	**45 Hrs**
Unit–I Introduction to Traditional foods	
Definition of Traditional foods, food as religious and cultural symbols; importance of food in understanding human culture - variability, diversity. Indian traditional foods and cuisine: History and evolution Specialty ingredients in regional cuisines – herbs, extract, spices, masala powders and cooking oils of different regions Geographical Indication (GI) tag for traditional foods Health Aspects of Traditional Foods: Comparisonoftraditionalfoodswithtypicalfastfoods/junkfoods–cost,foodsafety,nutritional facts and benefits; traditional foods used for specific ailments /illnesses, emotionalbenefits.	15 Hrs
Unit -II - Traditional Food Patterns	
Typical breakfast, meal and snack foods of different regions of India. Regional foods that have gone Pan Indian / Global. Popular regional foods; Traditional fermented foods, pickles and preserves, beverages, snacks, desserts and sweets, street foods. Regional cuisines of India- Traditional foods of south Indian, north Indian, west Indian, and east Indian cuisine. Traditional processing methods: sun drying, osmotic drying, brining, pickling, and smoking Adding yoghurt, browning of onions, preparation of curry base, cooking spice paste, natural colorings, dry roasting, spices in oil, ground spices, tempering	15 Hrs

Unit -III Commercial production of Traditional foods	
Processing and manufacture of traditional foods- paneer, butter and ghee manufacture Commercialproductionoftraditionalbreads,snacks,ready-to-eatfoodsandinstantmixes,frozen foods Commercial production and packaging of traditional beverages such as tender coconut water, neera, lassi, buttermilk, dahi. Commercialproductionofintermediatefoods–gingerandgarlicpastes,tamarindpastes,masalas (spice mixes), idli and dosabatters.	15 Hrs

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

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
Developing a sound knowledge on diversities of foods in India with focus on traditional foods	X											
Develop an understanding of historical and traditional perspective of foods and food habits	X											

Pedagogy- Lecture, Group discussion, Demonstrations

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	40 Marks

References	
1	Sen, Colleen Taylor Food Culture in India Greenwood Press, 2005.
2	Davidar, Ruth N. Indian Food Science: A Health and Nutrition Guide to Traditional Recipes: East West Books, 2001
3	WyaneGisslen. Professional Cooking. John Wiley& Sons, New Jersey. 2015. 8th edn
4	Jagmohan Negi. Fundamentals of Culinary Art. S. Chand and Company Pvt. Ltd., New Delhi. 2013.3

5	JagmohanNegi.FoodPresentationTechniques(GarnishingandDecoration).S.ChandandCompany Pvt. Ltd., New Delhi. 2013.4.
6	Eva Medved. Food Preparation and Theory. Prentice-Hall Inc., Englewood Cliffd, New Jersey.1986.
7	Al-Khusaibi, M., Al-Habsi, N., & Rahman, M. S. (Eds.). (2019). Traditional Foods: History, Preparation, Processing and Safety. Springer Nature.
8	Kristbergsson, K., & Oliveira, J. (2016). Traditional Foods: General and Consumer Aspects (Integrating Food Science and Engineering Knowledge Into the Food Chain, 10)(2016 ed.).
9	Galanakis, C. M. (Ed.). (2019). Innovations in traditional foods. Woodhead Publishing.

Date Signature of Chairperson

Government of Karnataka

Curriculum

Program Name	**BSc Nutrition and Dietetics**		Semester	**Fourth Sem**
Course Title	**Human Physiology (Theory)**			
Course No.	**NDT4.1**	**DSC 4**	No. of Credits	**4+2**
Contact hours	**56 Hrs**		Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Objectives

1. To understand the structure and functions of different organsystems
2. To learn about fundamental concepts in pathogenesis of diseases – inflammation
3. To learn measurement and estimation methods for various physiologicalcomponents
4. To build a strong foundation of human physiology which is critical in understanding of nutritional science

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

CO1: Gain knowledge about the cellular components, the role of blood and its components

CO2: Learn about the functions and components of the lymphatic and immune system

CO3: Gather in-depth the physiology of the cardiovascular, nervous, musculoskeletal, respiratory, digestive, reproductive, and endocrine systems

CO4: Understand the concepts involved in pathogenesis of diseases – inflammation

Content	**56 Hrs**
Unit–I Blood, Lymphatic, and Immune System	
Cell structure and function, cell membrane composition, fluid mosaic model, membrane proteins. Blood: Components of blood, functions of plasma proteins, erythropoiesis, coagulation cascade Lymphatic system and spleen Immune system: Innate, acquired, cell mediated and humoral immunity. Role of T and B cells, leukocytes, granulocytes, monocytes, macrophage. Inflammation, pro- and anti-inflammatory cytokines.	12 Hrs

Unit -II - Cardiovascular and Respiratory System	
Heart – cardiac muscle, cardiac cycle, heart rate and regulation, blood pressure-regulation and physiological variations. Respiratory system – Organs and functions, internal and external respiration, regulation, principles of gas exchange. Transport of oxygen and carbon Dioxide. Role of Hb as a buffer system. Cardio-respiratory response to exercise and effects of training.	15 Hrs
Unit -III Gastrointestinal and Renal System	
Digestive system – Organs, structure, layers of GIT, enteric nervous system, role of hormones in gut motility, mechanical and chemical digestion, secretory and absorptive function. Liver – structure, functions, gall bladder. Pancreas – structure, exocrine functions. Renal system – Structure and functions. Regulation of GFR, renal blood flow. Urine formation and regulation, water, electrolyte, and acid base balance	14 Hrs
Unit -IV Musculoskeletal, Nervous, Endocrine and Reproductive System	
Musculoskeletal system – Structure and function of bone, cartilage, and connective tissue; Types of muscles-structure and function. Exercise physiology. Nervous system – Review of structure and function of neuron, conduction of nerve impulse, synapse, organization of CNS. Structure and function of brain and Spinal cord, CSF. Hypothalamus –appetite and sleep regulation. Endocrine system – Functions and regulation of hormone of pituitary, thyroid, adrenal, parathyroid, pancreas (endocrine). Disorders of endocrine glands. Roleofadiposetissueasanendocrineorgan.Reproductivesystem:Maleandfemalereproductive systems – functions. Menstrual cycle	15 Hrs

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

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)										
	1	2	3	4	5	6	7	8	9	10	11
Gain knowledge about the cellular components and role of blood and its components			X								
Learn about the functions and components of the lymphatic an			X								
Gather in depth the physiology of the cardiovascular, nervous, musculoskeletal, respiratory, digestive, reproductive, and endocrine systems			X								
Understand the concepts involved in pathogenesis of diseases – inflammation			X								

Pedagogy-

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	40 Marks

Course Title	**Human Physiology (Practical)**	Practical Credits	**2**
Course No.	**NDP4.1**	Contact hours	**4 Hrs/Week**

List of Experiments to be conducted

1. Microscopic examination of Basic tissues.
2. Estimation ofhaemoglobin -Sahli's Method
3. Interpretation of RBCindices -blood group, RBC count demo
4. Measurement of blood pressure and heartrate and pulse at rest and after exercise.
5. Measurement of respiratory function – spirometer, oxygen saturation (pulseoximeter)
6. Measurement of muscle strength using hand grip dynamometer
7. Body composition measurement for muscle mass (using BIA) and fat mass (using BIA and skinfold callipers)

Pedagogy- Lecture, Group discussion, Presentation and Assignments

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	05
Test 2	05
Practical record	10
Participation & Involvement	05
Total	25 Marks

References	
1	Hall, J. E., Guyton, A. C. (2010). Guyton and Hall Textbook of Medical Physiology E-Book. United Kingdom: Elsevier Health Sciences.
2	Waugh,A.,Grant,A.,Grant,A.W.,Chambers,G.(2006).RossandWilsonAnatomyandPhysiology in Health and Illness. United Kingdom: ChurchillLivingstone.
3	McArdle, W. D., Katch, F. I., Katch, V. L. (2010). Exercise Physiology: Nutrition, Energy, and Human Performance. United Kingdom: Lippincott Williams & Wilkins.
4	Ganong, W. F. (2005). Review of Medical Physiology. United Kingdom: McGraw-Hill Education.
5	Tortora,G.J.,Derrickson,B.(2017).Tortora'sPrinciplesofAnatomyandPhysiology.UnitedStates: Wiley.

Date: Subject Committee Chairperson

Government of Karnataka

Curriculum

Program Name	**BSc Nutrition and Dietetics**		Semester	**Fourth Sem**
Course Title	**Nutrition in weight management– (Theory)**			**(OPEN ELECTIVE)**
Course No.	**NDT4.2**	**OE 4**	No. of Credits	**3**
Contact hours	**45 Hrs**		Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

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

1. Gain knowledge about issues regarding body weight and their implication onhealth.
2. Familiarize with popular fad diets and related health concerns.
3. Understand the macronutrient and micronutrient guidelines for weightmanagement.
4. Comprehend the dietary requirements to support exercise for weightmanagement.

Content	**45 Hrs**
Unit–I Understanding Body Weight	
Body weight components – water, fat, muscle, bone mass Assessment - ideal body weight, BMI, classification of BMI for Asians, waist circumference, hip circumference Undernutrition – definition, causes, consequences Overnutrition – obesity, causes, consequences	12 Hrs
Unit -II - Macronutrients, Micronutrients and Functional Foods for Weight Management	
Fad diets – concept, overview of the popular diets, impact on health Macronutrients – role and recommendations for weight management: Carbohydrates – simple and complex, sources Dietary fibre – soluble and insoluble, sources Protein – protein quality – high biological value Fats – SFA, MUFA, PUFA, sources Common nutrient deficiencies – calcium, iron, it D, folic acid, B12 Sources and role of antioxidants in weight management Functional foods – probiotics, prebiotics for gut health and weight issues	18 Hrs

Unit -III Diet and Physical Activity for Weight Management	
Aerobic and resistance exercise Recommendations for physical activity/exercise Exercises for fat loss and muscle gain Role of diet in physical activity and weight management Health benefits of exercise	15 Hrs

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

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
Gain knowledge about issues regarding body weight and their implication on health.	X											
Familiarize with popular fad diets and related health concerns.	X	X										
Understand the macronutrient and micronutrient guidelines for weightmanagement.	X	X										
Comprehend the dietary requirements to support exercise for weight management.	X	X										

Pedagogy- Lecture, Group discussion, Demonstrations

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	40 Marks

References	
1	Nix S (2009) William's Basic Nutrition & Diet Therapy, 13th edition, Missouri: Mosby
2	AgarwalAandUdipiSA(2014)TextbookofHumanNutrition.NewDelhi:JaypeeBrothersMedical Publishers.
3	B. Srilakshmi, V. Suganthi, C Kalaivani Ashok. (2016). Exercise Physiology, Fitness and Sports Nutrition. New Delhi: New Age International Publishers.

Date: Subject Committee Chairperson

Curriculum of

B.Sc

in

Clinical Nutrition and Dietetics

3rd and 4th Semester

(Model I C)

BENGALURU CITY UNIVERSIY

Sub-committee members of B.Sc. Clinical Nutrition and Dietetics

1	Dr. M. Anuradha
2	Dr. Usha Devi. C
3	Dr Navaneetha.R
4	Dr Neetha Pattan
5	Dr Bhavana S
6	Dr. Shilpa P

Government of Karnataka

Curriculum

Program Name	**B.Sc. Honours**	Total Credits for the Program	**224 Credits**
Discipline Core	**Clinical Nutrition and Dietetics**	Starting year of implementation	**2021-22**

Program Outcomes: At the end of the program the student should be able to:

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 analyse 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 counselling 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 lifecycle suchaschildhood,adolescenceandoldageandassessandevaluatetheirdietaryandexercisehabits.

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 counselling.

PO15.Practiceandimplementstateofartnutritioncareorconsultancyinhealthfoodindustry,criticalcare nutrition segments, clinical setups, nutraceutical industry, sports and fitness centers, therapeutic nutrition product manufacturing set ups, geriatric care units, meal/food distribution centers, women andchilddevelopmentorganizations,Foodauditingsetups,FoodtestinglabsandFoodcorporations.

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.)	**40**	**60**

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

Model I C

Semester	Course Name	Course Category	Theory / Practical	Credits	Paper Title	Marks	
						S. A	I.A
III	CNDT 3.1	DSC- 7	Theory	3	Life Cycle Nutrition	60	40
	CNDP 3.1		Practical	2	Life Cycle Nutrition	25	25
	CNDT 3.2	DSC- 8	Theory	3	Dietetics I	60	40
	CNDP 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	Traditional Foods and Health	60	40
IV	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	60	40
Exit Option with Diploma in Clinical Nutrition and Dietetics (100 Credits)							

Government of Karnataka

Curriculum

Program Name	**BSc Clinical Nutrition and Dietetics**		Semester	**Third Sem**
Course Title	**Life Span Nutrition (Theory)**			
Course No.	**CNDT3.1**	**DSC 7**	No. of Credits	**3+2**
Contact hours	**45 Hrs**		Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

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

1. To understand the nutrition requirements of different agegroups
2. To understand the guidelines of dietrequirements
3. To determine nutrient requirements/needs of individuals at different stages oflife
4. To discuss the major nutrition related concerns at each stage oflife

Content	**45 Hrs**
Unit–I Nutrition in pregnancy and lactation	
Pregnancy: Physiologic changes during pregnancy, nutritional requirements and dietary guidelines, gestational weight gain, dietary problems, complications during pregnancy, adolescent pregnancy, pre - conceptional nutrition. Lactation: Physiology of lactation, composition of breast milk, importance of breast feeding, advantages and disadvantages of breast feeding, factors affecting breast feeding, lactogogues, nutritional requirement and dietary guidelines,	15 Hrs
Unit -II - Nutrition- pediatrics	
Infancy: Nutritional requirements and dietary guidelines, Growth and development, Types of feeding – breast feeding, formula feeding, complementary feeding, failure to thrive in infants. Pre-school and school age: Nutritional requirements and dietary guidelines, Importance of breakfast and packed lunch, factors influencing food intake, nutritional problems.	15 Hrs
Unit -III Nutrition in adolescents, adult, and geriatrics	
Adolescents: Physiological changes during puberty, nutritional requirements, and dietary guidelines, eating disorders,	15 Hrs

Adults: Nutritional requirements and dietary guidelines, importance of weight management. Geriatrics:Physiologicalchangesduringoldage,Nutritionalrequirementsanddietaryguidelines, nutritional problems	

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
To understand the nutrition requirements of different age groups			✓				✓								
To understand the guidelines of diet requirements							✓					✓			
To determine nutrient requirements/needs of individuals at different stages oflife							✓				✓				
To discuss the major nutrition related concerns at each stage of life		✓			✓				✓						

Pedagogy- Lecture, Group discussion, Demonstrations, Hands on training skills

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	40 Marks

Course Title	**Life Span Nutrition (Practical)**	Practical Credits	**2**
Course No.	**CNDP3.1**		
Plan, prepare and evaluate			
1. A day's diet for pregnantwomen. 2. A day's diet for lactatingwomen. 3. Complimentary foods suitable forinfants. 4. Packed lunch for schoolchildren. 5. Nutrient dense recipes foradolescents.			
6. A day's diet for adultman 7. A day's diet for adultwoman 8. Suitable recipes forgeriatrics. 9. Nutrient rich breakfastrecipes 10. Healthysnacks			

Pedagogy- Lecture, Group discussion, Demonstrations

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	05
Test 2	05
Participation & Involvement	10
Records	05
Total	Exam 25 Marks + 25 Marks = 50 Marks

References	
1	Chadha R and Mathur P, Nutrition: A life cycle Approach. Orient Blackswan New Delhi, 2015.
2	SethVandSinghKN,DietPlanningthroughlifecycle:Part1NormalNutrition.APracticalManual, Elite Publishing House Pvt.Ltd. New Delhi,2006.
3	SrilakshmiB(2014) Dietetics, 4th and 7th edition, New Age International Publications, New Delhi.
4	Shubhangini A Joshi (2011) Nutrition and Dietetics, with Indian case Studies, 3rd edition, Tata McGraw Hill Publication, New Delhi
5	Mahan,L.K&Ecott-Stump,S(2000):Krause'sFood,NutritionandDietTherapy,12thEdition,W.B SaundersLtd
6	Bamji, M.S, Reddy, V. (1998), Text Book of Human Nutrition, Oxford & IBH Publishing Co, New Delhi.
7	Gibney M.J, Elia M Ljingquist. O (2005), Clinical Nutrition, Backwell Science Publishing Co.

References	
8	Robinson C.H and Winely E.S, (1984). Basic Nutrition and Diet Therapy, Macmillian Pub. Co. New York.
9	Swaminathan, M. (2002) Food and Nutrition, Volume I, The Bangalore Printing and Publishing Company Ltd.
10	Guthrie, H.A &Picciano, M.F (1995), Morby Publishing Co, New York.
11	Srilakshmi, B. (2005). Dietetics, New Age International Publishers, New Delhi

Date: Subject Committee Chairperson

Government of Karnataka

Curriculum

Program Name	**BSc Clinical Nutrition and Dietetics**		Semester	**Third Sem**
Course Title	**DIETETICS I (Theory)**			
Course No.	**CNDT3.2**	**DSC 8**	No. of Credits	**3+2**
Contact hours	**45 Hrs**		Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

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

1. Understand the concept of nutrient modifications in therapeuticdiets.
2. Understand the principles of diet and nutrition in infections andfever
3. Learn dietary requirements in therapeuticconditions
4. Understand the concept and importance of Weightmanagement

Content	**45 Hrs**
Unit–I Introduction to Dietetics	
The dietician: responsibilities, code of ethics, Definition and Objectives of diet therapy, medical nutrition therapy. Factors to be considered in planning therapeutic diets. Routine hospital diets – NPO, Liquid Diets- Clear Liquid Diet, Full Liquid Diet, Soft diet Special feeding methods (Enteral and Parenteral)	10 Hrs
Unit -II - Nutrition in Febrile Conditions	
Causes and nutritional management in; a) Infection- Host defence mechanisms, causes, types, Metabolic changes during infection, nutritionalmanagement b) Fever - types of fevers [long term (typhoid, TB, malaria) and short term (covid, dengue, chikungunya), metabolic changes duringfevers.	15 Hrs

Unit -III Nutrition for Weight Management	
Body weight components, Assessment: BMI, WHR, Energy imbalance: underweight, overweight, obesity	20 Hrs
Obesity - classification, theories, etiology, risk factors, nutritional management and dietary modifications, Role of hormones in control of appetite and weight management–action of leptin, ghrelin, insulin, estrogen, neural and hormonal count, other types of peptide hormones. Underweight- classification, etiology, risk factors, nutritional management and dietary modifications,	

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	**Program Outcomes (POs)**														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Understand the concept of nutrient modifications in therapeutic diets.			✓				✓								
Understand the principles of diet and nutrition in infections and fever	✓						✓								
Learn dietary requirements in therapeutic conditions							✓				✓				
Understand the concept and importance of Weight management								✓				✓			

Pedagogy- Lecture, Group discussion, Demonstrations, Hands on training skills

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	40 Marks

Course Title	**DIETETICS –I (Practical)**	Practical Credits	**2**
Course No.	**CNDP3.2**		
Plan, prepare and evaluate			
1. Routine hospital diets a. Clear fluid, b. Full fluid, c. Soft diet, d. Bland diet e. Blenderiseddiet			
2. A day's diet fortyphoid 3. A day's diet forTuberculosis 4. High calorie and high protein recipes for febrileconditions 5. Therapeutic recipes (micronutrient rich) forinfections 6. A day's low-calorie diet for obeseperson. 7. A day's high calorie diet for underweightperson.			

Pedagogy- Lecture, Group discussion, Demonstrations Hands on training skills

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	05
Test 2	05
Participation & Involvement	10
Records	05
Total	25 Marks + 25 Marks = 50 Marks

References	
1	Modern Nutrition in Health and Disease 10th edition by Maurice E. Shils
2	Alfred H.Katz, Prevention and health, the Haworth, Press, New York 1999.
3	Nutritional biochemistry of vitamins. David a bendor.
4	Achayya, K.T.:(1998) A Historical Dictionary of Indian Foods, Oxford Publishing Co.
5	Mahindru, S.N. (2002). Food Additives Characteristics, Detection andEstimation,Tata McGraw-Hill Publishing Co. Ltd. NewDelhi.
6	Research Methodology By C.R Kothari
7	International Life Sciences Institute Present Knowledge in Nutrition – latest edition.
8	Krause's food and nutrition care process,14th edition
9	Mahan,LK&Escott-Stump,(2000),Krause's food nutrition and diet therapy,12th edition
10	Sareen S,(2005)Advanced nutrition in human metabolism,4thedition,USA,IAPEN, BAPEN website
11	Williams, S.R. (1993): Nutrition and Diet Therapy, 7th Edition, Times Mirror/Mosby College Publishing.
12	Davis, J. and Sherer, K. (1994): Applied Nutrition and Diet Therapy for Nurses, 2nd Edition, W.B. Saunders Co.

Government of Karnataka

Curriculum

Program Name	**BSc Clinical Nutrition and Dietetics**		Semester	**Third Sem**
Course Title	**Nutritional Biochemistry (Theory)**			
Course No.	**CNDT3.3**	**DSC 9**	No. of Credits	**3**
Contact hours	**45 Hrs**		Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

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

1. Understand the basics of Biomolecules – Macronutrients and micronutrients
2. Role of biomolecules as nutrients and their requirement for physiologicalfunctions
3. Learn the biochemical mechanisms of nutrition andmetabolism.
4. Understand the mechanism and carbohydrate metabolism and inter relationship betweenmetabolic pathways

Content	**45 Hrs**
Unit–I Macronutrients	
Carbohydrates: Classification, Caloric value, Recommended daily allowances, Dietary sources, Functions, Digestion, absorption and storage, metabolism of carbohydrates, Malnutrition: Deficiencies and Overconsumption Protein: Classification, Caloric value, Recommended daily allowances, Dietary sources, Functions, Digestion, absorption and storage, metabolism of carbohydrates, Malnutrition: Deficiencies and Overconsumption Fat: Classification, Caloric value, Recommended daily allowances, Dietary sources. Functions, Digestion,absorptionandstorage,metabolism,Malnutrition:DeficienciesandOverconsumption	15 Hrs
Unit -II - Fat soluble vitamins and Water-soluble vitamins	

Classification, Recommended daily allowances, Dietary sources, Functions, Absorption, synthesis, metabolism storage & excretion, Deficiencies, Hypervitaminosis Water and electrolytes: Daily requirements, regulation of water metabolism, distribution ofbody water, Maintenance of fluid & electrolyte balance, Over hydration, dehydration and water intoxication, Electrolyteimbalances.	15 Hrs
Macro and micro minerals:Classification, Recommended daily allowances, Dietary sources ,Functions , Absorption, synthesis, metabolism storage & excretion , Deficiencies , Over consumption and toxicity	
Unit -III Carbohydrates Metabolism	
Introduction to metabolism, Metabolism of glucose (glycolysis), fructose and galactose; Metabolism of pyruvate and lactate; Metabolism of acetyl CoA (TCA cycle); energetic of glucose metabolism, Synthesis of ribose (HMP Shunt); Synthesis of glucose from noncarbohydrates (gluconeogenesis); Metabolism of Glycogen- Glycogenesis and Glycogenolysis,	15 Hrs

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Understand the basics of Biomolecules – Macronutrients andmicronutrients		✓													
Role of biomolecules as nutrients and their requirement for physiological functions		✓	✓												
Learn the biochemical mechanisms of nutrition and metabolism.			✓												
Understand the mechanism and carbohydrate metabolism and inter relationship between metabolic pathways			✓												

Pedagogy- Lecture, Group discussion, Demonstrations, Hands on training skills

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	40 Marks

References	
1	Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2000): 25th Ed. Harpers Biochemistry. Macmillan Worth Publishers.
2	Nelson, D.L. and Cox, M.M. (2000): 3rd Ed. Lehninger's Principles of Biochemistry, Macmillan Worth Publishers.
3	Devlin, T.M. (1997): 4th Ed. Text book of Biochemistry with Clinical Correlations, Wiley LissInc
4	Stryer, L. (1998): 4th Ed. Biochemistry, WH Freeman and Co.
5	Conn,E.E.,Stumpf,P.K.,Bruening,G.andDoi,R.H.(2001):5thEd.OutlinesofBiochemistry,John Wiley andSons.
6	Voet, D. Voet, J.G. and Pratt, C.W. (1999). Fundamentals of Biochemistry.
7	Tietz, N.W. (1976) Fundamentals of Clinical Chemistry. WB Saunders Co.
8	King, E.J. and Wootton, I.D.P. (1956). 3rd ed. Micro-Analysis in Medical Biochemistry. J and A Churchill Ltd.
9	Plummer, D.T. (1987). 3rd ed. An Introduction to Practical Biochemistry. McGraw-Hill Book Co.

Date: Subject Committee Chairperson

Government of Karnataka

Curriculum

Program Name	**BSc Clinical Nutrition and Dietetics**		Semester	**Third Sem**
Course Title	**Traditional Foods and Health (Theory)**			
Course No.	**CNDT3.4**	**OE -3**	No. of Credits	**3**
Contact hours	**45 Hrs**		Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

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

1. Understand the basics of Biomolecules – Macronutrients and micronutrients
2. Role of biomolecules as nutrients and their requirement for physiologicalfunctions
3. Learn the biochemical mechanisms of nutrition andmetabolism.
4. Understand the mechanism and carbohydrate metabolism and inter relationship betweenmetabolic pathways

Content	**45 Hrs**
Unit–I Introduction to Traditional foods	
Definition of Traditional foods, food as religious and cultural symbols; importance of food in understanding human culture - variability, diversity. Indian traditional foods and cuisine: History and evolution Specialty ingredients in regional cuisines – herbs, extract, spices, masala powders and cooking oils of different regions Geographical Indication (GI) tag for traditional foods **Health Aspects of Traditional Foods**: Comparison of traditional foods with typical fast foods / junk foods – cost, food safety, nutritional facts, and benefits; traditional foods used for specific ailments /illnesses, emotional benefits.	15 Hrs
Unit -II - Traditional Food Patterns	
Typical breakfast, meal, and snack foods of different regions of India. Regional foods that have gone Pan Indian / Global. Popular regional foods; Traditional fermented foods, pickles and preserves, beverages, snacks, desserts and sweets, street foods.	15 Hrs

Regional cuisines of India- Traditional foods of south Indian, north Indian, west Indian and east Indian cuisine.	
Unit -III Commercial production of Traditional foods	
Processing and manufacture of traditional foods- paneer, butter and ghee manufacture. Commercial production and packaging of traditional beverages such as tender coconut water, neera, lassi, buttermilk, dahi. Commercialproductionofintermediatefoods–gingerandgarlicpastes,tamarindpastes,masalas (spice mixes), idli and dosabatters.	15 Hrs

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	**Program Outcomes (POs)**														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Understand the basics of Biomolecules – Macronutrients andmicronutrients		✓													
Role of biomolecules as nutrients and their requirement for physiological functions		✓	✓												
Learn the biochemical mechanisms of nutrition and metabolism.			✓												
Understand the mechanism and carbohydrate metabolism and inter relationship between metabolic pathways			✓												

Pedagogy- Lecture, Group discussion, Demonstrations, Hands on training skills

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	40 Marks

References	
1	Sen, Colleen Taylor Food Culture in India Greenwood Press, 2005.
2	Davidar, Ruth N. Indian Food Science: A Health and Nutrition Guide to Traditional Recipes: East West Books, 2001
3	WyaneGisslen. Professional Cooking. John Wiley& Sons, New Jersey. 2015. 8th edn
4	Jagmohan Negi. Fundamentals of Culinary Art. S. Chand and Company Pvt. Ltd., New Delhi. 2013. 3.
5	JagmohanNegi.FoodPresentationTechniques(GarnishingandDecoration).S.ChandandCompany Pvt. Ltd., New Delhi. 2013.4.
6	Eva Medved. Food Preparation and Theory. Prentice-Hall Inc., Englewood Cliffd, New Jersey. 1986.
7	Al-Khusaibi, M., Al-Habsi, N., & Rahman, M. S. (Eds.). (2019). Traditional Foods: History, Preparation, Processing and Safety. Springer Nature.
8	Kristbergsson, K., & Oliveira, J. (2016). Traditional Foods: General and Consumer Aspects (Integrating Food Science and Engineering Knowledge Into the Food Chain, 10)(2016 ed.).
9	Galanakis, C. M. (Ed.). (2019). Innovations in traditional foods. Woodhead Publishing.

Date: Subject Committee Chairperson

Government of Karnataka

Curriculum

Program Name	**BSc Clinical Nutrition and Dietetics**		Semester	**Fourth Sem**
Course Title	**DIETETICS II (Theory)**			
Course No.	**CNDT4.1**	**DSC -10**	No. of Credits	**3+2**
Contact hours	**45 Hrs**		Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

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

1. Learn the pathophysiology of gastrointestinal disorders and their dietarymanagement.
2. Understand the pathophysiology of diabetes mellitus, dietary management, andtreatment
3. Learn the pathophysiology of Hypertension and Cardiovascular diseases and its dietary management.

Content	**45 Hrs**
Unit–I Diet in gastrointestinal disorders	
Pathophysiology and MNT for Indigestion, peptic ulcer, constipation, diarrhea, lactose intolerance, gluten enteropathy, irritable bowel syndrome	10 Hrs
Unit -II - Diabetes Mellitus	
a) Definition, Types (IDDM, NIDDM, MODY, GDM) etiological classification (WHO), etiology, symptoms, tests (blood and urine) – GTT, RBS, FBS, PPBS, HbA1c (Normal and abnormal values), complications (long and short term) b) NutritionalandDietarymanagementofIDDM,NIDDMandGDM,useoffoodexchangelist, Glycemic index and glycemic load of foods, carbohydrate counting, carbohydrate load, Oral hypoglycemic drugs, Insulin – long acting, short acting, intermittentacting c) Importance of physicalactivity	20 Hrs
Unit -III Hypertension and Cardiovascular disorders	
a) Hypertension - Etiology, risk factors, symptoms, types, nutritional and dietary management, role of physicalactivity. b) Cardiovascular disorders– • Etiology, risk factors, nutritional and dietarymanagement	15 Hrs

• Atherosclerosis – role of fat in the development ofatherosclerosis • Congestive HeartFailure • Dyslipidemia • Importance of physicalactivity	

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	Program Outcomes (POs)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Learn the pathophysiology of gastrointestinal disorders and their dietary management.		✓													
Understand the pathophysiology of diabetes mellitus, dietary management andtreatment		✓	✓												
Learn the pathophysiology of Hypertension and Cardiovascular diseases and its dietary management.			✓												

Pedagogy- Lecture, Group discussion, Demonstrations, Hands on training skills

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	40 Marks

Course Title	**DIETETICS –II (Practical)**	Practical Credits	**2**
Course No.	**CNDP4.1**		
Plan, prepare and evaluate			
1. A day's diet for pepticulcer 2. A day's diet forconstipation 3. A day's diet for diarrhoealcondition 4. Recipes for lactoseintolerance 5. Recipes for glutenenteropathy			
6. Prepare a list of low, medium, and high GIfoods 7. A day's diet for NIDDM (case profile) 8. A day's diet for GDM (caseprofile) 9. A day's diet for Hypertension (caseprofile) 10. A day's diet for atherosclerosis (caseprofile)			

Pedagogy- Lecture, Group discussion, Demonstrations Hands on training skills

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	05
Test 2	05
Participation & Involvement	10
Records	05
Total	25 Marks + 25 Marks = 50 Marks

References	
1	Modern Nutrition in Health and Disease 10th edition by Maurice E. Shils
2	Alfred H.Katz, Prevention and health, the Haworth, Press, New York 1999.
3	Nutritional biochemistry of vitamins David a bendor.
4	Achayya, K.T.:(1998) A Historical Dictionary of Indian Foods, Oxford Publishing Co.
5	Mahindru,S.N.(2002).FoodAdditivesCharacteristics,DetectionandEstimation,TataMcGraw-Hill Publishing Co. Ltd. NewDelhi.
6	Research Methodology By C.R Kothari
7	International Life Sciences Institute Present Knowledge in Nutrition – latest edition.
8	Krause's food and nutrition care process, 14th edition
9	Mahan, L K & Escott-Stump, (2000), Krause's food nutrition and diet therapy,12th edition
10	Sareen S, (2005) Advanced nutrition in human metabolism, 4th edition, USA

Date: Subject Committee Chairperson

Government of Karnataka

Curriculum

Program Name	**BSc Clinical Nutrition and Dietetics**		Semester	**Fourth Sem**
Course Title	**Community Nutrition (Theory)**			
Course No.	**CNDT4.2**	**DSC -11**	No. of Credits	**3+2**
Contact hours	**45 Hrs**		Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

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

1. Learn the concept of malnutrition and nutritionalepidemiology
2. Understand major nutritional problems prevalence, prevention, andcontrol
3. Understand policies and programs to combat community nutrition programs discussed inclass.
4. Know the role of organizations working towards combatingmalnutrition.

Content	**45 Hrs**
Unit–I Introduction	
Meaningandscopeofcommunitynutrition;Multidisciplinaryapproachofpublichealthnutrition; Concept of food security, nutrition security, nutrition monitoring, nutrition surveillance, health economics, epidemiological studies, nutritionalepidemiology. Malnutrition: etiology, prevalence, vicious cycle of malnutrition, economics of malnutrition. MajorNutritionalproblems:Prevalenceatnationalandinternationallevel;Preventionandcontrol of: Vitamin A deficiency, IDD, Anaemia, Coronary heart disease, Hypertension, Diabetes Mellitus,Diarrhoea,lowbirthweight,Child,andmaternalmalnutrition;PrevalenceofZnandCu deficiency.	15 Hrs
Unit -II - Nutrition policy and programs	
National nutrition policy: need for nutrition policy, policy strategies and their implementations. National Nutrition programs- Objectives and functions of National Anaemia prophylaxis programs; Vitamin A prophylaxis programs; Goitre control program ; ICDS; SNP; ANP Sustainable development goals; National nutrition policy-Aims, Short term and long-term intervention, implementation, Vision for the 21st century.	15 Hrs

Unit -III Organizations to combat malnutrition	
Objectives and functions, National organizations concerned with Food and Nutrition- ICMR, NIN, CFTRI, DFRL, NIPCCD InternationalorganizationsconcernedwithFoodandNutrition-FAO,WHO,UNICEF,WORLD BANK Approaches and strategies for improving nutritional status and health: Health–based interventions, Food–based interventions including fortification and genetic improvement of foods, supplementary feeding, Nutrition education for behaviour change, environmental sanitation.	15 Hrs

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	**Program Outcomes (POs)**														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Learn the concept of malnutrition and nutritional epidemiology		✓			✓		✓								
Understand major nutritional problems prevalence, prevention, and control									✓	✓			✓		
Understand policies and programs to combat community nutrition programs discussed in class.									✓				✓	✓	
Know the role of organizations working towards combating malnutrition.													✓		✓

Pedagogy- Lecture, Group discussion, Demonstrations, Hands on training skills

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	40 Marks

Course Title	**Community Nutrition (Practical)**	Practical Credits	**2**
Course No.	**CNDP4.2**		

Plan, prepare and evaluate

1. Preparation of audio-visual aids: Poster, Chart, Flash card, power point presentation and one video clipping.
2. Planning and Preparation of low-cost recipes for IronDeficiency.
3. Planning and Preparation of low-cost energy rich and protein rich recipes.
4. Planning and Preparation of low-cost recipes for Vitamin A deficiency
5. Planning and preparation of Complementary Foods (emphasis of premixes and ARF).
6. Planning and preparation of indigenous low cost, nutritive recipes (using methods to enhance the nutritive value of foods at home level) suitable for various vulnerable groups.
7. Visit to Food and Nutrition Board and NIPCCD
8. Planning and conducting nutrition Health Education activity using various teaching aids for vulnerablegroups.
9. PlanningandconductinganExhibitionwithreportwritingontopicsrelatedtocommunitynutritionand health.

Pedagogy- Lecture, Group discussion, Demonstrations Hands on training skills

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	05
Test 2	05
Project	15
Total	25 Marks + 25 Marks = 50 Marks

References	
1	BamjiSM,RaoNPandReddyV,Textbookofhumannutrition,oxfordandIBHpublishingco.,New Delhi.
2	GopalanC,Combating undernutrition-basic issues and practical approaches, Nutrition Foundation of India,1987.

References	
3	GopalanC,Women and nutrition in India, NFI,New Delhi,1992.
4	Jelliffe D.D.1966. The assessment of Nutritional Status of the Community. WHO, monograph series.
5	Jelliffe D.D.1966. The assessment of Nutritional Status of the Community. WHO, monograph series.
6	Michael.J.G,Barrie.M.M:Public health nutrition,Blackwell publishing,2005.
7	Nweze Eunice Nnakwe., Community Nutrition – planning health promotion and disease prevention., Jones and Bartlett publishers, 2009.
8	Park.K,Park's textbook of preventive and social medicine.,12th edition.M/S Banarsidasbhanot publishers,2009.
9	Reddy V, PrahladRao N, Sastry G and Nath KK, Nutrition trends in India, Hyderabad, NIN,1993

Date: Subject Committee Chairperson

Government of Karnataka

Curriculum

Program Name	**BSc Clinical Nutrition and Dietetics**		Semester	**Fourth Sem**
Course Title	**Nutrition In Physical Activity (Theory)**			
Course No.	**CNDT4.3**	**DSC -12**	No. of Credits	**3**
Contact hours	**45 Hrs**		Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

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

1. Learnhownutritioninfluenceshumandevelopment,exerciseperformance,recoveryandphysiological adaptations
2. Understand macronutrient metabolism during and after exercise and outline the requirements of these nutrients forathletes
3. Understand the physiological functions of vitamins, minerals, and major nutrients inathletes.
4. Learn the composition of common sports drinks and ergogenic aids and discuss how these can beused appropriately and safely before, during and after exercise

Content	**45 Hrs**
Unit–I Introduction to body composition	
Definition of physical fitness, Benefits of Fitness, Components of fitness. Conditioning by training – overload principle. Body's response to physical activity- Weight training, cardiorespiratory conditioning, muscle conditioning, Physical activity pyramid Balanced fitness program. Human Body Composition: Significance of studying body composition. Two compartment and multiple compartment models Methods of Assessment: Nutritional Anthropometry, BOD POD, Bioelectric impedance,DEXA, Whole body K counter. Factors affecting body composition: Age, Body weight, physicalactivity	10 Hrs
Unit -II - Macro Nutrients	
Carbohydrate as an energy source for sport and exercise. Carbohydrate stores, Fuel for aerobic and anaerobic metabolism, Glycogen re-synthesis, CHO Loading, CHO composition for pre-exercise, during and recovery period.	20 Hrs

Role of Fat as an energy source for sports and exercise. Fat stores, regulation of fat metabolism, factorsaffectingfatoxidation(intensity,duration,trainingstatus,CHOfeeding),effectoffasting and fatingestion Proteinandaminoacidrequirements,FactorsaffectingProteinturnover,Proteinrequirementand metabolism during endurance exercise, resistance exercise and recovery process. Protein supplement.	
Unit -III Important micronutrients for exercise	
Role of Vitamins and specific mineral needs during exercise, Dehydration, Exercise induced oxidative stress and role of antioxidants. Female athletic triad, sports anaemia Dietary supplements and ergogenic aids (nutritional, pharmacological and physiological). Popular and famous Ergogenic aids – Anti doping agency - list of banned drugs/substances	15 Hrs

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	**Program Outcomes (POs)**														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Learn how nutrition influences human development, exercise performance, recovery, and physiological adaptations		✓										✓			
Understand macronutrient metabolism during and afterexerciseandoutlinetherequirementsofthese nutrients forathletes			✓									✓			
Understand the physiological functions of vitamins, minerals and major nutrients inathletes.			✓									✓			
Learn the composition of common sports drinks and ergogenic aids and discuss how these can be used appropriately and safely before, during and after exercise.												✓			

Pedagogy- Lecture, Group discussion, Demonstrations, Hands on training skills

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	40 Marks

References	
1	Bucci, L., 1993 Nutrients as Ergogenic Aids for Sports and Exercise. Boca Raton, FL.:CRC Press.
2	Advances in Sport and Exercise Science: Nutrition and Sport , Edited by Don MacLaren. , ChPublished by Churchhill Livingstone, Elsevier. 2007
3	Sports Medicine: The school age athlete by Bruce Reider. 1996. Published by W.B. Saunders.
4	Nutrition for Serious Athletes. Dan Banardot. 2000; Human Kinetics.
5	Energy-Yielding Macronutrients and Energy Metabolism in Sports Nutrition. Edited by Judy A Driskell , Ira Wolinsky, CRC Press 2000.
6	Recommended Dietary Intakes for Indian Sportsman and Women. Satyanarayan, K; Nageshwar Rao. C; NarsingaRao,B.S.; Malhotra, M.S. (1985)., Hyderabad, National Institute of Nutrition.
7	Bucci, L., 1993 Nutrients as Ergogenic Aids for Sports and Exercise. Boca Raton, FL.:CRC Press.
8	Advances in Sport and Exercise Science: Nutrition and Sports, Edited by Don MacLaren, ChPublished by Churchhill Livingstone, Elsevier. 2007
9	Sports Medicine: The school age athlete by Bruce Reider. 1996. Published by W.B. Saunders.
10	Nutrition for Serious Athletes. Dan Banardot. 2000; Human Kinetics.
11	Energy-Yielding Macronutrients and Energy Metabolism in Sports Nutrition. Edited by Judy A Driskell, Ira Wolinsky, CRC Press 2000.
12	Recommended Dietary Intakes for Indian Sportsman and Women. Satyanarayan, K; Nageshwar Rao.

Date: Subject Committee Chairperson

Government of Karnataka

Curriculum

Program Name	**BSc Clinical Nutrition and Dietetics**		Semester	**Fourth Sem**
Course Title	**Nutrition in Weight Management (Theory)**			**OPEN ELECTIVE**
Course No.	**CNDT4.4**	**OE -4**	No. of Credits	**3**
Contact hours	**45 Hrs**		Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

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

1. Learn about the concept health, nutrition, macro, andmicronutrients
2. Learn about the importance of nutrients, sources, anddeficiencies
3. Understand the basics of weight management, ideal body weight,BMI
4. Understand the role of physical activity in goodhealth

Content	**45 Hrs**
Unit–I	
Health - Definition a) Balanced diet- factors affecting food intake b) Food groups andServing c) My Plate d) Classification of Macro and micronutrients e) Functions, Food Sources and Deficiency ofnutrients	15 Hrs
Unit -II	
a) Weightmanagement b) Overweight,underweight c) Ideal body weight,BMI d) Dietary guidelines and health hazards- overweight and underweight e) Role of physical activity in weight management	15 Hrs

Unit -III Important micronutrients for exercise	
a) Components of Physicalfitness b) Health benefits offitness c) Types of physical activity- Structured andunstructured.	15 Hrs
d) Physical activitypyramid e) Yoga and meditation in health: Effect of Yoga and meditation on physical and mentalhealth	

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

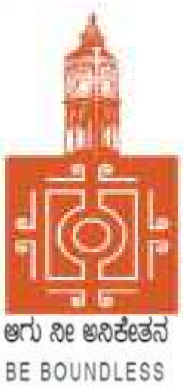
Course Outcomes (COs) / Program Outcomes (POs)	**Program Outcomes (POs)**														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Learn about the concept health, nutrition, macro, and micronutrients	✓	✓										✓			
Learn about the importance of nutrients, sources, and deficiencies	✓	✓													
Understand the basics of weight management, ideal body weight, BMI												✓			
Understand the role of physical activity in good health												✓			

Pedagogy- Lecture, Group discussion, Demonstrations, Hands on training skills

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	40 Marks

References	
1	Melvin H Williams (2005) Nutrition for Health, Fitness and Sports 7thEdn
2	Mahan L K and Ecott-Stumps (2000) Krause's Food, Nutrition and Diet Therapy, 10thedn,W B Saunders Ltd
3	Whitney and Rolfers S R (1999) Understanding Nutrition, 8thEdn West/Wadsworth, An International Thomson Publishing Company
4	Jayaprakash. C.S 2003 Sports Medicine, Jaypee brother's medical publishers (P) ltd New Delhi.

Date: Subject Committee Chairperson



BENGALURU CITY UNIVERSITY

CHOICE BASED CREDIT SYSTEM

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

Syllabus for B.Sc. Home Science
(V & VI Semester)

2023-24 onwards

Proceedings of the BOS in Home Science (UG& PG) for Bengaluru City University held on 15th September, 2023

A meeting of the BOS in Home Science (UG& PG) for Bengaluru City University held on 15th September, 2023 between 10:30 am to 5:30 pm in Smt. V.H.D Central Institute of Home Science, Seshadri Road, Bengaluru – 560 001.

The following members were present in online & offline mode for the meeting:

Name and Designation

1. **Dr.Usha Devi. C**
   Chairperson BOS in Home Science (UG, PG & PhD)
   Bengaluru City University (BCU)
   Principal & Director
   Smt. V.H.D Central Institute of Home Science
   Maharani Cluster University
   Seshadri Road, Bengaluru – 560 001.

   Usha 15/9/23

2. **Dr.Vijayalaxmi A.H.M.,**
   Member
   Professor & Joint Director,
   Department of Collegiate Education,
   Regional Joint Director Office,
   Mysuru – 570 001

   ABSENT

3. **Dr.Madhumathy S.,**
   Member
   Professor & HOD,
   Department of Home Science,
   Government College of Home Science,
   Hassan - 573211

   ATTENDED ONLINE

4. **Dr.AshaJyothi U. H.,**
   Member
   Professor & Principal,
   Department of Home Science,
   Government College of Home Science,
   Holenarasipura, Hassan – 573 211

   ATTENDED ONLINE

5. **Dr.Grace Premila Victor.,**
   Member
   Associate professor & HOD,
   Department of Nutrition & Dietetics,
   Bishop Cotton Women's College,
   Field Marshal Kariyappa Road,
   Bengaluru – 560 025

   Grace Premila 15/9/23

6. **Dr.Marie Kavitha Jayakaran.,**
   Member
   Associate professor & HOD,
   Department of Home Science,
   Bishop Cotton Women's College,
   Field Marshal Kariyappa Road,
   Bengaluru – 560 025

MKavitha 15/9/23

7. **Dr.Sangeeta Pandey.,**
   Member
   Professor & HOD,
   Department of Nutrition and Dietetics,
   Mount Carmel College (Autonomous),
   No. 58, Palace Road,
   Bengaluru – 560 052

Pandey 15/9/23

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

ATTENDED ONLINE

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

- Bishop Cotton Women's Christian College – BA/BSc Home Science as one optional and Nutrition and Dietetics course; and also PG in Nutrition and Dietetics
- S B A N M College, Yelahanka – BSc Clinical Nutrition & Dietetics

1. The Board reviewed the NEP Home Science UG syllabus of fifth and sixth semester, made the necessary minor changes in the syllabus and approved the same for the academic year 2023-2024 for all the courses
2. The BOS committee also finalised eligibility criteria for M.Sc – Nutrition & Dietetics course offered in Bishop Cotton Women's Christian College under BCU, which is as follows:- students who have studied in B.Sc – Nutrition & Dietetics/ B.Sc Food & Nutrition/ B.Sc – Composite Home Science/ B.Sc – Food Science & Nutrition/ B.Sc – Nutrition & Dietetics as one of the majors (Annexure-I).
3. The Board constitutes the BOE (UG/PG) for approval by the BCU (Annexure-II).

4. The Board included panel of examiners from MCU, School of Home Science, Bishop Cotton Women's Christian College, Mount Carmel College 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.

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

Dr.Grace Premila Victor. 15/9/23

Dr.Marie Kavitha Jayakaran. 15/9/23

Dr.Sangeeta Pandey. 15/9/23

Dr.Usha Devi C
Chairperson

Dr. USHA DEVI. C., MSc., Ph.D., FISCA
Chairperson
BOS in Home Science (UG&PG)
Bangalore City University (BCU)
Central College Campus, Bangalore - 01

BENGALURU CITY UNIVERSITY

SYLLABUS

5TH AND 6TH SEMESTER

DEPARTMENT OF HOME SCIENCE

1) **BA/BSC -Home Science**
   (AS ONE MAJOR)
2) **BSC -Nutrition & Dietetics**
   (AS ONE MAJOR)
3) **BSC -Clinical Nutrition & Dietetics**
   (Inter-disciplinary)

SEPTEMBER 2023

THE LIST OF THE MEMBERS OF THE BOARD OF STUDIES

FACULTY OF HOME SCIENCE

Sl.No	NAME	DESIGNATION
1	DR. USHA DEVI C	CHAIRPERSON
2	DR. VIJAYALAXMI A.H.M	MEMBER
3	DR. MADHUMATHY S	MEMBER
4	DR. SHANTHA MARIA B. V	MEMBER
5	DR. GRACE PREMILA VICTOR	MEMBER
6	DR. ASHAJYOTHI U.H.	MEMBER
7	DR. SANGEETA PANDEY	MEMBER
8	DR. KOMALA M	MEMBER
9	DR. MARIE KAVITHA JAYAKARAN	MEMBER

HOME SCIENCE SUBJECT EXPERT COMMITTEE

Composition of Curriculum – Committee for Home Science
(Composite Home Science/ Home Science/ Nutrition & Dietetics/ Clinical Nutrition & Dietetics/ Care and Welfare/ Human Development/ Family Resource Management)

S. No.	Name and Organization	Designation
1.	Dr. M. Anuradha Principal, Padmashree Institute of Management and Sciences, Bengaluru	Chairperson
2.	Dr. Komala M. (Human Development) Professor, University of Mysore, Mysuru	Member
3.	Dr. Vijayalakshmi A.H.M. (Human Dept./ Care & Welfare), Associate Professor, Maharani Cluster University, Bengaluru	Member
4.	Dr. Shantha Maria (Home Science) Associate Professor, Mount Carmel College, Bengaluru	Member
5.	Dr. Sangeetha Pandey (Nutrition & Dietetics), Associate Professor Mount Carmel College, Bengaluru	Member
6.	Dr. Marie Kavitha (Human Dept.), Bishop Cotton Women's Christian College, Bengaluru	Member
7.	Dr. Gana Shruthy M.K. Special Officer, KSHEC, Bengaluru	Member - Convenor

Curriculum

of

B.A/ B.Sc Home Science

as a ONE Major

(5th and 6th Semester)

KARNATAKA STATE HIGHER EDUCATION COUNCIL

Sub-committee members of B. A/ B.Sc. Home Science

1.	Dr. Marie Kavitha Jayakaran - Convenor Bishop Cotton Women's Christian College -Bengaluru
2.	Dr. Vijaya U Patil Government First Grade College -Ankola
3.	Dr. Manjula G. Kadapatti Maharani Cluster University-Bengaluru
4.	Mrs. Veena Tirlapur KLE Society's Art & Commerce College -Gadag
5.	Mrs. Anita Bettaiah Bishop Cotton Women's Christian College -Bengaluru
6.	Mrs. Shobha. S SDM College - Ujire

Listing of Courses from I to VI Semesters for the Four-Year Undergraduate Program (FYUGP) in Home Science

Sem No.	Course Category	Course Code	Course Titles	Credits assigned	Instructional Hours per week		Duration of Exam(Hrs.)	Marks		
					Theory	Practical		IA	Exam	Total
I	DSC	HSCC1-T	Principles of Food and Nutrition	4	4		2.5	40	60	100
		HSCC2-P	Principles of Food and Nutrition	2	-	4	3	25	25	50
		HSCOE1-T	Food Preservation	3	3	-	2.5	40	60	100
II	DSC	HSCC3-T	Fundamentals of Human Development	4	4		2.5	40	60	100
		HSCC4-P	Fundamentals of Human Development	2		4	3	25	25	50
		HSCOE2-T	Teaching materials for early childhood education	3	3	-	2.5	40	60	100
III	DSC	HSCC5-T	Early childhood care and education	4	4		2.5	40	60	100
		HSCC6-P	Early childhood care and education	2		4	3	25	25	50
		HSCC0E3-T	Fundamentals of interior decoration	3	3	-	2.5	40	60	100
IV	DSC	HSCC7-T	Introduction to textiles	4	4		2.5	40	60	100
		HSCC8-P	Introduction to textiles	2		4	3	25	25	50
		HSCC0E4-T	Fashion designing	3	3	-	2.5	40	60	100
V	DSC	HSCC9-T	Human development and family dynamics	4	4		2	40	60	100
		HSCC10-P	Human development and family dynamics	2		4	3	25	25	50
		HSCC11-T	Interior decoration	3	3		2.5	40	60	100
		HSCC12-P	Interior decoration	2		4	3	25	25	50
VI	DSC	HSCC13-T	Traditional textiles and costumes of India	4	4		2-5	40	60	100
		HSCC14-P	Traditional textiles and costumes of India	2		4	3	25	25	50
		HSCC15-T	Resource Management	3	3		2.5	40	60	100
		HSCC16-P	Resource management	2		4	3	25	25	50

Government of Karnataka

Model Curriculum

Program Name	**BA/B.Sc. Home Science**			Semester	**Fifth Sem**
Course Title	**Human development and Family Dynamics (Theory)**				
Course No.	**HSCC9-T**	**DSC**		No. of Credits	**4+2**
Contact hours	**60 Hrs**			Duration of SEA/Exam	**2 Hours**
Formative Assessment Marks	**40**			Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%.

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

1. Understand the period of Adolescence and its developmental changes.
2. Study the need of counselling for adolescents.
3. Understand the physical, Physiological cognitive and socio-emotional development during adulthood stages.
4. Sensitized about interpersonal relationships, Marriage, functions of marriage, changing trends in marriage and Family and family dynamics.
5. Prepare for outreach activities with varied groups of adults and elderly.

Content	**60 Hrs**
Unit-I. Adolescence	**15 Hrs**
Chapter No. 1 Definition, characteristics, developmental tasks of Adolescence.	**2 Hrs**
Chapter No. 2 Physical changes, puberty, primary and secondary sexual characteristics among adolescents.	**4 Hrs**
Chapter No. 3 Identity formation, social, emotional, cognitive and moral development. Interests and problems of adolescents	**5 Hrs**
Chapter No. 4 Need for adolescent counselling. Techniques and methods of adolescent counseling. Education and Career guidance	**4 Hrs**
Unit-II. Adulthood- Early Adulthood and Marriage	**15 Hrs**
Chapter No. 5 Historical perspectives on adulthood, Contemporary changes, increase in life expectancy	**7 Hrs**

and decrease in death rate, classification of Adulthood. Early Adulthood- Characteristics and developmental tasks, physical, social, cognitive, emotional and moral development. Roles, responsibilities and adjustments.	
Chapter No. 6 **Marriage** – definition, functions, areas of marital adjustments, essentials of successful marriage	3 Hrs
Chapter No. 7 **Changing trends in marriage**: cohabitation, remarriage, LGBT (Lesbian, Gay, Bisexual, and Transgender) marriages	5 hrs
Unit-III. Family, Family Dynamics and Middle Adulthood	**15 Hrs**
Chapter No. 8 **Family** – Definition functions and types. Changing trends in family: causes for change, single parent families, separated families, nuclear families cross-generational families, adoptive/foster families, blended families, same-sex parent families	5 Hrs
Chapter No. 9 **Family Dynamics-** Definition, function and scope. Gender norms and roles in family dynamics	3 Hrs
Chapter No. 10 **Middle Adulthood** - **C**haracteristics and developmental tasks. Physical, physiological and socio-emotional changes, changes in cognitive abilities, Adjustments and hazards of middle age, preparation for retirement	7 Hrs
Unit-IV. Family crisis and Late Adulthood	**15 Hrs**
Chapter No. 11 **Forms of family crisis**: Marriage, divorce/separation, remarriage, financial instability, poor work-family balance, illness, death, childlessness, child abuse/neglect, family violence, peer pressure, addiction, rape, suicide, unemployment, natural disasters, epidemics and wars. **Family cohesion**- the role of effective communication, compassion, perspective-taking, role distribution, positive conflict resolution, and teamwork. **Agencies offering support**: Marriage and family therapists, Family courts, Child guidance clinics, counseling and rehabilitation centers	10 Hrs
Chapter No. 12 **Late Adulthood -** Characteristics and developmental tasks. Physical, physiological, psychological and social changes. Health care and health problems, Adjustments to retirement. successful ageing	5 Hrs

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 period of Adolescence and its developmental changes		X		X	X						X	
Understand the physical, Physiological cognitive and socio-emotional development during adulthood stages								X	X		X	
Sensitized about interpersonal relationships, Marriage, functions of marriage, changing trends in marriage and Family and family dynamics								X		X		X
Prepare for outreach activities with varied groups of adults and elderly			X	X				X				

Pedagogy - Theory

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

Course Title:	**Human development and Family Dynamics (Practical)**	Practical Credits	**2**
Course No.	**HSCC10 P**	Contact Hours:	**52/13Sessions**
Practical Topics - 2 credits			**13 - 15 weeks**
Unit I • Conduct a study on selection of life partner/ changing trends in marriage//adjustments/ problems in marriage **OR** Plan an interaction with a counselor or therapists working in the area of interpersonal conflicts (in the family family/peer group/parent-child/ Adolescent).			**10 Hrs**
Unit II • Conduct a role play to create awareness among college students on family values / family relationship /stability in marriage. OR Select a form of family crisis or stress. Develop an educational aid to prevent and manage the crisis. • Visit to an Adolescent/ family counselling center and write a report			**15 Hrs**

Unit III • Organize a workshop for adolescents on -physical changes/health issues/ menstrual hygiene/behaviour during adolescence. OR Conduct a workshop on enhancing family cohesion and conflict resolution	**12 Hrs**
Unit IV • Plan, prepare and conduct activities to foster cognitive abilities / health/ nutrition/ recreational activities for the aged. **OR** Create posters about ways to improve interpersonal communication skills and patters of relating to enhance resiliency in relationships	**15 Hrs**

Assessment

Formative +Summative Assessment = 25+25=50 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment / project	5 + 5
Total	**25 marks + 25 marks = 50 marks**

References:

1.	Arnett, J. J., & Jensen, L. A. (2019). *Human Development: A cultural approach (3rded.)*. New York: Pearson.
2.	Berk, L.E. (2005). Child development (5th ed.). New Delhi: Prentice Hall
3.	Baradha.G 'Basics of Human Development' Saradalaya Press, Sri Avinashilingam Education Trust Institutions, Coimbatore 2008.
4.	Cavanaugh, J., & Blanchard-Fields, F. (2011). *Adult development and aging (7thed)*. Stamford, CT: Cengage Learning.
5.	Hurlock.B.Elizabeth 'Developmental Psychology – A Life Span Approach' Tata McGraw Hill Publications, New Delhi Latest Edition. 3.
6.	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.
7.	Santrock, J. (2017). A topical approach to life span development (9th ed.). New NY.:Mcgraw-Hill Higher Education.
8.	Singh, A. (2015). Foundations of Human Development: A life span approach. ND: Orient Black Swan
9.	Suriakanthi. A. (2015) 'Child Development' Kavitha Publications, Gandhigram, Tamil Nadu.
10.	Walsh, B.A., Deflorio, L., Burnham, M.M., & Weiser, D.A. (2017). Introduction to Human Development and Family Studies. NY: Routledge

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**BA/B.Sc. Home Science**		Semester	**Fifth Sem**
Course Title	**Interior Decoration (Theory)**			
Course No.	**HSCC11-T**	**DSC**	No. of Credits	**4+2**
Contact hours	**60 Hrs**		Duration of SEA/Exam	**2.5 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%.

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

- To Learn about housing and its principles
- To understand about color and its application in interiors
- To apply elements and principles of design in interior decoration
- To know about furniture, window treatment and accessories in interiors

Content	**60 Hrs**
Unit-I. Design Fundamentals	**15 Hrs**
Chapter No. 1 Types of design- Structural and Decorative, Naturalistic, Stylized, Geometric, Abstract.	**3 Hrs**
Chapter No. 2 Elements of Art- Line, form, color, space, texture, Pattern, light.	**6 Hrs**
Chapter No. 3 Principles of design- Harmony, Proportion, Balance, Rhythm, Emphasis	**6 Hrs**
Unit-II. Dimension of color	**15 Hrs**
Chapter No. 4 Dimension of color- Hue, Value, Intensity, Advancing and receding colors, cool and warm colors. Characteristics of colors	**7 Hrs**
Chapter No. 5 Prang color system- Primary, secondary, and Tertiary colors, color wheel. Color Harmonies- Related and Non-Related Color Harmonies.	**8 Hrs**
Unit-III Housing	**15 Hrs**
Chapter No. 4 Principles of Housing , types of Dwelling Units , Kitchen Plans	**7 Hrs**

Chapter No. 5 Factors to be considered in Selection, Principles of Furniture Arrangement, FurnitureArrangement for different rooms. Styles of Furniture and materials used to make furniture	**8 Hrs**

Unit IV – Window Treatment & Accessories	**15 hrs**
Chapter No. 8 Windows- Types of windows- casement, bay window, sliding window, awing window, picture window. Window treatment- Modes of Hanging Curtains- Cafe, Tier, Priscilla, CrissCross, Glass, Pleated	8 Hrs
Chapter No. 9 Accessories – classification and type Flower decoration -styles and shapes	7 Hrs

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**
To Learn about housing and its principles		X		X	X						X	
To understand about colour and its application in lnteriors								X	X		X	
To apply elements and principles of design in interior decoration								X		X		X
To know about furniture, window treatment and accessories in interiors			X	X				X				

Pedagogy - Theory

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

Course Title:	**Interior Decoration (Practical)**	Practical Credits	**2**
Course No.	**HSCC12 P**	Contact Hours:	**52/13Sessions**
Practical Topics - 2 credits			**13 - 15 weeks**
Unit I Elements of Arts and Principles of design.			**20 Hrs**
Unit II Color wheel, color harmonies.			**7 Hrs**
Unit III Furniture arrangement and Window treatment			**20 Hrs**
Unit IV Flower arrangement			**5 Hrs**

Assessment

Formative +Summative Assessment = 25+25=50 marks	
Formative Assessment	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / project	5
Total	**25 marks + 25 marks = 50 marks**

References:	
1.	Prathap Rao (2003) Interior design Principles - Standard Publishers and Distributors, New Delhi.
2.	Raja Rao and Subramanya (2003) Planning and Designing Residential Buildings - Standard Publishers and Distributors, New Delhi.
3.	Sita Ram Premavathy Pannuparveen (2005) Interior Design and Decoration - CBS Publishers, , New Delhi.
4.	Premlatha Mullick (2015) Textbook Of Home Science - Kalyani Publishers, New Delhi.

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**BA/B.Sc. Home Science**		Semester	**Sixth Sem**
Course Title	**Traditional Textiles and Costumes of India (Theory)**			
Course No.	**HSCC13 T**	**DSC**	No. of Credits	**4+2**
Contact hours	**60 Hrs**		Duration of SEA/Exam	**2.5 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%.

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

- Acquaint with Indian Textile and Clothing culture
- Analyse traditional textiles based on the process of making it.
- Understand the physical, geographical, cultural influence on costumes and textiles.
- Differentiates traditional textiles from different parts of the country.
- Appreciates the traditional Textiles and Costumes
- Utilize traditional costume and textiles in contemporary context.
- Understands the techniques of traditional embroidery

Content	60 Hrs
Unit-I. Introduction to Traditional Textiles	**15 Hrs**
Chapter No. 1 Textile Arts of India Weaving and weaving communities, Embroideries, Rugs and carpets, Saris Shawls and wraps.	**3 Hrs**
Chapter No. 2 History of Indian Traditional Textiles Chronological development of spinning, weaving and dyeing various trade routes.	**4 Hrs**
Chapter No. 3 Traditional Costumes- Classification of Traditional Textiles of India Painted and printed, Resist dyed, woven, and embroidered. Traditional Costume and Culture Influence of historical, economic, political and socio-cultural aspects on the evolution of traditional costume	**8 Hrs**
Unit-II. Ornamented and Resist Dyed Textiles	**15 Hrs**
Chapter No. 4 Pigment painted textiles Patachitra, Pichhavi and Phad Mordant painted textiles	**8 Hrs**

Kalamkari- Masulipatnam and Srikalahasti, Mata-ni- Pachhedi. Printed textiles Hand block printed, Ajrakh, Rogan, Sanganer, Bagh	
Chapter No. 5 Yarn resist Patola, Mashru, Ikat, Bandhana Fabric resist Sungadi, Bhandej, Laheriya	**7 Hrs**
Unit-III. Woven textiles and Embroidery	**15 Hrs**
Chapter No. 6 Woven textiles of India: Rajasthan – Kota Doria, Gujarat –Sujani, Tangaliya, Pachhedi Madhya Pradesh – Chanderi, Maheshwari, UttarPradesh – Brocades.	**3 Hrs**
Chapter No. 7 West Bengal – Dacca muslin, Balu Chari ,Tangail, Shawls from Kashmir, Assam and Nagaland, Maharashtra Paithani, Himroo , Andhra Pradesh and Telangana – Dharvaram, VenkatGiri, Gadwal and Narayan pet, Karnataka – Ilkal, moorkalmuru ,Tamil Nadu- Kanjeevaram	4 hrs
Chapter No. 8 Embroideries of India -kutch, ari, chikankari, kasuti, kashida, Chambaroomal	8 Hrs
Unit –IV Traditional Costumes of India:	**15 Hrs**
Chapter No. 9 Traditional Costumes of India: Jammu and Kashmir, Punjab, Haryana, Rajasthan, Gujarat, Maharashtra, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Orissa, West-Bengal, Assam, Nagaland, Meghalaya, Manipur, Arunachal, Mizoram, Tripura, India Uttar Pradesh, Madhya Pradesh, and Bihar	8 Hrs
Chapter No. 10 Traditional costumes of Kerala, Karnataka, Orissa, West-Bengal, Assam, Nagaland, Meghalaya, Manipur, Arunachal, Mizoram, Tripura, India Uttar Pradesh, Madhya Pradesh, and Bihar	7 Hrs

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**
Analyze traditional textiles based on the process of making it.		X		X	X						X	
Differentiates traditional textiles from different parts of the country								X	X		X	
Understands the techniques of traditional embroidery								X		X		X
Utilize traditional costume and textiles in contemporary context.			X	X				X				

Pedagogy - Theory

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

Course Title:	**Traditional textiles and costumes of India (Practical)**	Practical Credits	**2**
Course No.	**HSCC14 P**	Contact Hours:	**52/13Sessions**
Practical Topics - 2 credits			**13 - 15 weeks**
Unit I: Embroideries of India – 1. Kashida of Kashmir 2. Chamba of Himachal Pradesh 3. Phulkari and Bagh of Punjab 4. Chikankari of Uttar Pradesh 5. Kantha of Bengal			**20 Hrs**
Unit II: Embroideries of India 6. Embroideries of Manipur 7. Embroideries of Gujarat 8. Gold and Silver embroidery 9. Bead work			**20 Hrs**
Unit III: Preparation of portfolio • Pictures of traditional textiles with the descriptive analysis • Pictures of the traditional costumes with constructional details. • Samples of embroidery with its theoretical details			**12 Hrs**

Assessment

Formative +Summative Assessment = 25+25=50 marks	
Formative Assessment	**Weightage in Marks**
Record	10
Test 2	10
Assignment / project	5
Total	**25 marks + 25 marks = 50 marks**

References:	
1.	Bhatnagar P. (2004), Traditional Indian Costumes and Textiles, Abhishek Publications, New Delhi
2.	Chisti R.K., (2013) Sari tradition and beyond, Roli Publication
3.	Ghurye G. S. (1995), Indian Costume, Popular Prakashan, Bombay
4.	Irwin, J. H. & Hall, M. (1973). Indian Embroideries. Ahmedabad: Historic Textiles of India at Calico Museum of Textiles
5.	Karolia, A. (2019), Traditional India Handcrafted Textiles: Techniques, Processes and Designs Vol.I and II, Niyogi books, Delhi
6.	Pathak A. (2006), Indian Costumes, Roli Books, Mumbai
7.	Saraf, D. N. (1982). Indian Crafts. New Delhi: Vikas Publishing House Limited.
8.	Singh M. (2011) Traditional and Beyond Handcrafted Indian Textile, Roli Books Pvt. Ltd, New Delhi.
9.	Ritu Kumar, (2008). Costumes and Textiles of Royal India, Antique collectors club, India.
10.	John Gillow, Nicholas Barnard, (2008). Indian Textiles, Thames & Hudson, London
11.	Carl Kohler, (2012). A History of Costume, Dover Publications, INC, New York

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**BA/B.Sc. Home Science**			Semester	**Sixth Sem**
Course Title	**Resource Management (Theory)**				
Course No.	**HSCC15 T**	**DSC**		No. of Credits	**4+2**
Contact hours	**60 Hrs**			Duration of SEA/Exam	**2.5 Hours**
Formative Assessment Marks	**40**			Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%.

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

- Understand the available resources and develop the ability to evaluate the managerial efficiency and effectiveness in the family and other organization.
- Acquire an understanding of real-world challenges in HRM and identify measures to ensure a stable work environment efficiently through proper coordination, employee empowerment and training practices
- Critical thinking skills by developing a data-driven approach to improve business productivity and performance.
- Understand International Human Resource Management

Content	**60 Hrs**
Unit-I. Introduction to Resource Management	**15 Hrs**
Chapter No. 1 Resources: Definition and Classification – Human and Non-Human Resources, Renewable and Non-Renewable resources, Energy conservation and sustainability .	**5 Hrs**
Chapter No. 2 Management: Definition, Motivating factors, Managerial Process, Decision making and Problem Solving .	**5 Hrs**
Chapter No. 3 Money Management Budget plan, Account Keeping, Saving Process and Practice	**5 Hrs**

Unit-II. Resource management	**15 Hrs**
Chapter No. 5 Time Management Time plan, Tools, Process and practices	**8 Hrs**
Chapter No. 6 Energy Management ,Fatigue, Work simplification	**7 Hrs**
Unit-III. Ergonomics	**15 Hrs**
Chapter No. 8 Ergonomics – Concept, Definition, Characteristics of places, things and activities. Human Factors, Principles of Ergonomics, Occupational factors affecting the worker	**7 Hrs**
Chapter No. 9 – Anthropometry Definition and Applicability of Stature – Eye height, Elbow height, Sitting height,Shoulder and Elbow breadth, Thigh clearance and Popliteal height, Maximum and Minimum Vertical and Horizontal reach	8 Hrs
Unit-IV. Consumer Education	**15 Hrs**
Chapter No. 8 Definition of a consumer, Objects and Purpose of Consumer Education, Role of consumers in the economy, Types of consumer problems – products and service related, Causes and solutions	**7 Hrs**
Chapter No. 9 Consumer Protection, Consumer rights and responsibilities, Consumer Protection Act – Salient Features, Limitations and Guidelines for filling consumer compliant	8 Hrs

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 available resources and develop the ability to evaluate the managerial efficiency and effectiveness in the family and other organization		X		X	X						X	
Acquire an understanding of real-world challenges in HRM and identify measures to ensure a stable								X	X		X	

work environment efficiently through proper coordination, employee empowerment and training practices												
Critical thinking skills by developing a data-driven approach to improve business productivity and performance								X		X		X
Understand International Human Resource Management			X	X				X				

Pedagogy - Theory

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

Course Title:	**Resource Management (Practical)**	Practical Credits	**2**
Course No.	**HSCC16 P**	Contact Hours:	**45/13Sessions**
Practical Topics - 2 credits			**13 - 15 weeks**
Unit I: Preparation of time plans for self			**7 Hrs**
Unit II: Budget and banking procedures			**10 Hrs**
Unit III: Standards of Weights and Measures Act, 1976, ISI, BIS, FPO, AGMARK, ISO, Eco mark,Wool mark, Silk mark, Cotton mark, Handloom mark BEE star labeling, FSSAI, Codex, HACCP, Food laws			**20 Hrs**
Unit IV: Anthropometry and work simplification			**15 Hrs**

Assessment

Formative +Summative Assessment = 25+25=50 marks	
Formative Assessment	**Weightage in Marks**
Record	10
Test 2	10
Assignment / project	5
Total	**25 marks + 25 marks = 50 marks**

References:	
1.	Umesh Prasad, (2011). Essential of Ergonomics. Sonali Publications, New Delhi
2.	Sawhney, H. K. & Mital, M. (2007). Family Finance & Consumer Studies. Elite Publishing House Pvt. Ltd
3.	Engel, J.F. and Black, Well R.D. (1990). Consumer Behaviour, 4th Edition. Holt Sanders International Edition
4.	Seetharaman, P. and Sethi, M. (2001). Consumerism: Strength and Tactics. New Delhi, CBS Publishers
5.	Jan Dul and Bernard Weerdmeester, (2008). Ergonomics for Beginners – A quick reference guide, CRC Press, New York
6.	Gross. I. H.,Crandall,E.W.andKnoll,M.M.(1980).*Management for Modern Families.* New Jersey: Prentice Hall Inc
7.	Bhargava, B. (2005). *Family Resource Management and Interior Decoration*, Jaipur: Apple Printer and V. R. Printers
8.	Varghese, M. A., Ogale. N. and Srinivasan K. (1985). *Home Management*. New Delhi: New Age International (P) Limited, Publishers (ISBN 13: 9780852269046

Date **Course Coordinator** **Subject Committee Chairperson**

2.	Khan M.I., (2014). Industrial Ergonomics. PHI Learning Private Limited, New Delhi
3.	Umesh Prasad, (2011). Essential of Ergonomics. Sonali Publications, New Delhi
4.	Manjit Kaur Chauhan, (2015). Ergonomics Practical Manual for Beginners. Authors press, New Delhi.
5.	Tayyari. F and Smith J.L, (1997). Occupational Ergonomics – Principles and Applications, Chapman and Hall, Tokyo
6.	Jan Dul and Bernard Weerdmeester, (2008). Ergonomics for Beginners – A quick reference guide, CRC Press, New York.

Date **Course Coordinator** **Subject Committee Chairperson**

Curriculum

of

B.Sc. with

Nutrition and Dietetics as one Major 5th and 6th Semester

KARNATAKA STATE HIGHER EDUCATION COUNCIL

Sub-committee members of B.Sc. Nutrition and Dietetics

1.	Dr. Sangeeta Pandey -Convenor Mount Carmel College
2.	Dr. Geetha Santhosh Mount Carmel College
3.	Dr. V. Padma Mount Carmel College
4.	Dr Usha Devi C -Principal Maharani Cluster University
5.	Dr Asha G Maharani Cluster University
6.	Dr Vidhya K Maharani Cluster University

Content of courses for B.Sc. with Nutrition &Dietetics as Major subject & B.Sc. (Hons) Nutrition &Dietetics II A Model

Semester	Course Code.	Category of course	Theory/ Practical	Credits	Paper Titles	Marks	
						S.A	I.A
I	ND T C 1.1	DSC 1	Theory	4	Fundamentals of nutrition	60	40
	ND P C 1.1	DSC 1	Practical	2	Fundamentals of nutrition	25	25
	ND OE 1	OE 1	Theory	3	Fundamentals of food and health / Health lifestyle and nutrition	60	40
II	ND T C 2.1	DSC 2	Theory	4	Principles of Food Science and Preservation	60	40
	ND P C 2.1	DSC 2	Practical	2	Principles of Food Science and Preservation	25	25
	ND OE 2	OE 2	Theory	3	Food safety and Hygiene/ Food Adulteration	60	30
	Exit option with certificate (50 credits)						
III	ND T C 3.1	DSC 3	Theory	4	Nutrition through life span	60	40
	ND P C 3.1	DSC 3	Practical	2	Nutrition through life span	25	25
	ND OE 3	OE 3	Theory	3	Traditional Foods and Health/ Nutritional Assessment	60	40
IV	ND T C 4.1	DSC 4	Theory	4	Human Physiology	60	40
	ND P C 4.1	DSC 4	Practical	2	Human Physiology	25	25
	ND OE T 4	OE 4	Theory	3	Nutrition in weight management/ Diet in life style disorder	60	40
	Exit Option with Diploma (100 credits) or choose any one of the core subjects as major and the other as minor						
V	ND T C 5.1	DSC5	Theory	4	Clinical Nutrition & Dietetics – 1	60	40
	ND P C 5.1	DSC5	Practical	2	Clinical Nutrition & Dietetics – 1	25	25
	ND T C 5.2	DSC 6	Theory	4	Food Microbiology	60	40
	ND P C 5.2	DSC 6	Practical	2	Food Microbiology	25	25

VI	ND T C 6.1	DSC 8	Theory	4	Clinical Nutrition & Dietetics – II	60	40
	ND P C 6.1	DSC 8	Practical	2	Clinical Nutrition & Dietetics – II	25	25
	ND T C 6.2	DSC 9	Theory	4	Principles and practices in Public Health Nutrition	60	40
	ND TC P 2	DSC 10	Practical	2	Principles and practices in Public Health Nutrition	25	25
	Exit option with Bachelor of Science BSc Degree (142credits) or continue studies with the Major						

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Nutrition & Dietetics**		Semester	**Fifth Sem**
Course Title	**Clinical Nutrition & Dietetics – I (Theory)**			
Course No.	**ND T C 5.1**	**DSC 5**	No. of Credits	**4 +2**
Contact hours	**60 Hrs**		Duration of SEA/Exam	**2.5 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

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

1. Know the role of dietetics in preventive, promotive and curative health care
2. Understand the clinical condition with relevant data (laboratory, anthropometry, pharmacology)
3. Develop skills to make appropriate dietary modifications in clinical conditions.

Content	60 Hrs
Unit – 1	**15 Hrs**
Chapter No. 1: Introduction to Diet therapy – Objectives. Nutrition assessment in clinical set up, Nutrition Care Process (ADIME). Role of dietician, responsibilities, code of ethics.	**5 Hrs**
Chapter No. 2: Therapeutic meal planning - factors to be considered, food groups, exchange list.	**5 Hrs**
Chapter No. 3: Types of hospital diet; modification of normal diet to therapeutic diet,	**5 Hrs**
Unit – 2:	**15 Hrs**
Chapter No. 4: Weight management: Underweight, overweight, etiology, assessment and treatment, dietary guidelines, challenges – eating disorders and fad diets.	**10 Hrs**
Chapter No. 5: Inborn errors of metabolism – PKU, Galactosemia, GSD, MSUD	**5 Hrs**

Unit -3:	**15 Hrs**
Chapter No. 7: Infections and febrile conditions: host defence mechanism Dietary management in acute and chronic fever – typhoid, malaria, tuberculosis.	**8 Hrs**
Food sensitivity: Definition, diagnosis, nutrition management – allergens.	**7 Hrs**
Unit -4	**15 Hrs**
Chapter No. 8: Gastrointestinal disorders: Diarrhoea, Constipation, GERD, Peptic ulcers, Irritable Bowel Syndrome, Inflammatory Bowel Disease (Lactose intolerance and gluten intolerance).	**8 Hrs**
Chapter No. 9: Liver & biliary system: Viral hepatitis, Cirrhosis, cholecystitis, cholelithiasis, acute & chronic pancreatitis	**7 Hrs**

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 role of dietetics in preventive, promotive and curative health care	X						X					
Understand the clinical condition with relevant data (laboratory, anthropometry, pharmacology)					X							
Develop skills to make appropriate dietary modifications in clinical Conditions		X									X	

Pedagogy

Lecture, demonstration, hands on learning through projects, presentations, hospital dietary visits, case studies, workshops.

Assessment

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	10
Test 2	10
Presentation / Assignment	10
Project quiz	10
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

Course Title:	**Clinical Nutrition & Dietetics I (Practical)**	Practical Credits	**2**
Course No.	**ND P C 5.1**	Contact Hours:	**52 Hrs**
Practical Topics - 2 credits		**13 - 15 weeks**	

Diet planning in

1. Typhoid
2. Tuberculosis
3. GI condition – peptic ulcer, lactose and gluten intolerance
4. Overweight
5. Underweight
6. Cirrhosis
7. Hepatitis

Assessment

Formative +Summative Assessment = 25+25=50 marks	
Formative Assessment	**Weightage in Marks**
Internal Assessment	25
Summative Assessment (ESE)	25
Total	**25 marks + 25 marks = 50 marks**

References:	
1.	Krause MV and Mahan, Food (2008), Nutrition And Diet Therapy, WS Saunders Co.,12th edition
2.	Antia, F.P. (2005): Clinical Nutrition and Dietetics, Oxford University Press, Delhi
3.	Robinson,C.H;Lawler,M.R.Chenoweth,W.L;and Garwick,A.E (1986):Normal and Therapeutic Nutrition,17th Ed., Mac Millan Publishing Co
4.	Shills ME and Shike M (2006), Modern Nutrition in Health and Disease, 10th edition, Lippincott Williams and Wilkins

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Nutrition & Dietetics**		Semester	**Fifth Sem**
Course Title	**Food Microbiology (Theory)**			
Course No.	**ND T C 5.2**	**DSC 6**	No. of Credits	**4+2**
Contact hours	**60 Hrs**		Duration of SEA/Exam	**2.5 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

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

1. Understand about the origin of microbiology and characteristics of microorganisms.
2. Gain knowledge on factors affecting growth and death of microorganisms
3. Learn about microbial food spoilage and food-borne illnesses
4. Acquire knowledge on the role of food microbiology in biotechnology

Content	**60 Hrs**
Unit – 1 Introduction to Microbiology	**15 Hrs**
Chapter No. 1: Scope of Microbiology, Food Microbiology: its origins - historical roots (in brief), Germ theory of Disease.	**5 Hrs**
Chapter No. 2: Naming, Classification and identification, morphological characteristics of Bacteria, Fungi and viruses.	**5 Hrs**
Chapter No. 3: Growth and cell division, Bacterial Growth, Culturing bacteria- (Methods of obtaining pure cultures, culture media, maintaining cultures).	**5 Hrs**
Unit – 2: Factors affecting microbial growth and death	**15 Hrs**
Chapter No. 4: Factors affecting the growth of micro-organisms- temperature, water activity, pH, oxygen, redox and nutritional factors; interaction of factors and between organisms.	**5 Hrs**
Chapter No. 5: Death of micro-organisms and microbial populations- a) Heat, preservation of foods (Appertization, Pasteurization).	**10 Hrs**

b) Chemical agents- factors influencing activity of sanitizers, preservatives, Hurdle effect. c) Radiation-preservation, d) High pressure (brief).	
Unit -3: Food Spoilage and Food borne disease	**15 Hrs**
Chapter No. 7: Nature, Causes, Contamination, Composition of spoilage, Changes in foods caused by spoilage organisms Spoilage of important food commodities and food products-Meat, Fish, Egg and Milk, Fruits and Vegetables, Cereals. Influence of processing.	**8 Hrs**
Chapter No. 8: Genetically modified foods Role of Microorganisms in fermented foods- Fermented-baked food preparations, Fermented vegetable foods, soyabean products, dairy products, other meat products, economically important fermentation products (Beer & Wine).	**7 Hrs**
Unit –IV Food Poisoning	**15 Hrs**
Chapter No. 1: Cause of disease, investigations and origins of food poisoning outbreaks, importance of food poisoning to individual and economy, control. Food poisoning bacteria causing: 1. Infections- Salmonella, Shigella, E. coli, Vibrio cholerae 2. Intoxications- Staphylococcus aureus, Clostridium Botulinum 3. Viruses- Hepatitis A .	**10 Hrs**
Chapter No. 2: Chapter No. 6: Definition of FSSAI, HACCP- A Food Safety Assurance system.	**5 Hrs**

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 about the origin of microbiology and characteristics of microorganisms						X						
Gain knowledge on factors affecting growth and death of microorganisms						X						
Learn about microbial food spoilage and food-borne illnesses						X						
Acquire knowledge on the role of food microbiology in biotechnology						X	X					

Pedagogy

Lecture, demonstration, hands on learning through projects, presentations, case studies, workshops.

Assessment

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	10
Test 2	10
Presentation / Assignment	10
Project quiz	10
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

Course Title:	**Food Microbiology (Practical)**	Practical Credits	**2**
Course No.	**ND P C 5.2**	Contact Hours:	**52 Hrs**
Practical Topics - 2 credits		**13 - 15 weeks**	

1. Introduction to the microbiology lab
   Safety guidelines, Good microbiological laboratory practice (GMLP), Resources (equipment, apparatus, materials)
2. Microscopy: Using microscope- Compound microscope, Electron microscope.
3. a.-Stained preparations – identification of fungi
   b. Preparing a smear, Simple stain/Differential stain (Gram's staining method)
4. Sterilization, and disinfection- Use of autoclave
5. Spoilage of foods from different food groups – Observation of changes under the microscope, Identification of food spoilage and deterioration under different storage conditions, MPN method (Demonstration)
6. Preparation of fermented products and analyzing microbial load in:
   a. Fermented products- idly/ kimchi/Sauerkraut/fermented rice (pazhaya kanji)

7. Visit to industry to understand – quality operation cycle of commercial kitchen / Milk processing unit / any food industry to understand HACCP
8. Safe food-waste disposal strategies (Case studies)

Assessment

Formative +Summative Assessment = 25+25=50 marks	
Formative Assessment	**Weightage in Marks**
Internal Assessment	25
Summative Assessment (ESE)	25
Total	**25 marks + 25 marks = 50 marks**

References:	
1.	Norman G. Marriott, (1985) Principles of sanitation, Van Nostrand Reinhold company, Newyork.
2.	Mario Stanga, (2010) Sanitation: Cleaning and Disinfection in the Food Industry, Wiley.
3.	Y. H. Hui, L. Bernard Bruinsma, J. Richard Gorham, Wai-Kit Nip, Phillip S. Tong, Phil Ventresca (2002) Food plant sanitation, CRC Press.
4.	Y. H. Hui, (2014) Plant sanitation for food processing and food service, CRC Press.
5.	Jay, J. M., Loessner, M. J., & Golden, D. A. (2008). Modern food microbiology. Springer Science & Business Media.
6.	Bibek Ray (2014) Fundamental Food Microbiology. CRC press,

Date **Course Coordinator** **Subject Committee Chairpe**

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Nutrition & Dietetics**		Semester	**Sixth Sem**
Course Title	**Clinical Nutrition & Dietetics – II (Theory)**			
Course No.	**ND T C 6.1**	**DSC 8**	No. of Credits	**4**
Contact hours	**60 Hrs**		Duration of SEA/Exam	**2.5 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

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

1. Integrate dietetics and counselling in preventive, promotive and curative health care
2. Understand the clinical condition with relevant data (laboratory, anthropometry, pharmacology)
3. Utilize and demonstrate skills to make appropriate dietary modifications in clinical conditions

Content	60 Hrs
Unit – I	**15 Hrs**
Chapter No. 1: Nutritional counseling – objectives, importance, process.	**7 Hrs**
Chapter No. 2: Nutrition support – Enteral and parenteral nutrition overview. Enteral and parenteral nutrition: access routes, formulas, challenges.	**8 Hrs**
Unit – II	**15 Hrs**
Chapter No. 3: Diabetes: Classification, Risk factors, Diagnosis, Complications, Dietary management – Type 1 & Type 2.	**7 Hrs**
Chapter No. 4: Renal: Etiology, Dietary management – Glomerulonephritis, nephrotic syndrome, chronic kidney disease, dialysis, renal calculi.	**8 Hrs**

Unit -III	**15 Hrs**
Chapter No. 5: Starvation, Stress, Trauma. Burns – Assessment, Fluid and electrolyte repletion, nutrition management.	**7 Hrs**
Chapter No. 6 Cardiovascular disorder: Atherosclerosis, Dyslipidemia, hypertension – etiology, risk factors, dietary management.	**8 Hrs**
Unit -: IV	**15 hrs.**
Chapter No. 7: Nutrient, drug interactions: Effect of drug on food intake; food and nutrient on drugs .	**7Hrs**
Chapter No. 8: Cancer: Risk factors, prevention, and dietary management	**8 Hrs**

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**
Integrate dietetics and counselling in preventive, promotive and curative health care	X						X					
Understand the clinical condition with relevant data (laboratory, anthropometry, pharmacology)					X							
Utilise and demonstrate skills to make appropriate dietary modifications in clinical conditions		X									X	

Pedagogy

Lecture, demonstration, hands on learning through projects, experiments, hospital dietary visits, case studies, workshops.

Assessment

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	10
Test 2	10

Presentation / Assignment	10
Project quiz	10
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

Course Title:	**Clinical Nutrition & Dietetics II (Practical)**	Practical Credits	**2**
Course No.	**ND P C 6.1**	Contact Hours:	**52 Hrs**
Practical Topics - 2 credits		**52 hrs/13 sessions**	

1. Type 2 Diabetes
2. Type 1 DM (carbohydrate counting)
3. Cancer
4. Chronic kidney disease
5. Renal Calculi
6. Burns
7. Hypertension

Assessment

Formative +Summative Assessment = 25+25=50 marks	
Formative Assessment	**Weightage in Marks**
Internal Assessment	25
Summative Assessment (ESE)	25
Total	**25 marks + 25 marks = 50 marks**

References:	
1.	Krause MV and Mahan, Food (2008), Nutrition and Diet Therapy, WS Saunders Co.,12th edition
2.	Antia, F.P. (2005): Clinical Nutrition and Dietetics, Oxford University Press, Delhi
3.	Robinson, C.H;Lawler, M.R. Chenoweth, W.L; and Garwick,A.E (1986):Normal and Therapeutic Nutrition,17th Ed., Mac Millan Publishing Co
4.	Shills ME and Shike M, Modern Nutrition in Health and Disease, 10th edition, Lippincott Williams and Wilkins, 2006

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Nutrition & Dietetics**		Semester	**Sixth Sem**
Course Title	**Principles and Practices in Public Health Nutrition (Theory)**			
Course No.	**ND T C 6.3**	**DSC 10**	No. of Credits	**4**
Contact hours	**60 Hrs**		Duration of SEA/Exam	**2.5 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

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

1. Understand the definition, utility and applications of epidemiology in nutritional sciences.
2. Understand the multi-faceted nature of problems in public nutrition.
3. Gain understanding about the food and nutrition security in India

Content	60 Hrs
Unit – 1 Concept of Public Health and Nutritional Epidemiology	**15 Hrs**
Chapter No. 1: Introduction to Nutritional Epidemiology and Public health Nutrition. Scope and principles of public health Nutrition – Definition, aims and objectives. Multidisciplinary nature of public nutrition, Role of public nutritionist.	**6 Hrs**
Chapter No. 2: National and International agencies in community nutrition- Role of WHO, UNICEF, UNDP, FAO, UNESCO, ILO, WORLD BANK, Red Cross, CARE.	**9 Hrs**
Unit – 2: Nutritional problems and Assessment	**15 Hrs**
Chapter No. 3: Etiology, prevalence, clinical features, and preventive strategies of Protein energy malnutrition. Dual Nutrition Burden: i. Under nutrition and Over nutrition Nutritional anemia's, Vitamin A deficiency, Iodine deficiency disorders Obesity, coronary heart disease, Diabetes Mellitus.	**7 Hrs**
Chapter No 4 Assessment of Nutritional Status in community a. Anthropometric Assessment: Measurement of body weight, stature, mid upper arm circumference, standards (NCHS - weight for height, weight for age. Clinical Assessment: clinical signs of nutritional disorders c. Dietary Assessment: Family dietary survey, Assessment of dietary intake of individuals.	**8 Hrs**

Unit -3: Nutrition Security and Education	**15 Hrs**
Chapter No. 5: Food and Nutrition Security: Basic concepts & Policies. Overview of the on-going public sector programmes for improving food and nutrition security. Identification and measurement of food insecurity (FIA, ISMAP)Social capital and coping mechanism for food insecurity.	**8 Hrs**
Chapter No. 6: Objectives, principles and scope of nutrition and health education and promotion Links with health promotion Purpose, advantage and constraints of nutrition education Framework for planning nutrition promotion and education programs for the public Information, education and communication	**7 Hrs**
Unit -IV	**15 Hrs**
Chapter No. 7: National Nutrition Policy and Programmes - Integrated Child Development Services (ICDS) Scheme, Midday Meal Programme (MDMP)	**7 Hrs**
Chapter No. 8: National programmes for preventionof Anaemia, Vitamin A deficiency, Iodine Deficiency Disorders National Programme for Prevention and Control of Cancers, Diabetes, Cardiovascular Diseases and	**8 Hrs**

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 definition, utility and applications of epidemiology in nutritional sciences	X					X						
Understand the multi-faceted nature of problems in public nutrition.					X							
Gain understanding about the food and nutrition security in India.		X						X			X	
Develop and prepare different types of visual aids suitable to community nutrition programmes.				X								
Gain practical experience in imparting the knowledge of nutrition to the community										X		

Pedagogy

Lecture, demonstration, hands on learning through projects, experiments, field visits, case studies, workshops.

Assessment

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	10
Test 2	10
Presentation / Assignment	10
Project quiz	10
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

Course Title:	**Principles and Practices in Public Health Nutrition** **(Practical)**	Practical Credits	**2**
Course No.	**ND P C 6.3**	Contact Hours:	**52 Hrs**
Practical Topics - 2 credits		**13 weeks**	

1. Preparation of audio-visual aid for
   a. PEM
   b. Vitamin A deficiency
   c. Anemia
2. Preparation of a low-cost recipes for PEM, Vitamin A deficiency and Anemia
3. Anthropometric and dietary assessment
4. Organize and conduct a nutrition awareness program on Anemia/ Vitamin A

Assessment

Formative +Summative Assessment = 25+25=50 marks	
Formative Assessment	**Weightage in Marks**
Internal Assessment	25
Summative Assessment (ESE)	25
Total	**25 marks + 25 marks = 50 marks**

References:	
1.	Sheila ChanderVir (2011). Public Health Nutrition in developing countries – part I and II, Woodhead Publishing India, Pvt Ltd
2.	Nutrition in Public Health - A handbook for developing programmes and services.3rd edition, Sari Edelstein, Jones and Bartlett learning, 2011
3.	Nutrition Epidemiology- An Introduction
4.	Wadhava, A. and Sharma, S. (2003). Nutrition in community. New Delhi : Elite publication house pvt. Ltd
5.	Annual reports – Dept. of agriculture and co-operation –Ministry of agriculture, Govt of India
6.	Gopaldas, J. and Seshadri, S.(1987). Nutrition monitoring and assessment. New Delhi: Oxford University Press.
7.	Park, J.E. and Park, K. (1997). Text book of preventive and social medicine (15thed.). Jabalpur: Banarasidas Bhanot.
8.	Samanta, R. K. (1991). Manual on instructional aids for teachingexcellence. New Delhi: Mittal Publications
9.	Shukla, P.K. (1982). Nutritional problems of India. New Delhi: PrenticeHall India Pvt. Ltd
10.	Bamji MS, Krishnaswamy K and Brahmam GNV (Eds) (2016). Textbook of Human Nutrition, 4 thedition. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi, Chapter 34, pg 563 – 575

Date **Course Coordinator** **Subject Committee Chairperso**

Curriculum

of

B.Sc.

in

Clinical Nutrition and Dietetics

5th and 6th Semester

KARNATAKA STATE HIGHER EDUCATION COUNCIL

Sub-committee members of B.Sc. Clinical Nutrition and Dietetics

1.	Dr. M. Anuradha Convenor Principal, Padmashri Group of Institutions
2.	Dr. Usha Devi. C -Principal Maharani Cluster University
3.	Dr. Navaneetha.R Maharani Cluster University
4.	Dr. Neetha Pattan Maharani Cluster University
5.	Dr. Bhavana S Padmashri Group of Institutions
6.	Dr. Shilpa P Padmashri Group of Institutions

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	DSC- 2	Practical	2	Fundamentals of Nutrition	25	25
	CNDT 1.2	DSC- 3	Theory	3	Essentials of Macronutrients	60	40
	CNDP 1.2	DSC- 4	Practical	2	Essentials of Macronutrients	25	25
	CNDT 1.3	DSC- 5	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 - 6	Theory	3	Human Physiology	60	40
	CNDP 2.1	DSC - 7	Practical	2	Human Physiology	25	25
	CNDT 2.2	DSC- 8	Theory	3	Essentials of Micronutrients	60	40
	CNDP 2.2	DSC - 9	Practical	2	Essentials of Micronutrients	25	25
	CNDT 2.3	DSC- 10	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							
3.	CNDT 3.1	DSC- 11	Theory	3	Life Cycle Nutrition	60	40
	CNDP 3.1	DSC - 12	Practical	2	Life Cycle Nutrition	25	25
	CNDT 3.2	DSC- 13	Theory	3	Dietetics I	60	40
	CNDT 3.2	DSC - 14	Practical	2	Dietetics I	25	25

	CNDT 3.3	DSC- 15	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- 16	Theory	3	Dietetics II	60	40
	CNDP 4.1	DSC- 17	Practical	2	Dietetics II	25	25
	CNDT 4.2	DSC- 18	Theory	3	Community Nutrition	60	40
	CNDP 4.2	DSC- 19	Practical	2	Community Nutrition	25	25
	CNDT 4.3	DSC- 20	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- C21	Theory	4	Dietetics III	60	40
	CNDP 5.1	DSC- C22	Practical	2	Dietetics III	25	25
	CNDT 5.2	DSC- C23	Theory	4	Food Science	60	40
	CNDP 5.2	DSC- C24	Practical	2	Food Science	25	25
	CNDT 5.3	DSC- C25	Theory	4	Physiologic and metabolic changes in disease	60	40
	CNDT 5.5	DSE- E1	Theory	3	Nutrigenomics & Nutraceuticals / Geriatric nutrition	60	40
	CNDT 5.4	VOC - 1	Theory	2	Ayurveda Ahara and Poshan Sahayak / Diet counselling	60	
			Practical	1			40
6.	CNDT 6.1	DSC- C26	Theory	4	Dietetics IV	60	40
	CNDP 6.1	DSC- C27	Practical	2	Dietetics IV	25	25
	CNDT 6.2	DSC- C28	Theory	4	Food Microbiology and functional foods	60	40
	CNDP 6.2	DSC- C29	Practical	2	Food Microbiology and Functional Foods	25	25

	CNDT 6.3	DSC- C30	Theory	4	Food service management	60	40
	CNDT 6.4	DSE- E2	Theory	3	Information Education Communication (IEC)/ Food entrepreneurship	60	40
	CNDT 6.5	VOC - 2	Theory	2	Nutrition counseling / Diabetes management	60	
			Practical	1			40
Exit Option with Bachelor of Science in Clinical Nutrition and Dietetics							

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Clinical Nutrition and Dietetics**		Semester	**Fifth Sem**
Course Title	**Dietetics III (Theory)**			
Course No.	CNDT 5.1	**DSC- C21**	No. of Credits	**4+2**
Contact hours	**60 Hrs**		Duration of SEA/Exam	**2.30 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%.

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

1. Gain a solid understanding of the principles of nutrition during diseased condition
2. Knowledge of medical nutrition therapy for various health conditions such as Liver disorders, gastrointestinal disorders, and renal disease, as well as strategies to create tailored meal plans to meet individual health needs.
3. Learn about the dietary management of genetic disorders
4. Seek knowledge on food allergies and their dietary management

Content	**60 Hrs**
Unit-I	20 hours
• Liver disorders - Etiology, types, symptoms, dietary management of Non-alcoholic fatty liver disease, Jaundice, viral hepatitis and cirrhosis • Gall bladder disorders - Etiology, types, symptoms, dietary management of Cholecystitis, Choledocholithiasis, and Cholelithiasis. Biliary dyskinesia, Sclerosing cholangitis • Pancreatic disorders - Etiology, types, symptoms, dietary management of acute and chronic pancreatitis, Cystic fibrosis.	

Unit- II	15 hours
• Renal disorders - Etiology, symptoms, dietary management • Chronic Kidney Disease(CKD) • Glomerulonephritis • Nephrosis	

nic)	
Unit- III	15hours
•Genetic disorders Introduction to inborn errors of metabolism, common disorders (phenylketonuria, galactosemia, fructosuria, maple syrup urine disease), Understanding metabolic pathways and their disruption, and Dietary management. Genetic Disorders Affecting Nutrient Digestion and Absorption- Cystic fibrosis and pancreatic insufficiency, Celiac disease and gluten-related disorders, Lactose intolerance and other carbohydrate malabsorption disorders, Dietary modifications and enzyme replacement therapy. •Rheumatic Disease-Osteoarthritis, Rheumatoid arthritis, Gout - Etiology, symptoms, dietary management, lifestyle modification	
Unit IV	10 hours
• Food Allergy Introduction to Food Allergy and Food Intolerance Immunology and Pathophysiology of Food Allergy, Common Food Allergens Diagnosis of Food Allergies and Intolerances, Management and Treatment of Food Allergies, Food sensitivity: Food sensitivity: Types of reactions, Foods involved in sensitivity, Difference between food allergy and food intolerance, Food Intolerances and Sensitivities. Lactose intolerance, gluten sensitivity, and other common intolerances, Mechanisms and symptoms, Diagnosis and management strategies, Special Considerations and Dietary Planning ✓ •Nutrient and Drug interactions: Effect of drug on food intake, digestion, absorption, transportation and excretion	

Pedogogy

Formative Assessment	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Seminar	5 + 5
Project	10
Total	**40 marks**

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.Gain a solid understanding of the principles of nutrition during diseased condition	✓	✓									✓				
2. Knowledge of medical nutrition therapy for various health conditions such as Liver disorders, gastrointestinal disorders, and renal disease, as well as strategies to create tailored meal plans to meet individual health needs.	✓										✓				
3.Learn about the dietary management of genetic disorders	✓														✓
4. Seek knowledge on food allergies and their dietary management	✓														✓

Pedagogy - Theory

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

Course Title:	**Dietetics III (Practical)**	Practical Credits	**2**
Course No.	**CNDP 5.1**	Contact Hours:	**39hrs/ 13Sessions**
Practical Topics - 2 credits			**13 - 15 weeks**
Plan, prepare and evaluate: • A day's diet for Cirrhosis (case profile) • A day's diet for Hepatitis (case profile) • Recipes for cholelithiasis • Recipes for acute pancreatitis • A day's diet for Nephrotic syndrome (case profile) • Prepare a list of low, medium and high Potassium foods • Recipes for PKU (adult) • Recipes for **Osteoarthritis / Rheumatoid arthritis** (case profile) • A day's diet for **Gout** and list of low-purine foods (case profile)			

Assessment

Formative +Summative Assessment = 25+25=50 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment / project	5 + 5
Total	**25 marks + 25 marks = 50 marks**

References:	
1.	Klaus Kraemer and Peter B. Meier. Nutraceuticals in Health and Disease Prevention, CRC Press, 2001
2.	Jim Kaput and Raymond L. Rodriguez, Nutritional Genomics: Discovering the Path to Personalized Nutrition, Wiley-Interscience, 1st edition, 2006
3.	Ann L. Yaktine and Robert Pool, Institute of Medicine (IOM). 2007. Nutrigenomics and beyond: Informing the future. Washington, DC: The National Academies Press, 2007
4.	Debasis Bagchi, Francis Lau, Manashi Bagchi, Genomics, Proteomics and Metabolomics in Nutraceuticals and Functional Foods, Wiley-Blackwell; 1st edition, 2010.
5.	Journal Nutrients 2012, 4, 1898-1944; Molecular Nutrition Research—The Modern Way Of Performing Nutritional Science.
6.	Journal Nutrients 2013, 5, 32-57; Nutrigenetics and Metabolic Disease: Current Status and Implication for Personalized Nutrition
7.	Lynnette R. Ferguson, Nutrigenomics and Nutrigenetics in Functional Foods and Personalized Nutrition, CRC Press, 1st edition, 2013.
8.	Satinder Kaur Brar, Surinder Kaur, Gurpreet Singh Dhillon, Nutraceuticals and Functional Foods: Natural Remedy, Nova Science Publishers, 2014.
9.	Raffaele De Caterina, J. Alfredo Martinez, Martin Kohlmeier, Principles of nutrigenetics and nutrigenomics, Academic Press, 2020.
10.	Debasis Bagchi, Harry G. Preuss, Anand Swaroop, Nutraceuticals and Functional Foods in Human Health and Disease Prevention, CRC Press, 1st edition, 2021.

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Clinical Nutrition and Dietetics**		Semester	**Fifth Sem**
Course Title	**Food Science (Theory)**			
Course No.	CNDT 5.2	**DSC- C23**	No. of Credits	**4+2**
Contact hours	**60 Hrs**		Duration of SEA/Exam	**2.30 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%.

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

1. Define the fundamental concepts and principles of food science, including the composition of various food components and their roles in food quality and nutrition.
2. Examine the composition and nutritive value of milk and its products, including their properties and changes during cooking
3. Learn various food processing and preservation methods, including their effects on food quality and shelf life.
4. Analyze factors influencing the shelf life of different food products and recommend techniques to prolong product freshness and quality.

Content	**60 Hrs**
Unit-I	08 hours
Introduction to food science Food science: Definition, importance and scope of food science. Sensory evaluation- Factors affecting the acceptability of food, Selection of taste panel, Subjective and objective tests Bound and free water, Colloids, Emulsions-Types and factors affecting stability, pH, Osmosis, Freezing point.	
Unit- II	22 hours
Study of cereals and pulses • Structure and composition of cereals, processing of cereals and pulses • Gelatinization of starch and factors affecting • Role of ingredients in baking, dough formation, factors affecting dough formation and gluten formation • Toxic constituents Fruits and vegetables • Classification and composition • Pigments---classification, Changes during cooking and factors affecting it • Enzymatic browning and prevention Fats and oils • Physical and chemical properties • Rancidity	

• Changes during frying • Factors affecting fat absorption Sugar cookery and leavening agents • Stages of sugar cookery • Crystallization and factors affecting it • Non-enzymatic browning	
Unit- III	**15 hours**
Milk and milk products: Composition and Nutritive value of milk, properties of milk, Milk cookery, effect of heat on milk, Nutritional importance of milk, milk products -Non fermented and fermented products- Role of milk in cookery. Meat, Fish, poultry and Eggs: Meat: Structure, composition and nutritive value, post-mortem changes in meat, tenderization, curing and sessions. Cooking of meat and changes during cooking, Grades of meat Fish and Poultry: composition and nutritive value, Cooking, Fish products. Egg: Structure and composition, Changes during cooking, Storage, effect of heat on proteins, egg products.	
Unit- IV	**15 hours**
Sensory evaluation – selection of panel of judges, preparation of samples, types – f tests, judging and results- Objectives methods, subjective methods. Food Preservation and Processing: Studying various food processing techniques and preservation methods to enhance food quality and extend shelf life to maintain nutritional content. Food Packaging: Food packaging in preserving food quality, preventing spoilage, and maintaining product integrity during storage and transportation. Shelf life studies: factors that affect the shelf life of different food products and techniques to prolong product freshness and quality	

Pedogogy

Formative Assessment	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Seminar	5 + 5
Project	10
Total	**40 marks**

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Define the fundamental concepts and principles of food science, including the composition of various food components and their roles in food quality and nutrition.		✓					✓								
Examine the composition and nutritive value of milk and its products, including their properties and changes during cooking		✓													
Learn various food processing and preservation methods, including their effects on food quality and shelf life.		✓													
Analyze factors influencing the shelf life of different food products and recommend techniques to prolong product freshness and quality.		✓		✓											

Pedagogy - Theory

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

Course Title:	**Dietetics III (Practical)**	Practical Credits	**2**
Course No.	**CNDP 5.2**	Contact Hours:	**39hrs /13Sessions**
Practical Topics - 2 credits			**13 - 15 weeks**
1. Methods of Cooking- boiling, broiling, frying, Microwave cooking, Poaching 2. Starch Cookery- a) Gelatinization of starch, and Dextrinisation of starch, Glutenisation, Effect of kneading 3. Pulse cookery a) Whole grams- effect of soaking and germination. b) Dhals-Effect of acid and alkali on cooking time. 4. Fats and Oils - Smoking point of different fats and oils. a. Effect of deep frying at smoking point, below smoking point, above smoking point.			

b. Shallow frying- vegetable cutlet d) Deep fat frying-papads 5. Milk cookery- Coagulation of milk 6. Egg Cookery-. a) Assessing of Egg quality b) boiled eggs (soft and hard), effect of beating on egg preparations c) Prevention of ferrous sulphide formation. 7. Stages of sugar cookery 8. Vegetables and fruits – Enzymatic browning, preparation of jam, jelly and squash.	

Assessment

Formative +Summative Assessment = 25+25=50 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment / project	5 + 5
Total	**25 marks + 25 marks = 50 marks**

References:	
1.	Srilakshmi, B. (2003). Food science. New Age International (P) Ltd, New Delhi, 7th edition, Reprint 2022.
2.	Hardy, Ronald W., and Sadasivam J. Kaushik, eds. Fish nutrition. Academic press, 2021.
3.	Bockisch, Michael, ed. Fats and oils handbook (Nahrungsfette und Öle). Elsevier, 2015.
4.	Duckworth, Ronald Barrett. Fruit and vegetables. Elsevier, 2013.
5.	Potter, Norman N., and Joseph H. Hotchkiss. Food science. Springer Science & Business Media, 2012.
6.	Pomeranz, Yeshajahu. Functional properties of food components. Academic Press, 2012.
7.	Coultate, Tom P. Food: the chemistry of its components. Royal Society of Chemistry, 2009.
8.	Feiner, Gerhard. Meat products handbook: Practical science and technology. Elsevier, 2006.
9.	Stone, Herbert, and Joel L. Sidel. "Introduction to sensory evaluation." Sensory Evaluation Practices (Third Edition). Academic Press, San Diego (2004): 1-19.
10.	Aneja, R. P., B. N. Mathur, R. C. Chandan, and A. K. Banerjee. Technology of indian milk products: handbook on process technology modernization for professionals, entrepreneurs and scientists. Dairy India Yearbook, 2002.
11.	Manay, N. Shakuntala O. Food: facts and principles. New Age International, 2001

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Clinical Nutrition and Dietetics**		Semester	**Fifth Sem**
Course Title	**Physiological and metabolic changes in diseases (Theory)**			
Course No.	CNDT 5.3	**DSC- C25**	No. of Credits	**4**
Contact hours	**60 Hrs**		Duration of SEA/Exam	**2.30 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%.

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

1. To understand the pathophysiology of various diseases
2. To study the metabolic and physiologic response of the body during disease.
3. Learn to identify the clinical significance and risk factors associated with the disease.

Content	**60 Hrs**
Unit-I	12 hours
Introduction – Objectives and Scope and importance. Pathophysiology • Infection – Fever and metabolic changes. • Common disorders of Digestive tract and associated glands a) Peptic and Duodenal Ulcers b) Diverticulosis, Diarrhoea, Irritable bowel syndrome, Malabsorption c) Hepatitis, Liver Cirrhosis d) Acute and Chronic Pancreatitis	
***Unit- II* Circulatory system**	12 hours
Pathophysiology of Hypertension, Arterio and Atherosclerosis, Variation of HDL & LDL in blood, Angina pectoris and Myocardial Infarction. • Anaemia – Types and Remedial measures.	
***Unit- III* Excretory system**	12 hours
Pathophysiology of Acute and Chronic Nephritis, Nephrosclerosis, Renal calculi, Renal failure, Chronic kidney disease (CKD), 1-5 stages along with dialysis and transplantation	
Unit- IV	24 hours
Part -A Pathophysiology of Diabetes Mellitus – Types, Causes, Symptoms, Remedial measures, Hypo and hyper Vitaminosis, Endocrine Disorders - Thyroid, Adrenal and Growth hormones, Stress – Physiological effects, Neuro-endocrine control of stress Part -B Malnutrition, under and over nutrition	

Obesity – Types, Causes and risks Cancer biology – Types, Properties of cancer cells, Prevention and Regulation. Inborn errors of Metabolism – AKU, PKU, Cystic fibrosis, Galactosemia, Albinism	

Pedogogy

Formative Assessment	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Seminar	5 + 5
Project	10
Total	**40 marks**

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**
To understand the pathophysiology of various disease	✓										✓	
To study the metabolic and physiologic response of the body during disease.	✓										✓	
Learn to identify the clinical significance and risk factors associated with the disease.	✓								✓			

Pedagogy – Lecture, demonstration, hands on learning through projects, experiments, hospital dietary visits, case studies, workshops.

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

References:	
1.	Bansal, N., Pasricha, C., Kumari, P., Jangra, S., Kuar, R., & Singh, R. (2023). A comprehensive overview of juvenile idiopathic arthritis: From pathophysiology to management. *Autoimmunity Reviews*, 103337.
2.	
3.	Kliegman, R. M., Behrman, R. E., Jenson, H. B., & Stanton, B. M. (2007). *Nelson textbook of pediatrics e-book*. Elsevier Health Sciences.
4.	Abbott, M. B., & Vlasses, C. H. (2011). Nelson textbook of pediatrics. *Jama*, *306*(21), 2387-2388.
5.	.
6.	Mann, D. L. (2011). The emerging role of innate immunity in the heart and vascular system: for whom the cell tolls. *Circulation research*, *108*(9), 1133-1145.
7.	Lødrup, A. B., Karstoft, K., Dissing, T. H., Nyengaard, J. R., & Pedersen, M. (2008). The association between renal function and structural parameters: a pig study. *BMC nephrology*, *9*(1), 1-9.
8.	Pallone, T. L., Yagil, Y. O. R. A. M., & Jamison, R. L. (1989). Effect of small-solute gradients on transcapillary fluid movement in renal inner medulla. *American Journal of Physiology-Renal Physiology*, *257*(4), F547-F553.
9.	Corbin, K. D., Driscoll, K. A., Pratley, R. E., Smith, S. R., Maahs, D. M., Mayer-Davis, E. J., & Advancing Care for Type 1 Diabetes and Obesity Network (ACT1ON). (2018). Obesity in type 1 diabetes: pathophysiology, clinical impact, and mechanisms. *Endocrine reviews*, *39*(5), 629-663.
10.	Gan, M. J., Albanese-O'Neill, A., & Haller, M. J. (2012). Type 1 diabetes: current concepts in epidemiology, pathophysiology, clinical care, and research. *Current problems in pediatric and adolescent health care*, *42*(10), 269-291.
11.	Del Chierico, F., Rapini, N., Deodati, A., Matteoli, M. C., Cianfarani, S., & Putignani, L. (2022). Pathophysiology of type 1 diabetes and gut microbiota role. *International Journal of Molecular Sciences*, *23*(23), 14650.
12.	Bezabeh, M., Tesfaye, A., Ergicho, B., Erke, M., Mengistu, S., Bedane, A., & Desta, A. (2004). General pathology.
13.	Bezabeh, M., Tesfaye, A., Ergicho, B., Erke, M., Mengistu, S., Bedane, A., & Desta, A. (2008). Genetics: Principles and Analysis.

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Clinical Nutrition and Dietetics**		Semester	**Fifth Sem**
Course Title	Nutrigenomics & Nutraceuticals **(Theory)**			
Course No.	CNDT 5.5	**DSE – E1A**	No. of Credits	**3**
Contact hours	**45 Hrs**		Duration of SEA/Exam	**2 Hours 30 mins**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%.

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

1. The course provides an in-depth exploration of the field of nutrigenomics and nutraceuticals, focusing on the intersection of nutrition, genetics, and health.
2. Students will gain knowledge and understanding of how individual genetic variations influence nutrient metabolism and response to specific dietary components.
3. This course provides an overview of nutraceuticals, their role in health promotion, and their impact on various aspects of human health.
4. Students will gain knowledge about different types of nutraceuticals, their mechanisms of action, and their potential applications in preventing and managing chronic diseases.

Content	**45Hrs**
Unit-I	13 hours
Introduction to Nutrigenomics: Definition and scope of nutrigenomics, historical background and development of nutrigenomics, key principles, and concepts in nutrigenomics, significance of nutrigenomics in personalized nutrition Genetic Variation and Nutrient Metabolism: basics of genetics and genetic variations, Single nucleotide polymorphisms (SNPs) and their relevance in Nutrigenomics, genes involved in nutrient metabolism and their variants, impact of genetic variations on nutrient requirements and metabolism	
Unit- II	17 hours
Nutrigenomics and Chronic Diseases: Role of genetics and environmental factors in chronic disease development Obesity and Nutrigenomics: Genetic factors contributing to obesity and body weight regulation, Gene-nutrient interactions influencing energy balance and adipose tissue	

metabolism, Nutrigenomic approaches for personalized weight management and obesity prevention Cardiovascular Diseases and Nutrigenomics: Genetic variants associated with cardiovascular diseases, Impact of dietary components on lipid metabolism and cardiovascular health, Nutrigenomic strategies for managing dyslipidemia and reducing cardiovascular risk Diabetes and Nutrigenomics: Genetic predisposition to type 2 diabetes and insulin resistance, Gene-diet interactions influencing glucose metabolism and pancreatic function, Nutrigenomic interventions for diabetes prevention and management Cancer and Nutrigenomics: Genetic factors contributing to cancer development and progression, Nutrigenomic approaches for cancer prevention and adjuvant therapy, Personalized nutrition strategies for reducing cancer risk based on genetic variations Gut Microbiota: Gut microbiota composition and its relationship with chronic diseases, Influence of dietary factors on gut microbiota-host interactions, Nutrigenomic modulation of gut microbiota for improved health outcomes	
Unit- III	15hours
Nutraceuticals and Health Promotion: Definition and classification of nutraceuticals. Dietary supplements: vitamins, minerals, botanicals, and other bioactive compounds, Fortified foods: enriched and fortified products with added nutrients. Introduction to phytochemicals and their role in human health. Exploration of various phytonutrients – curcumin, resveratrol, quercitin, green tea catechins, polyphenols, phytoestrogens, plant pigments, and their potential health benefits. Traditional herbs, spices, and plant-based remedies with nutraceutical properties Overview of the nutraceutical market in India, Regulatory framework and challenges in the Indian context, Opportunities and future prospects for nutraceuticals in the Indian healthcare industry	

Pedogogy

Formative Assessment	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Seminar	5 + 5
Project	10
Total	**40 marks**

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
The course provides an in-depth exploration of the field of nutrigenomics and nutraceuticals, focusing on the intersection of nutrition, genetics, and health.							✓								
Students will gain knowledge and understanding of how individual genetic variations influence nutrient metabolism and response to specific dietary components.							✓				✓				
This course provides an overview of nutraceuticals, their role in health promotion, and their impact on various aspects of human health.		✓													
Students will gain knowledge about different types of nutraceuticals, their mechanisms of action, and their potential applications in preventing and managing chronic diseases.		✓													

Pedagogy - Theory

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

References:	
1.	Klaus Kraemer and Peter B. Meier. Nutraceuticals in Health and Disease Prevention, CRC Press, 2001
2.	Jim Kaput and Raymond L. Rodriguez, Nutritional Genomics: Discovering the Path to Personalized Nutrition, Wiley-Interscience, 1st edition, 2006
3.	Ann L. Yaktine and Robert Pool, Institute of Medicine (IOM). 2007. Nutrigenomics and beyond: Informing the future. Washington, DC: The National Academies Press, 2007
4.	Debasis Bagchi, Francis Lau, Manashi Bagchi, Genomics, Proteomics and Metabolomics in Nutraceuticals and Functional Foods, Wiley-Blackwell; 1st edition, 2010.
5.	Journal Nutrients 2012, 4, 1898-1944; Molecular Nutrition Research—The Modern Way Of Performing Nutritional Science.
6.	Journal Nutrients 2013, 5, 32-57; Nutrigenetics and Metabolic Disease: Current Status and Implication for Personalized Nutrition
7.	Lynnette R. Ferguson, Nutrigenomics and Nutrigenetics in Functional Foods and Personalized Nutrition, CRC Press, 1st edition, 2013.
8.	Satinder Kaur Brar, Surinder Kaur, Gurpreet Singh Dhillon, Nutraceuticals and Functional Foods: Natural Remedy, Nova Science Publishers, 2014.
9.	Raffaele De Caterina, J. Alfredo Martinez, Martin Kohlmeier, Principles of nutrigenetics and nutrigenomics, Academic Press, 2020.
10.	Debasis Bagchi, Harry G. Preuss, Anand Swaroop, Nutraceuticals and Functional Foods in Human Health and Disease Prevention, CRC Press, 1st edition, 2021.

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Clinical Nutrition and Dietetics**			Semester	**Fifth Sem**
Course Title	Geriatric Nutrition **(Theory)**				
Course No.	CNDT 5.5	**DSE – E1B**		No. of Credits	**3**
Contact hours	**45 Hrs**			Duration of SEA/Exam	**2.30 Hours**
Formative Assessment Marks	**40**			Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%.

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

1. Understand the physiology of aging.
2. Learn the nutrition assessment tools and intervention for nutrient deficiencies.
3. Analyze the chronic diseased conditions and dietary needs.
4. Learn dietary modifications and meal planning for adapting diets.

Content	**45Hrs**
Unit-I	13 hours
Physiological Changes in Aging: Age-Related Physiological Changes and Metabolic alterations. Impact of aging on body composition, metabolic rate, and nutrient metabolism, Body composition change, changes in muscle mass, strength, and functional capacity. Effects of increased body fat and visceral fat on health, Hormonal changes and their influence on metabolism. Effects of aging on basal metabolic rate (BMR) and energy expenditure, changes in nutrient absorption and utilization, gastrointestinal changes and their impact on nutrient absorption, age-related alterations in gastric acid secretion, intestinal absorption, and gut microbiota. Consequences of impaired absorption on nutrient status and overall health	
Unit- II	17 hours
Nutritional Assessment of Older Adults: Introduction to screening tools used in geriatric nutrition assessment (e.g., MNA, MUST, SGA), Application of screening tools in identifying malnutrition risk or existing malnutrition Interpretation of screening results and implications for further assessment and intervention. Methods for assessing dietary intake in older adults (e.g., food diaries, 24-hour recalls, FFQs), Analysis and interpretation of dietary intake data, identifying nutrient deficiencies or excesses in older individuals.	

Evaluating dietary intake and nutritional needs, Overview of dietary guidelines and recommendations specific to older adults. Understanding nutrient requirements and recommended intakes for optimal health. Factors influencing individual nutritional needs in elderly population Nutritional Considerations for Age-Related Conditions: Malnutrition and sarcopenia, Causes, consequences, and prevention strategies, Role of nutrition in managing malnutrition and sarcopenia Chronic Diseases and Nutrition: Nutrition implications for cardiovascular disease, diabetes, osteoporosis, and other common conditions Dietary modifications and therapeutic diets for disease management	
Unit- III	15hours
Nutrition Interventions for Healthy Aging: Concept of Hydration and Fluid Balance in the Elderly, Importance of hydration in older adults, Strategies to maintain proper fluid balance Meal Planning and Dietary Modifications: Practical considerations for meal planning and preparation, adapting diets for age-related changes, dietary restrictions, and taste preferences Using nutritional assessment results to develop personalized nutrition plans. Adapting diets to address nutrient deficiencies, preferences, and dietary restrictions. Promoting Optimal Aging through Nutrition: Nutritional strategies for healthy aging and disease prevention. Role of physical activity and overall lifestyle in promoting well-being	

Pedogogy

Formative Assessment	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Seminar	5 + 5
Project	10
Total	**40 marks**

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Understand the physiology of aging.			✓												
Learn the nutrition assessment tools and intervention for nutrient deficiencies.							✓		✓						
Analyze the chronic diseased conditions and dietary needs.	✓							✓							
Learn dietary modifications and meal planning for adapting diets.							✓	✓							

Pedagogy - Theory

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

References:

1. Marie Jaffe, Geriatric Nutrition and Diet Therapy, Skidmore-Roth Pub,1995.
2. John E. Morley, David R. Thomas, Geriatric Nutrition, 1st edition, CRC press, 2007
3. Paola S. Timiras, Physiological Basis of Aging and Geriatrics, 4th edition, CRC press, 2007
4. Dr. Sukhpal Kaur Dr. Jugal Kishore Dr. Amarjeet Singh, Comprehensive Textbook of Elderly Care.1st edition, Century publications, 2014
5. Academy of Nutrition and Dietetics, Nutrition Care of the Older Adult A Handbook for Nutrition Throughout the Continuum of Care, American Dietetic Association, 3rd edition, 2016.
6. Jeffrey B. Halter, Joseph G. Ouslander, Stephanie Studenski, Kevin P. High, Sanjay Asthana, Mar Supiano, Christine S. Ritchie, Kenneth Schmader, Hazzard's Geriatric Medicine and Gerontology. 7t McGraw-Hill Education; 2017

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Clinical Nutrition and Dietetics**		Semester	**Fifth Sem**
Course Title	**Ayurveda Ahara and Poshan Sahayak (Theory)**			
Course No.	**CNDT 5.6**	**VOC – 1A**	No. of Credits	**2+1**
Contact hours	**30 Hrs**		Duration of SEA/Exam	**2.30 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%.	
Course Outcomes (COs): At the end of the course the student should be able to 1. Understand the basic principles of Ayurveda 2. Learn about the principles of ayurvedic diet & nutrition 3. Learn about important medicinal plants and their properties used in ayurveda formulations. 4. Understand the concept of preventive healthcare in Ayurveda.	
Content	**30 Hrs**
Unit-I	**13 hrs**
Introduction to Basic principles of Ayurveda and their significance: Basic principles of Ayurveda (Vata, Pitta, Kapha). Origin and philosophy of Ayurveda. Five elements in Ayurveda. Role of the Five Elements in the functioning of the body and the environment. Interplay of the elements in maintaining health and causing imbalances. Body constitutions such as Dosha and Dhatus. Characteristics and functions of each Dosha. Influence of Doshas on physical, mental, and emotional well-being. Understanding the concept of Dhatus (seven bodily tissues). Role and functions of each Dhatu in the body. Relationship between Dhatus and Doshas in maintaining health Basic structure and function of human body (Rachana Sharir and Kriya Sharir): Various body parts. Concept of anatomy (Rachana Sharira). Concept of physiology (Kriya Sharira). Concept of six regions (Shadangatwam) of Sharira. Divisions of Sharira. The concept of homeostais (Dhātusāmya) in Ayurveda. Different diseases, disorders and syndromes associated with various body systems. Dietary and medicinal substances and concepts of health and disorders in Ayurveda: Principles of Ayurvedic diet and nutrition. Concept of Sattvic, Rajasic, and Tamasic foods. Dietary guidelines for balancing Doshas and promoting health.	

Unit- II	
Ayurvedic Medicinal Substances: Overview of herbal medicines in Ayurveda, Classification and properties of medicinal herbs and plants, Ayurveda formulations such as churnas, decoctions, and oils and their therapeutic uses. Various treatment modalities used in Ayurveda, including diet and lifestyle modifications, herbal medicines, Panchakarma (detoxification therapies), and rejuvenation therapies. Importance of Ahara in Health and Disorders: The concept of food (Ahara) in health and ailments. Classification of diet/food articles (Aahara Dravya) and their properties. Importance of wholesome food (Hita Avam), and unwholesome food (Ahita Ahara) based on body type and constitution (Doshika Prakriti). Importance of favourable (Pathya) and unfavourable (Apathya) Ahara in the treatment of diseases. Different Dairy products and their uses in health and disease. Macro and micronutrients along with their functions. Use and importance of water in Ahara. Importance of using oils in Ahara as medicinal therapy. Properties and function of taste (Shadrasa) in Ahara. Prevention and Maintenance of Health in Ayurveda: Principles of preventive healthcare in Ayurveda, including Dinacharya (daily routines), Ritucharya (seasonal regimens), and Swasthavritta (health-promoting practices). Roles and responsibilities of Ayurveda Ahara and Poshana Sahayak. Scope of practice of Ayurveda Ahara and Poshana Sahayak.	

Pedogogy

Formative Assessment	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Seminar	5 + 5
Project	10
Total	**40 marks**

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Understand the basic principles of Ayurveda			✓						✓						
Learn about the principles of ayurvedic diet & nutrition			✓						✓						
Learn about important medicinal plants and their properties used in ayurveda formulations.			✓						✓						
Understand the concept of preventive healthcare in Ayurveda.			✓						✓						

Pedagogy - Theory

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

Course Title:	**Dietetics III (Practical)**	Practical Credit	**1**
Course No.	**CNDP 5.6**	Contact Hours:	**15hrs**
Practical Topics – 1 credit			**13 - 15 weeks**
1. Apply the knowledge of Ayurveda to identify the Doshas and Dhatus of the body using charts and models. 2. Create a diagrammatic representation depicting the characteristic of Vata, Pitta, and Kapha. 3. Apply the knowledge of basic human anatomy to identify different parts of the body using charts and models. 4. Demonstrate the process of classifying food items based on their nutritional properties such as protein-rich, carbohydrate-rich, etc. 5. Demonstrate the process of preparing a diet plan using dairy products as per the health and ailment.			

6. Demonstrate the method of classifying food items in different categories such as Drinkables (Pan), Eatables (Asana), Chewable (Bhakshya), and Lickable (Lehya) etc. 7. Demonstrate usage of the appropriate dietetics-related Ayurveda terminology during role play	

Assessment

Formative +Summative Assessment = 25+25=50 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment / project	5 + 5
Total	**25 marks + 25 marks = 50 marks**

References:	
1.	CK Gurung - 2011 - elibrary.tucl.edu.np
2.	Ayurveda and Traditional Chinese Medicine; a comparative overview- B Patwardhan, D Warude, P Pushpangadan and Narendra Bhat.
3.	Fundamentals of Pharmacognosy and Phytotherapy- Third edition - Michael Heinrich, Joanne Barnes, Jose em Prieto Garcia, Simon Gibbons, Elizabeth M Williamson, 2018
4.	Medicinal plants: chemistry and properties, M Daniel – 2006
5.	Ayurvedic science of Food and Nutrition – S Rastogi, 2014
6.	Traditional and Ayurvedic foods of Indian origin – P Sarkar, LK Dh, C Dhumal, SS Panigrahi, 2015
7.	Diet and nutrition concepts in Ayurveda: Gleaming into Opportunities for evidence based applications in healthcare – Devesh rastogi, Shalini Gupta, Ranjan rastogi & Rajeev Rastogi, 2011
8.	A literature review on fundamental aspect of Sharir Rachana - BR Pathak, S Mulje, S Bhosale – 2023.
9.	From Ancient Medicine to Modern Medicine: Ayurvedic Concepts of Health and Their Role in Inflammation and Cancer- Prachi Garodia, Haruyo Ichikawa, Nikita Malani, Gautam Sethi, Bharat B. Aggarwal, 2007.

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Clinical Nutrition and Dietetics**			Semester	**Fifth Sem**
Course Title	**Diet Counselling (Theory)**				
Course No.	**CNDT 5.6**	**VOC – 1B**		No. of Credits	**3**
Contact hours	**30 Hrs**			Duration of SEA/Exam	**2.30 Hours**
Formative Assessment Marks	**40**			Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%.	
Course Outcomes (COs): At the end of the course the student should be able to 1. Understand the basic concepts of counselling. 2. Learn and practice the nutrition care plan. 3. Demonstrate different assessment before planning a diet. 4. Understand the components of counselling process.	
Content	**45 Hrs**
Unit-I	**15 hrs**
Basic Concepts of Counselling Definition of counseling, Models for behavioral change, trans-theoretical model of behavior change. Motivational interview: Principles, a motivational intervention model Fundamentals of food behavior. Assessment of readiness to change, Client counselor relationship, Therapeutic counselling **Communication skills** Objectives, Verbal, non-verbal communication skills. Skills - Listening, response, action process, sharing response, observing, paraphrasing & reflecting Behaviour change: Counseling skills for resistance behaviour Cultural competence in counseling – ABCDE approach	
Unit- II	**15 hrs**
Nutrition Care Plan (NCP) Introduction, Goal setting: Basics, Define goals, Design goals, Design plan of action Dietary assessment-Food Intake data collection, Data analysis, Interpretation, Energy determination-Determination of REE, Physical Activity factor (PA), Determination of Total Energy Expenditure (TEE) Physical Assessment; Healthy Weight standards, Weight for height tables, BMI and Waist circumference Documentation – SOAP format	
Unit- III	**15 hrs**
Components of counselling process	

Strategies to promote change-Food management tools, Behaviour change strategy, cognitive restructuring, education during counselling Making behaviour change last-social network, stress management, relapse prevention, counselling evaluation Counseling sessions: Not ready to change, unsure about change, Ready to change, skill development for OARS (open end questions, affirmations, reflective listening, summary statements, three Client rights)	

Pedogogy

Formative Assessment	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Seminar	5 + 5
Project	10
Total	**40 marks**

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Understand the basic concepts of counselling.									✓					✓	
Learn and practice the nutrition care plan.								✓						✓	
Demonstrate different assessment before planning a diet.											✓			✓	
Understand the components of counselling process.														✓	

Pedagogy - Theory

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

References:	
1.	Counseling psychology- CJ Gelso, EN Williams, 2022
2.	Ethics in psychotherapy and counseling – KS Pope, MJT Vasquez, 2016
3.	Fundamentals of foods, nutrition and diet therapy- SR Mudambi, 2007 Krause's food and the nutrition care process e-book, LK Mahan, JL Raymond, 2016
4.	An introduction to counselling – J McLeod, 2013
5.	The therapeutic relationship- P Clarkson, 2003
6.	Theories of psychotherapy and counseling- RS Sharaf, 2015

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Clinical Nutrition and Dietetics**		Semester	**Sixth Sem**
Course Title	**Dietetics IV (Theory)**			
Course No.	**DSC- C27**	**DSC**	No. of Credits	**4**
Contact hours	**60 Hrs**		Duration of SEA/Exam	**2.30 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

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

1. To understand the critical cases and its stages.
2. To understand diet management during disease condition.
3. To understand the nutrition requirement in different disease conditions.
4. To learn about Medical Nutrition Therapy in different critical cases.

Content	60 Hrs
Unit – 1 Nutrition and Cancer	
Definition of cancer and its global health impact, Role of nutrition in cancer development and progression, Link between diet, lifestyle, and cancer risk. Etiology and causes of cancer development. Types of cancer and their risk factors. Role of genetics, environment, and lifestyle in cancer development. Common symptoms experienced by cancer patients. Impact of cancer and treatment on appetite and dietary intake. Strategies to address complaints related to food intake in cancer patients, Dietary management for cancer patients. Importance of a well-balanced diet in supporting treatment and recovery. Strategies to manage nutrition-related side effects of cancer treatment. Addressing malnutrition and weight loss in cancer patients. Immunonutrients and their role in cancer prevention and treatment. Impact of specific nutrients on the immune system and cancer outcomes. Benefits of immunonutrients in reducing treatment-related side effects. Current research and evidence on immunonutrients in cancer care.	**15 Hrs**
Unit – 2: HIV/AIDS: Introduction to HIV/AIDS	
Definition of HIV/AIDS, Modes of transmission and risk factors stages of HIV infection: acute, chronic, and AIDS. Impact of HIV/AIDS on nutritional status and immune function. Specific nutritional requirements for individuals with HIV/AIDS. Effects of HIV on energy expenditure, nutrient absorption, and metabolism. Nutrient deficiencies commonly associated with HIV/AIDS. Importance of adequate macro- and micronutrient intake for immune support. Dietary challenges and strategies for individuals with HIV/AIDS.	**15 Hrs**

Maintaining a balanced diet and managing nutrition-related side effects of antiretroviral therapy (ART). Nutrition's role in managing opportunistic infections and supporting immune function. Dietary considerations for specific symptoms like diarrhoea, oral thrush, and weight loss. **BURNS:** Definition of burns and their health impact. Classification of burns: first-degree, second-degree, third-degree, and fourth-degree. Causes and risk factors for burns. Physiological response to burns and its impact on nutrition. Dietary needs and challenges during the acute or flow phase of burn injury. Meeting increased energy and protein requirements for wound healing and recovery. Role of hydration and electrolyte balance in burn management. Strategies for oral, enteral, and parenteral nutrition support as needed. Dietary requirements during the anabolic or recovery phase of burn injury. Promoting wound healing, tissue regeneration, and muscle recovery. Importance of adequate protein, carbohydrates, fats, vitamins, and minerals in the healing process. Review of current research and advancements in nutrition and burn management	
Unit -3: General nutrition care in Stress, Infection and Surgery:	
Types of diet orders/prescription-Adequate general (regular) diet; Modified diet Stress-Metabolic changes associated with stress, causative agents of stress, result of acute or prolonged stress, diet changes. Infection- nutritional needs and dietary requirements Surgery and nutritional status: Pre-operative nutrition -objectives and dietary management Post-operative nutrition – points to be considered to promote food intake (spacing meals, creating a pleasant environment, conditions favouring a patient to eat and favouring digestion, promoting adequate fluid intake. Role of Progressive diet); Common complaints of patients associated with food intake and management.	**15 Hrs**
Unit - 4: Nutrition support in critically ill	
Definition of critical illness and its impact on nutritional status**,** Understanding the importance of nutrition support in critically ill patients. Overview of the goals and benefits of providing adequate nutrition during critical illness. Introduction to the different methods of nutrition support. Malnutrition in critically ill patients, assessing nutritional status in critically ill patients. Understanding the impact of critical illness on body composition and metabolic changes. Assessing energy requirements and determining the appropriate route of feeding. Exploring the role of laboratory values in assessing nutritional needs and monitoring nutritional interventions. Enteral nutrition - Definition, patient screening, Indications, and Tube feeding: Nasogastric, Nasoduodenal, Nasojejunal, Types of enteral feeds: natural liquid foods, blenderised diets and elemental diets. Parenteral Nutrition: Definition, composition, Indications, Parenteral routes for nutrition and drug administration, Total Parenteral Nutrition (TPN). Refeeding syndrome- Definition, causes, symptoms. Home care for critically ill and requiring long-term nutrition support, palliative care, rehabilitation diets (stages).	**15 Hrs**

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
To understand the critical cases and its stages.															✓
To understand diet management during disease condition.	✓													✓	✓
To understand the nutrition requirement in different disease conditions.														✓	✓
To learn about Medical Nutrition Therapy in different critical cases.															✓

Pedagogy

Lecture, demonstration, hands on learning through projects, experiments, hospital dietary visits, case studies, workshops.

Assessment

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

Course Title:	**Dietetics IV (Practical)**	Practical Credits	**2**
Course No.	**DSC – C27**	Contact Hours:	**60 Hrs**
Practical Topics - 2 credits		**13 - 15 weeks**	
Plan, prepare, and evaluate; • A day's diet for Cancer • A day's diet for HIV/AIDS • A day's diet for different stages of burns • Recipes for elderly hospitalized patients (soft diet post-surgery) • Recipes for hospitalized sick children (soft diet post-surgery) • Market survey and listing of commercially available enteral and parenteral formulas			

Assessment

Formative +Summative Assessment = 25+25=50 marks	
Formative Assessment	**Weightage in Marks**
Internal Assessment	25
Summative Assessment (ESE)	25
Total	**25 marks + 25 marks = 50 marks**

References:	
1	Nutrition and HIV infection- A Mangili, DH Murman, AM Zampini, 2006
2	The ASPEN nutrition support core curriculum, 2007
3	Clinical nutrition in practice- N Katsilambros, C Dimosthenopoulos, MD Kontogianni, 2011
4	Nutritional therapy in major burns- AF Rousseau, MR Losser, C Ichai, MM Berger - Clinical nutrition, 2013
5	Nutrition, metabolism and integrative approaches in cancer survivors- V Sierpina, L Levine, J Mckee, C Campbell, 2015
6	The essential burn unit handbook- JJ Roth, W Hughes, 2015
7	Krause's food and the nutrition care process – LK Mahan, JL Raymond, 2016

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Clinical Nutrition and Dietetics**		Semester	**Sixth Sem**
Course Title	**Food Microbiology and Functional Foods (Theory)**			
Course No.	**DSC- C28**	**DSC**	No. of Credits	**4**
Contact hours	**60 Hrs**		Duration of SEA/Exam	**2.30 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

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

- To understand the microorganisms in foods and its relation to health.
- To study about contaminated food and infectious diseases.
- To understand the sanitary practices required to prevent food borne diseases.
- To learn about functional foods and their health benefits

Content	60 Hrs
Unit – 1 Introduction to Food Microbiology	
Introduction to Food Microbiology, Definition and scope of food microbiology. Microorganisms in the food environment: bacteria, viruses, fungi, and parasites. Factors influencing microbial growth in food. Foodborne illnesses and their impact on public health. Microbial Spoilage of Food: Microbial spoilage: causes, signs, and symptoms. Common spoilage microorganisms in different food groups (e.g., dairy, meat, fruits, vegetables). Factors affecting microbial spoilage and shelf life of food. Preventive measures and control strategies for reducing microbial spoilage. Major foodborne pathogens and their characteristics (e.g., Salmonella, E. coli, Listeria, Campylobacter), Routes of contamination and transmission of foodborne pathogens, Symptoms and health risks associated with foodborne infections, Food safety regulations and preventive measures for controlling foodborne pathogens.	**15 Hrs**
Unit – 2: Food Hygiene and Sanitation Practices	
Importance of food hygiene and sanitation in preventing foodborne illnesses**.** Good Manufacturing Practices (GMP) and Hazard Analysis and Critical Control Points (HACCP) principles**.** Cleaning and sanitizing procedures for food preparation areas and equipment**.** Personal hygiene and employee practices in the food industry**.** Food Safety Management Systems: Introduction to food safety management systems (e.g., ISO 22000, FSSC 22000),	**15 Hrs**

Implementation and maintenance of food safety programs**.** Auditing, monitoring, and verification of food safety practices**.** Role of regulatory agencies in ensuring food safety and compliance. Food regulations and standards related to microbiological criteria. International organizations and agencies involved in food safety regulation. Case studies and real-world examples of foodborne outbreak investigations.	
Unit -3: Functional foods	
Introduction: Definitions: functional food, nutraceutical and food supplements. Significance of functional foods and nutraceuticals in the food and pharma industry. FOSHU (Foods for specified health use) categories of functional ingredients. Food labels and regulations of nutraceuticals and functional foods. Benefits and Active principles of common herbs/ plants (containing beneficial ingredients) used in the field of nutraceuticals – Ginseng, Rosemary, Thyme, Oregano, Sage, Basil, wheat grass, turmeric.	**15 Hrs**
Unit - 4: Prebiotics	
Prebiotics: Definition, sources, Non-digestible/slow digestible carbohydrates: Dietary fibre, Oligosaccharides, sugar alcohols used in food products, resistant starch, Gums. Role of fibre in the diet: Diabetes and Obesity, Constipation and Diverticular disease, Colon cancer, breast cancer. Health benefits of Oligosaccharides: Anti-constipation, Non-carcinogenic, Reduction of serum cholesterol, improved intestinal flora. Probiotics: Definition, sources, Health benefits of Lactic acid bacteria, Bifidobacterium, Saccharomyces Boulardii, Streptococcus thermophiles. Health benefits - natural pigments (chlorophyll, chlorophyllin, carotenoids, anthocyanins), Polyunsaturated fatty acids (Omega 3 and Omega 6), peptides and proteins (Glutamine, L-Arginine), Glycosides, Isoprenoides, Alcohols and Phenols, Lecithin and Choline, Isoflavonoids, phytoestrogens, antioxidants, phytosterols. Vitamins and mineral supplements in health.	**15 Hrs**

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
To understand the microorganisms in foods and its relation to health.				✓											
To study about contaminated food and infectious diseases.				✓											
To understand the sanitary practices required to prevent food borne diseases.				✓											
To learn about functional foods and their health benefits.		✓													

Pedagogy

Lecture, demonstration, hands on learning through projects, experiments, hospital dietary visits, case studies, workshops.

Assessment

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

Course Title:	**Food Microbiology and Functional Foods (Practical)**	Practical Credits	**2**
Course No.	**DSC – C29**	Contact Hours:	**60 Hrs**
Practical Topics - 2 credits		**13 - 15 weeks**	
1. Quality testing for milk – MBRT, Alcohol, Formalin and Starch test of milk samples and their standard plate count. 2. Alkaline phosphatase test to check the efficiency of pasteurization of milk. 3. Production, antimicrobial effect and nutritional value of probiotics- yoghurt, kefir and acidophilus milk.			

4. Isolation of any pathogenic bacteria (Staphylococcus or Salmonella) from food products.
5. Isolation of spoilage microorganisms from spoiled vegetables/fruits.
6. Quality testing for milk and milk products.
7. Microbial enumeration of street foods and restaurant foods.
8. Direct count of microbes present in milk by haemocytometer.
9. Physical, chemical and microbial assessment of water and potability test for water.
10. Preparation of a resource file on functional foods
11. Market survey on dietary supplements, probiotics and prebiotics available in the market
12. Planning and preparation of probiotic product.
13. Planning and preparation of nutraceutical product.

Assessment

Formative +Summative Assessment = 25+25=50 marks	
Formative Assessment	**Weightage in Marks**
Internal Assessment	25
Summative Assessment (ESE)	25
Total	**25 marks + 25 marks = 50 marks**

References:	
1	Adams.M.R and Moss.M.O (2000) Food Microbiology, New Age International Ltd. New Delhi.
2	Benson Harold, J (1990) Microbiological applications, Wn C Brown Publishers, USA.
3	Bibek Ray (2001).Fundamentals of Food Microbiology.Bibek Ray. 2nd Edition. CRCPress
4	Bibek Ray and Arun Bhunia (2013).Fundamentals of Food Microbiology. 5thEdition. CRCPress
5	Collins, C H and Lyne, PM (1976): Microbiological Methods, Butters worth, London
6	Frazier, WC and Westholf, DC (1988): Fourth Edition, Food Microbiology, McGraw Hill Inc
7	James M. and Jay J.M (1991) Food Borne Pathogen An illustrated text, Wolfepublications Ltd, England, Jay James, M (1986) : Third Edition, Modern Food Microbiology, Van No strand Reinhold company Inc
8	Sullia, S.B and Shantharam, S (2017). General Microbiology, 2nd Edition, Oxford and IBH Publishers
9	Thomas, J Montville and Karl, R Mathews. Food Microbiology- An Introduction, 2nd Edition, ASM PublisherColour in food improving quality – D MacDougall, 2002
10	Nutraceuticals- B Lockwood, L Rapport, 2007
11	Prescription for Nutritional Healing: A Practical A-to-Z Reference to Drug-Free Remedies Using Vitamins, Minerals, Herbs & Food Supplements" by Phyllis A. Balch and James F. Balch (2010)
12	Functional foods and Nutraceuticals, modern approach to food science- World Applied Sciences Journal, 2012
13	Dietary fiber: sources, properties and relation to health - D Betancur-Ancona, L Chel-Guerrero eBooks, 2013
14	Handbook of nutraceuticals and functional foods- REC Wildman, TC Wallace, 2016
15	Prebiotics and probiotics - K Venema, AP do Carmo – Wageningen, 2015
16	Probiotic dairy products – AY Tamime, LV Thomas, 2018
17	Polyunsaturated fatty acids and their health benefits – F Shahidi, P Ambigaipalan, 2018
18	The Vitamin Book: The Complete Guide to Vitamins, Minerals, and the Most Effective Herbal Remedies and Dietary Supplements" by Harold M. Silverman (2018)

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Clinical Nutrition and Dietetics**		Semester	**Sixth Sem**
Course Title	**Food Service Management (Theory)**			
Course No.	**DSC- C30**	**DSC**	No. of Credits	**4**
Contact hours	**60 Hrs**		Duration of SEA/Exam	**2.30 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

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

- To learn about various institutional food service systems.
- To understand the process of food service systems.
- To learn about costing in food service industry.
- To learn about quality management in food service industry.

Content	60 Hrs
Unit – 1	
Evolution of the Food Service Industry: Historical overview of the food service industry. Factors influencing the growth and development of the industry. Evolution of food service establishments and concepts. Types of Food Service: Commercial food service establishments: restaurants, cafes, fast food chains, etc. Non-commercial food service establishments: schools, hospitals, prisons, etc. Characteristics and unique considerations for each type of food service, Similarities and differences in operations, management, and customer expectations. Styles of Food Service: Formal food service: fine dining, upscale establishments. Semi-formal food service: casual dining, family-style restaurants. Informal food service: fast casual, quick-service restaurants. Differentiating factors, ambiance, and customer experiences in each style. Management- Definition, principles, functions. Menu planning and design: considerations, strategies, and techniques, Equipment and technology: selection, maintenance, and utilization, Inventory management: procurement, storage, and stock control. Facility layout and design: optimizing space utilization and workflow Tangible and Intangible tools.	**15 Hrs**
Unit – 2	
Layout of kitchen space-Layout plan, hotel kitchen, college hostel, food service area of a canteen. Facility layout and design: optimizing space utilization and workflow. Equipment and technology: selection, maintenance, and utilization, Catering equipment-classification based on mode of operation. Selection, purchase and storage of food.	**15 Hrs**

Methods of purchasing- open market buying, formal buying, wholesale buying, contract purchase, auction buying. Menu planning-Types of menus, factors affecting menu planning. Hygiene and sanitation: Environmental hygiene and sanitation, hygiene in food handling, personal hygiene, accidents and safety procedures, waste disposal	
Unit -3	
Costing in the Food Service Industry: Introduction to cost concepts and principles, Components of cost: material cost, employee cost, overhead cost. Understanding cost behaviour: fixed, semi-fixed, and variable, concept of break- even and cost benefit ratio; cost control-Food, labour, overhead and hidden cost; Pricing of dishes: Factors influencing menu pricing decisions, Cost-based pricing vs. value-based pricing, Menu engineering and pricing strategies for maximizing profitability, Pricing considerations for different food service segments, Food laws and regulations: Overview of food laws and regulations in the food service industry. Understanding regulatory agencies and their roles (local, national, international). Food safety standards and requirements for food establishments. Compliance with labelling, packaging, and allergen regulations. Compulsory Indian food standards.	**15 Hrs**
Unit - 4	
Concept of Total Quality Management in the food service industry. Definition and principles of Total Quality Management, Understanding the importance of TQM in the food service industry, Key concepts of customer focus, continuous improvement, and employee involvement, Benefits of implementing TQM in food service operations. Quality assurance principles and practices. Overview of quality assurance in the food service industry. Establishing quality standards and specifications for food and service. Implementing quality control measures to ensure adherence to standards. Monitoring and evaluating quality through inspections and audits. Quality Control Measures- Developing standard operating procedures (SOPs) for key processes. Implementing quality control checks at each stage of food production and service. Corrective and preventive actions for non-conformities and deviations. Overview of quality certifications and accreditations in the food service industry (e.g., ISO 9001, HACCP).Understanding the requirements and benefits of certification. Implementing certification processes and documentation. Maintaining compliance and continuous improvement in relation to certifications.	**15 Hrs**

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs 1-15)

Course Outcomes (COs) / Program Outcomes (POs)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
To learn about various institutional food service systems.											✓				
To understand the process of food service systems.											✓				
To learn about costing in food service industry.											✓				
To learn about quality management in food service industry											✓				

Pedagogy

Lecture, demonstration, hands on learning through projects, experiments, hospital dietary visits, case studies, workshops.

Assessment

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

References:	
1	Service management and marketing – C Gronroos, 2007
2	Foodservice Manual for Health Care Institutions" by Ruby Parker Puckett (2012)
3	Foodservice Organizations: A Managerial and Systems Approach" by Mary B. Gregoire (2014)
4	Managing Quality Service In Hospitality: How Organizations Achieve Excellence In The Guest Experience" by Robert C. Ford and Michael C. Sturman (2014)
5	Introduction to Foodservice" by June Payne-Palacio and Monica Theis (2015)
6	Foodservice Management: Principles and Practices" by June Payne-Palacio and Monica Theis (2018)
7	Pricing and revenue optimization- RL Philips, 2021

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Clinical Nutrition and Dietetics**		Semester	**Sixth Sem**
Course Title	**Information and Communication Technology (Theory)**			
Course No.	**DSE- 2A**	**DSE**	No. of Credits	**3**
Contact hours	**45 Hrs**		Duration of SEA/Exam	**2.30 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

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

- To learn importance of ICT in nutrition.
- To learn utilization of social media platform for nutrition communication.
- To learn the importance of AI in nutrition.
- To understand utilization of ICT in diet assessment.

Content	**45 Hrs**
Unit – 1	
ICT- Meaning, Components of ICT, Applications of ICT. Introduction to Information Communication Technology (ICT) in Nutrition. Overview of ICT and its role in the field of nutrition. Benefits and applications of ICT in nutrition research, education, and practice. Data Collection and Analysis Tools Introduction to data collection tools used in nutrition research and practice (e.g., online surveys, mobile data collection).Using software and tools for data entry, cleaning, and analysis. Data visualization techniques for presenting nutrition-related information. Applying statistical software for data analysis and interpretation. Nutrition Education and Counselling Technologies: Using technology for nutrition education and behaviour change interventions. Digital tools for interactive and engaging nutrition education materials. Telehealth and virtual platforms for remote nutrition counselling. Considerations for effective implementation of technology in nutrition education and counselling.	**15 Hrs**
Unit – 2	
Introduction to MS Word, Excel, and PowerPoint. Data Communication: Meaning, Types and Components. Concept of computer networking: Types, Benefits, Teleconferencing, Videoconferencing, and Computer conferencing. Social Media and Online Communication: Utilizing social media platforms for nutrition communication and advocacy. Ethical considerations and guidelines for professional use of social media. Creating and managing online nutrition communities and support groups. Engaging with the public through social networking sites, blogs, podcasts, and other online platforms.	**15 Hrs**

Electronic Health Records and Nutrition Documentation: Introduction to electronic health records (EHR) and nutrition documentation system. Utilizing EHR for nutrition assessment, intervention, and monitoring. Privacy and security considerations in EHR and nutrition documentation. Integrating nutrition data with electronic medical records for comprehensive patient care.	
Unit -3	
ICT in Health sector E health: Meaning, Benefits of e health, ICT applications in Public health Care in India: E health projects: Birth and death registration, online maternal death review monitoring system, National Identification Number (NIN), Self-monitoring healthcare devices. Mobile Health: meaning, Difference between e health and m health, health apps, Healthy you card, 1 mg, mswasthya-CDAC, CycleTel, mDiabetes, Evoz, MAMA, My Fitness Pal, Zoojoo.be. Adverse health consequences of using mobile phones. Overview of Artificial Intelligence (AI) and its applications in the field of nutrition. AI-powered tools and methods for dietary assessment and analysis. Automated food recognition and portion estimation using image recognition and machine learning algorithms. AI-based tools and platforms for delivering nutrition education and information. ICT in Food and Nutrition: ICT and food security. Use of ICT for dietary assessment: 24-hour recall, use of a personal digital assistant, digital photography, smart cards. ICT in counselling..	**15 Hrs**

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 learn importance of ICT in nutrition									✓				✓		
To learn utilization of social media platform for nutrition communication									✓				✓		
To learn the importance of AI in nutrition									✓				✓		
To understand utilization of ICT in diet assessment									✓		✓		✓		

Pedagogy

Lecture, demonstration, hands on learning through projects, experiments, hospital dietary visits, case studies, workshops.

Assessment

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

References:	
1	Artificial Intelligence: A Modern Approach - Stuart Russell and Peter Norvig (2016)
2	Digital Communications: Fundamentals and Applications- Bernard Sklar (2016)
3	Data Communications and Networking - Behrouz A. Forouzan (2017)
4	Computer Organization and Design: The Hardware/Software Interface - David A. Patterson and John L. Hennessy (2017)
5	Computer Security: Principles and Practice - William Stallings and Lawrie Brown (2017)
6	Enterprise Systems for Management -Luvai F. Motiwalla and Jeffrey Thompson (2018)
7	Information Systems: A Manager's Guide to Harnessing Technology - John Gallaugher (2018)
8	Information Technology for Management: Digital Strategies for Insight, Action, and Sustainable Performance- Efraim Turban, Linda Volonino, Gregory R. Wood (2020)
9	Database System Concepts - Abraham Silberschatz, Henry F. Korth, and S. Sudarshan (2020)
10	Computer Networking: A Top-Down Approach - James F. Kurose and Keith W. Ross (2020)
11	Information Technology Project Management - Kathy Schwalbe (2021)

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Clinical Nutrition and Dietetics**		Semester	**Sixth Sem**
Course Title	**Food Entrepreneurship (Theory)**			
Course No.	**DSE- 2B**	**DSE**	No. of Credits	**3**
Contact hours	**45 Hrs**		Duration of SEA/Exam	**2.30 Hours**
Formative Assessment Marks	**40**		Summative Assessment Marks	**60**

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

- To enable students to acquire necessary knowledge to become self-employed.
- To understand various dimensions of entrepreneurship.
- To learn about food product development.
- To understand financial management in entrepreneurship.

Content	**45 Hrs**
Unit – 1 Introduction to Food Entrepreneurship	
Understanding Food Entrepreneurship: Definition and scope of food entrepreneurship, Importance of food entrepreneurship in the food industry, Characteristics and skills required to become a successful food entrepreneur. Identifying Food Business Opportunities: Market research and analysis for food business opportunities, Identifying target markets and customer segments, Assessing competition and trends in the food industries, Concept Development, and Business Planning Generating innovative food product ideas: Concept development and refinement, Business planning process for food entrepreneurship. Legal and Regulatory Considerations: Understanding legal requirements and regulations for food businesses, Licensing, permits, and certifications needed for food entrepreneurship, Food safety and quality standards compliance.	**15 Hrs**
Unit – 2 Launching and Managing a Food Business	
Developing a Business Model: Defining the business model for a food venture, Value proposition and competitive advantage, Revenue streams, cost structure, and pricing strategies. Product Development and Production: Product design and development considerations, Sourcing ingredients and raw materials, Food production processes, quality control, and packaging. Marketing and Branding: Creating a unique brand identity for a food business, Marketing strategies and tactics for food entrepreneurship, Building customer relationships and implementing effective marketing campaigns.	**15 Hrs**

Sales and Distribution: Developing sales channels and distribution networks, Sales techniques and strategies for food products, Managing distribution logistics and supply chain for food businesses.	
Unit -3	
Sustainable sourcing and ethical considerations, Waste reduction and environmentally friendly practices, Social responsibility in the food industry, Growth and Scaling Strategies, Scaling up a food business, Franchising and licensing opportunities, Managing growth challenges, and expanding into new markets. Financial management for growth and expansion, Securing investment and financing for food ventures, Exit strategies, and succession planning, Developing entrepreneurial skills, such as creativity, problem-solving, and resilience, Overcoming challenges and managing risk in the food industry, Networking, and building industry connections.	**15 Hrs**

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 enable students to acquire necessary knowledge to become self-employed														✓	✓
To understand various dimensions of entrepreneurship														✓	✓
To learn about food product development														✓	✓
To understand financial management in entrepreneurship															✓

Pedagogy

Lecture, demonstration, hands on learning through projects, experiments, hospital dietary visits, case studies, workshops.

Assessment

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

References:	
1	Entrepreneurship: Theory, process and practices- DF Kuratko, 2016
2	Researching entrepreneurship – P Davidsson, 2004
3	Innovation and entrepreneurship – P Drucker, 2014
4	Concepts in strategic management and business policy – TL Wheelen, 2011
5	Quality and safety standards in the food industry, developments and challenges- J Trienekens, P Zuurbier- International Journal of Production Economics, 2008
6	Exploring consumer attitude and behavior towards green practices in the lodging industry in India- K Manaktola, V Jauhari, 2007

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Clinical Nutrition and Dietetics**			Semester	**Sixth Sem**
Course Title	**Nutrition Counselling (Theory)**				
Course No.	**CNDT 6.5 – VOC2A**	**VOC**		No. of Credits	**2+1**
Contact hours	**30 Hrs**			Duration of SEA/Exam	**2.30 Hours**
Formative Assessment Marks	**40**			Summative Assessment Marks	**60**

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

- To learn the skills of diet counselling.
- To understand various levels of counselling techniques.
- To learn designing counselling plans.
- To understand nutritional counselling for different conditions.

Content	30 Hrs
Unit – 1 Components of nutrition counselling	
Assessment component: Methods of review (verbal and non-verbal techniques).Dietary Data Analysis: Usage of standard cups and measurement, 24 hour dietary recall method, 3 days dietary recall method, Food Frequency Questionnaire (FFQ), Food log. Counselling process: Techniques for obtaining relevant information – General profile, medical history, clinical information, lifestyles, physical activity, stress, nutritional status. Planning component: Designing of counselling plans- goals and objectives, client care plan and designing evaluation instruments. Implementation component: counselling the patient. Evaluation component: Measuring the success of performance of client and evaluating the counselling process, counselling strategies for behaviour modification, the OARS technique.	**15 Hrs**
Unit – 2	
Counselling spectrum: Individual and group counselling. Nutrition counselling for adolescent eating disorder- Anorexia nervosa, Bulimia nervosa, Binge eating disorder. Nutrition counselling for weight management during adulthood- Lifestyle modification strategies. Nutrition Counselling for pregnant women with respect to pre pregnancy, prenatal and ante natal care. Nutrition counselling for mothers on weaning. Nutrition counselling for geriatrics- Definition of ageism, geriatrics.	**15 Hrs**

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 learn the skills of diet counselling										✓				✓	
To understand various levels of counselling techniques										✓				✓	
To learn designing counselling plans														✓	
To understand nutritional counselling for different conditions												✓		✓	

Pedagogy

Lecture, demonstration, hands on learning through projects, experiments, hospital dietary visits, case studies, workshops.

Assessment

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

Course Title:	**Nutrition Counseling (Practical)**	Practical Credits	**1**
Course No.	**CNDP 6.5 -1**	Contact Hours:	**60 Hrs**
Practical Topics - 2 credits		**13 - 15 weeks**	

- Preparation of counseling aids for all stages of life (Vulnerable group)
  Complementary feeding
  Child nutrition during preschool and school years.
- Preparation of counseling aids for a given condition
  Adolescence-Importance of breakfast, Importance of five food group
  Pregnanacy
  Lactation

Geriatrics

- Preparation of data sheet, questionnaire, client care plan
- Setting up counseling centre and conducting counseling sessions for obesity, diabetes mellitus, hypertension, CVD and cancer
- Evaluation and report writing.

Assessment

Formative +Summative Assessment = 25+25=50 marks	
Formative Assessment	**Weightage in Marks**
Internal Assessment	25
Summative Assessment (ESE)	25
Total	**25 marks + 25 marks = 50 marks**

References:	
1	Nutrition Counseling and Communication Skills: 1,000 Strategies for Success- Kathleen D. Bauer and Carol Sokolik (2009)
2	Motivational Interviewing in Nutrition and Fitness - Dawn Clifford and Laura Curtis (2015)
3	"Nutrition Counseling and Education Skills for Dietetics Professionals" by Betsy Holli, Judith Beto, and Sara Long (2011)
4	Medical Nutrition Therapy: A Case Study Approach" by Marcia Nahikian Nelms, Sara Long Roth, and Karen Lacey (2012)
5	Counseling and Therapy Skills - David G. Martin (2014)
6	Clinical Nutrition Counseling Skills- Susan B. Roberts (2017)
7	Counseling in Communication Disorders: A Wellness Perspective" by Audrey L. Holland and Ryan L. Nelson (2017)
8	Nutrition Counseling Skills for the Nutrition Care Process" by Linda Snetselaar and Mark L. Hackett (2018)
9	"Nutrition Counseling and Education Skill Development" by Kathleen Bauer, Doreen Liou, and Carol Sokolik (2018)
10	“Motivational Interviewing in Nutrition and Dietetics" by Dawn Clifford and Laura Curtism (2020)

Date **Course Coordinator** **Subject Committee Chairperson**

Government of Karnataka

Model Curriculum

Program Name	**B.Sc. Clinical Nutrition and Dietetics**			Semester	**Sixth Sem**
Course Title	**Diabetes Management (Theory)**				
Course No.	**CNDT 6.5 - VOC2B**	**VOC**		No. of Credits	**2+1**
Contact hours	**45 Hrs**			Duration of SEA/Exam	**2.30 Hours**
Formative Assessment Marks	**40**			Summative Assessment Marks	**60**

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

- To learn about diabetes and its types.
- To understand management of diabetes.
- To learn dietary management for diabetes conditions.
- To understand complications of diabetes.

Content	**45 Hrs**
Unit – 1	
Understanding Diabetes Mellitus (DM), glucose utilization in the body, Physiology of glucose absorption, insulin and pancreas, blood glucose homeostasis, glucose metabolism. Types of DM -Type I, Type II, Gestational DM. Modifiable and non- modifiable risk factors of Type II DM. Other types of DM. Impaired Glucose tolerance. Etiology of DM, Indian diabetes risk score, Symptoms of DM. Understanding diagnostic tests for DM : urine glucose testing, Commercially available HbA1c meter, urine ketone testing, blood ketone monitoring, Diabetes monitoring: self-monitoring of blood glucose using glucometer, continuous glucose monitoring system.	**15 Hrs**
Unit – 2 Management of DM	
Pharmacological-oral glucose lowering drugs, other agents, Insulin therapy-Types Non pharmacological (lifestyle management)- MNT, Physical activity, weight management MNT -Objectives, principles, assessment prior to MNT. Food and blood sugars-Macro and micronutrients, functional foods in DM. Menu planning, dietary exchanges, healthy eating plate carbohydrate counting, Glycaemic index, Glycaemic load, portion control. Role of Exercise in DM-importance of exercise, types of exercise (Aerobic, resistance, flexibility), blood sugars and exercise. Complications of Diabetes: Acute -hypoglycaemia, diabetic ketoacidosis, hyperglycaemic syndrome. Chronic-Microvascular (Neuropathy, Nephropathy, Retinopathy) and Macro vascular (Cardiovascular, cerebrovascular, peripheral vascular disease). Diabetic Neuropathy and foot care guide for diabetics.	**15 Hrs**

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 learn about diabetes and its types							✓	✓							
To understand management of diabetes								✓							
To learn dietary management for diabetes conditions															✓
To understand complications of diabetes	✓														

Pedagogy

Lecture, demonstration, hands on learning through projects, experiments, hospital dietary visits, case studies, workshops.

Assessment

Formative Assessment + Summative assessment = 40+60=100 marks	
Formative Assessment	**Weightage in Marks**
Test 1	15
Test 2	15
Assignment + Project	5 + 5
Summative Assessment	60
Total	**40 marks + 60 marks = 100 marks**

Course Title:	**Diabetes Management (Practical)**	Practical Credits	**2**
Course No.	**CNDP 6.5 -2**	Contact Hours:	**60 Hrs**
Practical Topics - 2 credits		**13 - 15 weeks**	

Diet in Diabetes management

- Demonstrate weights and measures of food ingredients of different food groups (raw ingredients and cooked food weight) and learn concept of portion size.
- Use of Food exchange list and carbohydrate count
- Prepare a list Low , Medium and High GI foods from different food groups
- Planning low GI recipes and calculation of glycemic load
- Planning and preparation of day's diet for IDDM (individual case profile)
- Planning and preparation of day's diet for NIDDM (individual case profile)

Assessment

Formative +Summative Assessment = 25+25=50 marks	
Formative Assessment	**Weightage in Marks**
Internal Assessment	25
Summative Assessment (ESE)	25
Total	**25 marks + 25 marks = 50 marks**

References:	
1	Srilakshmi, B. (2014) Dietetics,4th and 7th edition, New Age International Publications, New Delhi
2	Clinical Dietetics Manual, January 2018 by Indian Dietetic Association (Author)
3	Diet Metrics: Hand Book of Food Exchanges by Meenakshi Bajaj
4	Dietary Guidelines For Indians a manual colour full,2nd edition by Dr Laxmaiah
5	Nutrient Requirements for Indians Recommended Dietary Allowances Estimated Average Requirements - A Report of the Expert Group, 2020 ICMR, NIN , Ministry of Health and Family Welfare
6	Shubhangini A Joshi (2011) Nutrition and Dietetics, with Indian Case Studies, 3rdedn Tata McGraw Hill Publication, New Delhi
7	Mahan, L.K. &Ecott-Stump, S. (2000): Krause's Food, Nutrition and Diet Therapy, 12th Edition, W.B. Saunders Ltd
8	Modern Nutrition in Health and Disease 10th edition by Maurice E. Shils
9	Alfred H.Katz, Prevention and health, the Haworth, Press, New York 1999
10	Textbook of Nutrition and Dietetics by Ranjana Mahna & Seema Puri Kumud Khanna, Sharda Gupta, Santosh Jain Passi, Rama Seth, Elite publishing house, India
11	International Life Sciences Institute Present Knowledge in Nutrition – latest edition.
12	Clinical and therapeutic nutrition-IGNOU school of continuing education
13	Normal and Therapeutic Nutrition September 1990 by Corinne Hogden Robinson , Marilyn Lawler , Macmillan USA

Date **Course Coordinator** **Subject Committee Chairperson**