Composition of Curriculum - Committee for Home Science

(34. Home Science/Food Science/Processing/Food and Nutrition and Dietetics)

Sl. No.	Name and Organisation	Designation
1.	Dr. Ravikumar Patil H. S	Chairperson
2.	Dr. Renuka Meti	Member
3.	Dr. Vijayalaxmi A.H.M	Member
4.	Dr. Usha Devi C.	Member
5.	Dr. Rajeshwari	Member
6.	Maj. Dr. Shantha Maria	Member
7.	Dr. M. Anuradha	Member
8.	Dr. Gana Shruthy M.K	Special Officer, KHEC

SPEACIAL INVITEES

Sl . No.	Programmes	Sub-Committee Members
1.	**B.Sc. Home Science**	• Maj. Dr. Shantha Maria • Dr. Sundaravalli. A • Dr. Rebecca John • Dr. Indiramma • Dr. Srilakshmi Ramireddy • Dr. Vijaya U. Patil • Ms. Gayathree • Ms. Dorothy Anthony • Ms. Lakshmi Jithendhran • Ms. Michelle Vaz • Dr. Sapna Dinesh • Ms. Swathi R
2.	**BA/B.Sc. Home Science**	• Dr. Marie Kavitha • Dr. Mamatha B • Dr. Vijaya U Patil • Dr. Manjula G. Kadapatti • Mrs. Veena Tirlapu • Mrs. Anita Bettaiah • Mrs. Shobha .S • Dr. Sapna Dinesh
3.	**B.Sc. Food Science and Nutrition**	• Dr. Rajeshwari J • Dr. Shekhara Naik. R • Dr. Anitha C • Dr. Mahesh MS
4.	**B.Sc. Nutrition and Dietetics**	• Dr. Sangeeta Pandey • Dr. Geetha Santhosh • Dr. V. Padma
5.	**B.Sc. Clinical Nutrition**	• Dr. Usha Devi. C • Dr. M. Anuradha • Dr. Vijayalaxmi A.H.M
6.	**B.Sc. Food Technology**	• Dr. Ravikumar Patil H. S • Dr. Renuka Meti
7.	**B.Sc. Human Development/ Care and Welfare**	• Dr. Vijayalaxmi A.H.M • Dr. Sujata Gupta Kedar • Dr. Shobha.G • Dr. Venkat Lakshmi H. • Dr. Kowsalya.D.N • Dr. Indiramma. B.S • Dr. Manjula G Kadapatti • Dr. Marie Kavitha Jayakaran • Smt. Vijaya U Patil

Structure of
B.Sc in
Composite Home Science

(Model I C)

Contents of Courses for B.Sc. Home Science

Model I C

Semester	Course No.	Course Category	Theory/ Practical	Credits	Paper Title	Marks	
						S.A	I.A
1.	CHSCT1.1	DSC- 1	Theory	3	Fundamentals of Textiles	60	40
	CHSCP1.1		Practical	2	Fundamentals of Textiles	35	15
	CHSCT1.2	DSC- 2	Theory	3	Fundamentals of Interior Design	60	40
	CHSCP1.2		Practical	2	Fundamentals of Interior Design	35	15
	CHSCT1.3	DSC- 3	Theory	3	Human Development I - Child Development	60	40
	CHSCT1.4	OE - 1	Theory	3	Developmental Communication / Introduction to Resource Management	60	40
2.	CHSCT2.1	DSC - 4	Theory	3	Basic Nutrition and Food Science	60	40
	CHSCP2.1		Practical	2	Basic Nutrition and Food Science	35	15
	CHSCT2.2	DSC- 5	Theory	3	Extension Education and Communication	60	40
	CHSCP2.2		Practical	2	Extension Education and Communication	35	15
	CHSCT2.3	DSC- 6	Theory	3	Human Physiology	60	40
	CHSCT2.4	OE- 2	Theory	3	Sustainable Development through Energy Conservation / Adolescent Brain and Behaviour	60	40

Curriculum Structure for the Undergraduate Degree Program
B.Sc. COMPOSITE HOME SCIENCE

Total Credits for the Program: 265 Credits

Starting year of implementation: 2021-2022

Name of the Degree Program: BSc Degree and M.Sc Home Science (Food & Nutrition/Human Development/Resource Management/Textiles and Clothing/Extension Education)

Discipline/Subject: Home Science

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

Semester	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 1- Fundamentals of Textiles	PO- 2 PO – 8 PO- 9	12+/ Equivalent Pass	• Lectures • Demonstration • Projects and experiments • Collaboration with industries and institutions	Formative and Summative Assessment
	DSC 2- Fundamentals of Interior Design	PO- 7 PO- 8 PO- 10	12+/ Equivalent Pass	• Skill oriented programs • Demonstrations • Workshops • Tutorial • Lectures • Collaborations • Experimental Learning • Presentations • Creative Thinking	Formative and Summative Assessment
	DSC 3 Human Development I- Child Development	PO- 3 PO- 7 PO- 9	12+/ Equivalent Pass	• Presentations • Case Studies • Creative Thinking	Formative and Summative Assessment

	OE – 1 • Developmental Communication	PO – 1 PO - 2	12+/ Equivalent Pass	• Tutorial • Lectures	Formative and Summative Assessment

				• Presentations • Case Studies	
	• Introduction to Resource Management	PO- 2 PO- 6 PO- 10	12+/ Equivalent Pass	• Lectures • Demonstration • Projects and experiments • Presentations	Formative and Summative Assessment
2	DSC 4- Basics of Nutrition	PO- 2 PO – 5 PO- 9	12+/ Equivalent Pass	• Regular lectures • Demonstrations • Group discussions • Case studies • ICT enabled teaching and learning experiences in terms of video lessons • Hands on experience in laboratory	Formative and Summative Assessment
	DSC 5- Extension Education and Communication	PO- 1 PO-2	12+/ Equivalent Pass	• Community Oriented practices	Formative and Summative Assessment
	DSC 6- Human Physiology	PO- 1 PO – 4 PO- 12	12+/ Equivalent Pass	• Lectures • Presentations	Formative and Summative Assessment
	OE – 2 • Sustainable Development through Energy Conservation /	PO- 2 PO- 7 PO- 9	12+/ Equivalent Pass	• Tutorial • Lectures • Presentations • Case Studies	Formative and Summative Assessment
	• Adolescent Brain and Behaviour	PO- 2 PO- 5 PO- 12	12+/ Equivalent Pass	• Tutorial • Lectures • Presentations • Case Studies	Formative and Summative Assessment

SYLLABUS FOR B.SC. COMPOSITE HOME SCIENCE &B.SC.

B.SC. COMPOSITE HOME SCIENCE
SEMESTER I

Course Title: **FUNDAMENTALS OF TEXTILES (DSC 1) (Theory)**	
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. Develop the skill of identifying and analyzing various types of fibres, yarns and fabrics.
2. Knowledge of textile care and maintenance
3. Awareness on sustainable textiles and its application daily life.

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**
Develop an understanding of various types of fibres, yarns and fabrics		**x**						**x**	**x**			
Understanding of textile care and maintenance		**x**				**x**		**x**	**x**		**x**	
Awareness on sustainable textiles and its application.				**x**	**x**	**x**		**x**	**x**		**x**	

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 1

Title of the Course: FUNDAMENTALS OF TEXTILES

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

CONTENT	**45 hours**
Unit I - STUDY OF FIBRES, YARNS AND FABRICS	**23 Hours**
Chapter 1 - Classification of fibres, Structure, Composition, Origin, manufacture of natural and man-made fibres, Identification of fibres, Properties and characteristics of natural and man-made fibres, Understanding Fibre blends	5 Hrs
Fibre testing methods, Recent developments in fibres **Chapter 2 -** Yarn Classification, Yarn Types, Yarn Spinning, Advanced yarn spinning methods, Man-made filament yarn processing, Fancy yarns, Yarn Testing Methods	5 Hrs
Chapter 3 - Weaving - Types of weaves, properties and applications, Parts of Loom and Types of looms, Design, Weaving preparation, Weaving process, draft and peg plan for weaving. Testing of woven fabrics	5 Hrs
Chapter 4 - Knitting- Knitting needles- Types, Classification of knitting, Types of Knitting machines, Properties of knitted fabrics, Care and Maintenance of knitted fabrics, quality assessment.	4 Hrs
Chapter 5 - Non-Woven and other types of fabrics - Nonwoven Fibre Preparation and Web formation, Bonding Processes, Finishing of Nonwovens - Non Woven fabrics- properties, Felting, Netting, Lacing, Bonding, Leather, foam, fur, composites. Evaluation and Application of Nonwovens	4 Hrs
Unit II- LAUNDRY SCIENCE	**12 Hours**
Chapter 6- Materials, Reagents, Equipment and Process involved in laundering.	3 Hours

	3 Hours
Chapter 7 - Dry & wet laundry (Stain removal techniques)	3 Hours
Chapter 8 - Various sources of water and types of hardness and its impact on clothes during laundry	3 Hours
Chapter 9 - Starches, Stiffeners and Softeners, Additional laundry agents	
Unit III – ECO-TEXTILES & FASHION	**10 Hours**
Chapter 10 - Eco fibres and fabrics, carbon footprint, Eco mark for fabrics, Eco fibres and their applications and impact on the environment, its comparison with the other manmade fibres.	3 Hours
Chapter 11 - Textile waste and Up-cycling, Reuse, recycle, Concept of Reconstruction - Redesign, repair and recycle	4 Hours
Chapter 12 - Eco fashion terminologies, Eco fashion labels, Benefits of eco labels.	3 Hours

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10+ 10
Total	**60 marks + 40 marks = 100 marks**

Practical – 2 Credits **52 Hours**

List of Experiments to be conducted

1. Fibre identification: Identification of natural and manmade fibres by following three methods by Microscopic test, burning test and Solubility test.
2. Study of Yarn:
3. Detail study on types of yarns,
4. Count of yarn using Beesley's yarn count balance, T
5. Twist by twist tester,
6. Crimp by crimp tester

7. Strength of the yarn by single yarn or lea strength tester
8. Characteristics of Fabric:
9. Fabric count using pick glass,
10. Shrinkage
11. Thickness of Fabric
12. Tensile strength (breaking strength and elongation) using tensile strength tester, tearing strength using tearing strength tester, Fabric GSM.
13. Care of Textiles - Stain removal techniques, Starching using different types of starches
14. Knitting – Any two types
15. Crochet – Basic stitches with one product.
16. Collection of different types of fabrics and Identification of the type of fibre, yarn and weave from the same.

Formative Assessment - 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	-
Assignment + Project	5
Total	**35 marks + 15 marks = 50 marks**

PEDEGOGY

- Lectures
- Demonstration
- Projects and experiments
- Collaboration with industries and institutions

REFERENCES

1. Booth, J.E. (1996). Principles of Textile Testing. New Delhi: CBS Publishers & Distributors Pvt. Ltd.
2. Corbman, P.B. (1983). Textiles: Fibre to Fabric. McGraw-Hill Publishers.
3. Collier, B.J., & Epps, H.H. (1998). Textile testing and analysis. Prentice Hall Publishers.
4. Dantyagi, S. (1996).Fundamentals of Textiles and their Care. India: Orient Black swan Private Limited. D'Souza, N. (2014).Fabric Care. New Delhi: New Age International Publishers.
5. Hollen, R. N., Saddler, J., & Langford, A. (1979).Textiles. Macmillan Publishers.
6. Joseph, M. (1992), Introductory Textile Science. Sixth edition, California: Harcourt College Publishers
7. Madhulika, P. (2013). Weaving. New Delhi: Random Publishing.
8. Rastogi, D., & Chopra, S. (2017). Textile Science. India: Orient Blackswan Private Limited.

9. Robert, R. & Mather, R. H. (2015). The Chemistry of Textile Fibers. Cambridge: RSC Publishers.
10. Rose Sinclair, (2015). Textile and Fashion materials, Design and Technology, Wood head publications, London.
11. Mirftab.M, Horrocks. A. R, (2007). Eco Textiles the Way Forward for Sustainable Development in Textiles, Wood head publications, London.
12. Sushma Gupta, Neeru Garg, Renus Saini, (2005). Text book of clothing, textiles and laundry, Kalyani Publishers, New Delhi.
13. Cheryl Mendelson,(2005). Home comforts- the art and science keeping house, published by Scriber, New York.
14. Meenakshi rastogi,(2009). Textile and Laundry, Sonali Publications, New Delhi.

Date **Course Coordinator** **Subject Committee Chair person**

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 1

Course Title: **FUNDAMENTALS OF INTERIOR DESIGN (DSC 2) (Theory)**	
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. Gain knowledge on application of elements of art and principles of design in Interiors.
2. Analyze the traditional and contemporary furniture designs and furnishing styles
3. Understand the history of Interior design at local, National and International levels
4. Evaluate case studies on global market trends and techniques in the area of design.

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**
Gain knowledge on application of elements of art and principles of design in Interiors.	×							×	×			
Analyze the traditional and contemporary furniture designs and furnishing styles								×				×
Understand the history of Interior design at local, National and International levels				×								
Evaluate case studies on global market trends and techniques in the area of design								×		×		

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 1

Title of the Course: FUNDAMENTALS OF INTERIOR DESIGN

Course: DSC 2	
Number of Theory Credits	**Number of lecture Hours/semester**
3	**45**

CONTENT OF COURSE	**45 Hrs**
Unit – 1 DESIGN ASPECTS	**12 Hrs**
Chapter No.1: Design, Definition, Characteristics and classification of Design, History of Design, Terminologies in Interior design and decoration	2 Hrs
Chapter No. 2: Elements of Design and its application	3 Hrs
Chapter No.3: Principles of Design and its application	3 Hrs
Chapter No. 4: Colors in Interiors - Meaning of colour, Colour Spectrum – VIBGYOR, Dimensions of colour, Colour Systems -Prang and Munsell colour systems, Colour schemes and its significance in interiors, Colour psychology and Colour dynamics, Skills in rendering colours to interiors	4 Hrs
Unit – 2 DECORATION AND FURNISHINGS FOR INTERIORS	**15 Hrs**
Chapter No. 5: Lighting and Its Accessories - Lighting types, Lighting fixtures, suitable for various activities, Lighting accessories and their role in interiors, Effect of natural light and artificial light.	4 Hrs
Chapter No. 6: Decoration - Flower arrangement, Rangoli and Floral Decorations, Accessories and decoration - Recent Trends & Innovation	3 Hrs
Chapter No. 7: Furnishings- Soft Furnishings and Hard Furnishings, Selection, use and care of household linens and other furnishings	3 Hrs
Chapter No. 8: Window Treatments and Curtain Styles- Hard windows and Soft Windows, Curtain Styles	5 Hrs

Unit – 3 FURNITURE DESIGN	18 Hrs
Chapter No. 9: History of Furniture Design, History of Interior design in India- traditional styles of design and decoration in homes. Global Furniture Styles.	7 Hrs
Chapter No. 10: Selection and arrangement of furniture, Upholstered furniture material, techniques and design	3 Hrs
Chapter No. 11: Design of furniture and its work heights, Comfortable working postures with design considerations for residential and commercial work spaces, Furniture design based on anthropometric dimensions	8 Hrs

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10+ 10
Total	**60 marks + 40 marks = 100 marks**

Practical: 2 Credit **52 Hours**

List of Experiments to be conducted

1. Illustrate the different types of design
2. Illustrate the application on Elements of Art and Principles of Design.
3. Develop Prang and Munsell Colour chart.
4. Illustrate the different colour schemes for various interiors.
5. Market Survey on lighting accessories, furnishings and Furniture
6. Flower Arrangements- Different types and styles
7. Create an album on furniture styles – Traditional, Modern and Contemporary.
8. Design Research – Evaluation of Case Studies
   - Decoration – trends and classic style to suit lifestyle
   - Furniture Designs - international markets and global trends, marketing techniques, branding, promotion and presentation, work opportunities, intellectual property.

Formative Assessment = 35 marks + Summative Assessment = 15 Marks = 50 Marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	-
Project	5
Total	**35 marks + 15 marks = 50 marks**

References

1. Ball, Victoria .K (2001), The Art of Interior Design, McMillan and Co, New York.
2. Bhatt.P.D, Goenka.S(2003). Foundation of Art Design, Lakshmi Book Depot, Mumbai.
3. GopalKrishna, K.R, (2006), Fundamentals of Drawing, Subhas Stores Book Corner, Bangalore.
4. Pratap Rao M, (2002) Interior Design, Principles and Practices, Standard Publishers and Distributors
5. John Pile and Judith (2013). A History of Interior Design, Wiley Publishers
6. Penny Spark (2009). Designing the Modern Interior, Berg Publishers
7. Choudhary, A.K.R. (2000). Modern Concepts of Colour and Appearance, Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
8. Hilliard, E. (2000). Brilliant Colour at Home, Kyle Cathie Ltd, London

Date **Course Coordinator** **Subject Committee Chair person**

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 1

Course Title: **HUMAN DEVELOPMENT I - CHILD DEVELOPMENT (DSC 3) (Theory)**	
Total Contact Hours: 45 Hrs	Course Credits: 3
Formative Assessment Marks: 60 marks	Duration of ESA / Exam: 3 Hrs
Model Syllabus Authors:	Summative Assessment Marks: 40 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. Gain a scientific understanding of growth and development of a child.
2. Identify and suggest referral services for developmental delays.
3. Create a stimulative environment for early childhood.

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**
Gain a scientific understanding of growth and development of a child.		×		×	×						×	
Identify and suggest referral services for developmental delays.								×	×		×	
Create a stimulative environment for early childhood.								×		×		×

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 1

Title of the Course: HUMAN DEVELOPMENT I - CHILD DEVELOPMENT

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

CONTENT	**45 Hrs**
Unit – 1 INTRODUCTION TO CHILD DEVELOPMENT	**14 hrs**
(a) Child Development as an Interdisciplinary Science **Chapter No. 1:** Definition and meaning; Interdisciplinary nature, Principles of Child Development, Nature versus nature, Child Development and Child Psychology	4 hrs
Chapter No. 2: Methods of studying Child Development, Careers in Child Development	3 hrs
(b) Biological Foundations	3 hrs
Chapter No. 3: Evolutionary base of behavior, Heredity and behavior **Chapter No. 4**: Biology and behavior, Nervous system in action (Sensation and perception - sensing , organizing, identifying and recognizing , the visual system, visual system, hearing , and other senses organizational process in perception)	4 hrs
Unit – 2 DOMAINS OF DEVELOPMENT	**24 hrs**
(a) Physical and Motor development	6 hrs
Chapter No. 5: Physical development. Perceptual development	2 hrs
Chapter No. 6: Motor development	3 hrs
(b) Cognitive Development and Language	1 hrs
Chapter No. 7: Concept and overview, Cognitive processes, Piaget's Theory	2 hrs
Chapter No. 8: Intelligence and intelligence assessment, Theory of understanding	6 hrs
Chapter 9: Language: Overview, concepts, role of the environment	2 hrs
(c) Socio emotional Development **Chapter No. 10:** Overview of social development, Overview of emotional development	2 hrs
Chapter No. 11: Motivation: Motivation genes and obesity, motivation	

theory, motivation for personal achievement, **Chapter No. 12:** Child care: Parenting and types, Effect on personality, Child rearing practice	
Unit – 3 CHILDREN AS A VULNERABLE GROUP	**7 hrs**
Chapter No. 13. Concept of children as a vulnerable group	3 hrs
Chapter No. 14. Laws to protect children	2 hrs
Chapter No. 15. Welfare schemes - health, education	2 hrs

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10+ 10
Total	**60 marks + 40 marks = 100 marks**

References

1. Child Psychology Made Simple, Richard Lansdown
2. Psychology and life education, Richard J.Gerrig, Philip G Zimbardo, Pearson
3. Human Development – A life Span view, Kail Robert and Cavanaugh John, 7th edition (also online book)
4. Life Span Development, Santrock John, 14th edition (also online book)

Date **Course Coordinator** **Subject Committee Chair person**

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 1

Course Title: **DEVELOPMENTAL COMMUNICATION (OE-1) (Theory)**	
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. Understand the concept and process of development and communication
2. Sensitize about issues related to society, environment, health, and education.
3. Acquire experiential learning skills on media and development communication.

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 concept and process of development and communication	×	×	×									
Sensitize about issues related to society, environment, health, and education.					×	×	×					
Acquire experiential learning skills on media and development communication.									×	×	×	

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 1

Title of the Course: DEVELOPMENTAL COMMUNICATION

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

CONTENT	45 Hrs
Unit-I Communication and developmental Concept	**15 Hrs**
Chapter No. 1. Meaning, definition, scope and importance of communication Functions of communication – information function, command or instructive function, influence or persuasive function and integrative function. Elements of Communication – five elements – communicator, communicate, message, channel and feedback	**5 Hrs**
	5 Hrs
Chapter No. 2. Means of Communication – Oral, Written, Sign / signal, action, object. Types of Communication – Formal and Informal Communication. Advantages and Limitations of communication media **Chapter No. 3.** Definition, basic concept, nature, significance and functions and dysfunctions. Models of Development- Basic Needs model, Philosophy and principles of development communication.	**5 Hrs**
Unit-II Media and Development Communication	**15 Hrs**
Chapter No. 4. Development Communication: Definition, Scope, Objectives, Role of ICT in Development communication. Traditional media – types, characteristic role in development communication	**5 Hrs**
Chapter No. 5. Development reporting – roles and responsibilities of development reporter, ethics in reporting, required skills and issues in development reporting News reporting – definition of news, ingredients and qualities of news, news value, types of news reports, structure of news reports	**5 Hrs**

Chapter No. 6. Radio news, features and commentaries, radio and development communication, Television and cinema – role in development communication.	**5 Hrs**
Unit -III Skills for Development Communication (Experiential Learning)	**15 Hrs**
Chapter No. 7. Photography – Role of photography in communication, Video films – planning and execution based on a topic.	**7 Hrs**
Chapter No. 8. - Editing procedure – optical effects, music titles and other accessories. Editing for a short video – 3 mins, 5 mins etc, Flyiers – preparation and importance of flyer's for a specific message.	**8 Hrs**

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

References:

1. Capila.A. (2001). Images of Women in the Folk Songs of Garhwal Himalayas. New Delhi: Concept Publishers
2. Communication for Development in the Third World Theory and Practices (1991). New Delhi: Sage Publications
3. Dhanraj patil. (2010). Communication for rural development in India. New Delhi: Serials Publications
4. Gupta.D. (2007). Development Communication in Rural Sector. New Delhi: Mukhopadhyay, Abhijeet Publication
5. Joshi Uma. (1997). Textbook of Mass Communication and Media. New Delhi: Anmol Publications
6. Joshi Uma. (2001). Understanding Development Communication. New Delhi: Dominant Publishers

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

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 1

Course Title: INTRODUCTION TO RESOURCE MANAGEMENT (OE 1)	
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. Describe the bi-directional relationship between resources and family functioning.
2. Develop the ability to evaluate the managerial efficiency and effectiveness of decision making techniques.
3. Improve time management and evaluate outcomes of effective time management.
4. Simplify work and increase work efficiency through proper energy managerial process and posture training.

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**
Describe the bi-directional relationship between resources and family functioning		**X**		**X**		**X**						
Develop the ability to evaluate the managerial efficiency and effectiveness of decision making techniques.		**X**		**X**		**X**						
Improve time management and evaluate outcomes of effective time management.		**X**		**X**		**X**			**X**			
Simplify work and increase work efficiency through proper energy managerial process and posture training		**X**		**X**		**X**			**X**	**X**		

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 1

Title of the Course: INTRODUCTION TO RESOURCE MANAGEMENT

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

CONTENT	**45 Hrs**
Unit-I Management – Contexts and Concepts	**10 Hrs**
Chapter No. 1. Management – Definition , Management process, Motivating factors of Management- Goals, Values and Standards,	**2 Hrs**
Chapter No. 2. Decision Making – Definition, Types of Decisions, Decision making process	**3 Hrs**
Chapter No. 3. Resources- Definition, Classification, Effective use of resources, Conventional and Non – Conventional Resources	**5 Hrs**
Unit-II Resource Management	**15 Hrs**
Chapter No. 4. Human Resource Management -	**10 Hrs**
Chapter No. 5. Time Management **-** Concept, Importance, Tools in time management, Process of time management, making time plans – factors and steps, Time demands during different stages of the family life cycle.	**5 Hrs**
Unit -III Energy Management and Body Mechanics	**20 Hrs**
Chapter No. 6 – Energy Management- Definition, Significance and managerial process, Energy Expenditure and its assessment, Fatigue, Work simplification techniques; Comfortable reach and Working heights, of work spaces, Space dimensions for different work centers; Stature of workers and its application on work centers.	**6 Hrs**
Chapter No. 7. – Ergonomics – Definition, Significance, Ergonomics and Design, Anthropometry, Assessment using ergonomic Tools.	**6 Hrs**
Chapter No. 8.- Posture and Body Mechanics **-** Principles of Body Mechanics, Mechanics of Posture (Sitting, Standing and Sleeping), Risk due to lifestyle, causes and remedies, Preventing injuries through exercises,	**8 Hrs**

Stress into poor posture and its management.	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

References:

1. Ergonomics for Improved Productivity Proceedings of HWWE 2017 Volume 2, Mohammad Muzammil, Abid Ali Khan, Faisal Hasan.
2. Handbook of Human Factors and Ergonomics in Consumer Product Design, 2 Volume Set (Ergonomics Design & Mgmt. Theory & Applications) 1st Edition by Waldemar Karwowski (Editor), Marcelo Soares (Editor), Neville A. Stanton (Editor).
3. Introduction to Human Factors and Ergonomics, R.S. Bridger, 7 December 2017
4. Ergonomics For The Layman Applications In Design 2020, Edition by Mukhopadhyay P, Taylor & Francis Ltd
5. Working Postures: A Literature Review
6. July 2004Journal of Occupational Rehabilitation, 14(2):14359DOI:10.1023/B:JOOR.0000018340.46029.05, SourcePubMed
7. International Journal of Industrial Ergonomics, Volume 8, Issue 1, August 1991, Pages 3-15

Date **Course Coordinator** **Subject Committee Chair person**

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 2

Course Title: **Basic Nutrition and Food Science (DSC4) (Theory)**	
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. Summarize and critically discuss and understand both fundamental and applied aspects of Food Science and nutrition.
2. Able to explain functions of specific nutrients in maintaining health
3. Identifying nutrient specific impact and apply the principles from the various factors of foods and related disciplines to solve practical as well as Real world problems
4. Use current information Technologies to locate and apply evidence-based guidelines and protocol and get imported with critical thinking to take leadership roles in the field of health, diet special nutritional needs and nutritional counseling.

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
Summarize and critically discuss and understand both fundamental and applied aspects of Food Science and nutrition.	X		X	X			X					
Able to explain functions of specific nutrients in maintaining health							X	X	X	X		
Identifying nutrient specific impact and apply the principles from the various factors of foods and related disciplines to solve practical as well as Real world problems						X					X	X
Use current information Technologies to locate and apply evidence-based guidelines and protocol and get imported with critical thinking to take leadership roles in the field of health, diet special nutritional needs and nutritional counseling.	X			X							X	X

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 2

Title of the Course: Basic Nutrition and Food Science

Course: DSC 4	
Number of Theory Credits	**Number of lecture hours/semester**
3	**45**

CONTENT	**45 Hrs**
Unit-I. Introduction of Food Groups, Food Pyramid and Cooking Methods	**8 Hrs**
Chapter No. 1 Definition and Terms used in Food Science and Nutrition - Health, Food, Nutrition, Nutrients and Malnutrition	**2 Hrs**
Chapter No. 2: Various classifications of Foods and Food Groups - Definition, Classification and Functions of Foods, Basic Food Groups and Need for Grouping Foods and Application of Food Groups in Planning Adequate/Balanced Diets – Introducing EAR.	**3 Hrs**
Chapter No. 3: Culinary terms and Methods of Cooking - An Overview of culinary terms - Different Modes of heat transfer like Radiation, Conduction and Convection. Moist heat methods - Boiling, Simmering, Poaching, Steaming, Pressure cooking. Dry heat methods - Air as medium of cooking - Grilling, broiling, roasting, Baking. Fat as medium of cooking -Sautéing, Shallow fat frying, Deep fat frying. Combined (Moist and dry) Methods - Braising, Stewing. Other cooking methods -Microwave cooking, and Solar cooking. Advantages and Disadvantages of Cooking methods	**3 Hrs**
Unit-II. Nutritional Significance of different Food Groups	**17 Hrs**
Basic Concepts, classification, Composition, nutritive value and Role in Cookery **Chapter No 4: Cereals and Cereal Products-** a). Types of cereals: wheat, rice, millets,	**4 Hrs**

b) Cereal ProductsFlaked rice, puffed rice, wheat flour) Principles and properties of Cereals and its utility: Germination (Amylase Rich Foods- ARF), fermentation, Parboiling, Gelatinization, Dextrinization, Gluten formation	**2 Hrs**
Chapter No. 5 Pulses and Legumes	**2 Hrs**
Chapter No. 6: Fruits and Vegetables	**6 Hrs**
Chapter No. 7: a) Milk and Milk Products: including Fortified milk & its importance; b) Eggs-Basic structure of an egg and biological value, Quality evaluation and grading of eggs; c) Meat, poultry and fish **Chapter No. 8**: a) Nuts, oils and Oil seeds; b) Salt, Sugar and Jaggery; C) Spices & Condiments -Importance and their functional propertie	**3 Hrs**
Unit – 3 Nutrients	**20 hrs**
Chapter No. 9: Macro Nutrients Definition, Classification, Dietary Sources, Functions, Recommended Dietary Allowances, clinical signs and symptoms of Deficiency diseases and Excess of a) Energy; b) Carbohydrates; C) Fats; d) Proteins; e) Water	**5 Hrs**
Chapter No. 10: Minerals Definition, Classification, Dietary Sources, Functions, Recommended Dietary Allowances, clinical signs and symptoms of Deficiency diseases and Excess of a) Calcium; b) Phosphorus; c) Magnesium; d) sodium; e) Potassium; f) Iron; g) Zinc; h) Iodine; i) Flourine	**7 Hrs**
Chapter No. 11: Vitamins Classifications, functions, sources, Clinical signs and symptoms of deficiency, requirements of a) Fat Soluble Vitamins - A, D, E and K b) Water Soluble Vitamins-B Complex Vitamins- Thiamine, Riboflavin, Niacin, Pyridoxine, Folic acid, Cyanocobalamin and Vitamin C	**8 Hrs**

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Practical: 2 Credits **52 Hrs**

1. Weights and measures
2. Standardization of recipes
3. Enhancing the traditional recipes with specific nutrients (Protein, carbohydrate, vitamin A, Vitamin C, Calcium and Iron.
4. Cereal and millet preparation
5. Leavened and unleavened products, Fermented products and malted products
6. Pulse Cookery
7. Vegetable cookery – Effect on pigments and enzymatic browning in fruits and vegetables
8. Milk cookery
9. Egg cookery
10. Sugar and Jaggery – Syrup formation crystallization and caramelization
11. Fat and oil cookery

Formative Assessment = 35 marks + Summative Assessment = 15 Marks = 50 Marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	-
Project	5
Total	**35 marks + 15 marks = 50 marks**

References:

1. Khanna K, Gupta S, Seth R, Mahna R, Rekhi T (2004). The Art and Science of Cooking: A Practical Manual, Revised Edition. Elite Publishing House Pvt Ltd.
2. Raina U, Kashyap S, Narula V, Thomas S, Suvira, Vir S, Chopra S (2010). Basic Food Preparation: A Complete Manual, Fourth Edition. Orient Black Swan Ltd.
3. Rekhi T and Yadav H (2014). Fundamentals of Food and Nutrition. Elite Publishing House Pvt Ltd., Delhi.
4. Srilakshmi B (2014). Food Science, 6th Edition. New Age International Ltd., Delhi.
5. Bamji MS, Krishnaswamy K, Brahmam GNV (2016). Textbook of Human Nutrition, 4th edition. Oxford and IBH Publishing Co. Pvt. Ltd.

6. Byrd-Bredbenner C, Moe G, Beshgetoor D, Berning J. Wardlaw's Perspectives in Nutrition, McGraw- Hill International Edition, 9th edition, 2013.
7. Antia, F.P. (2005): Clinical Nutrition and Dietetics, Oxford University Press, Delhi
8. Gordon M Ward law (1999) Perspectives in Nutrition 4thed.WCB/Mcgraw Hill. International edition.
9. Mahan, L.K., Arlin, M.T. (2000): Krause's Food, Nutrition and Diet therapy, 11th edition, W.B.Saunders Company, London.
10. Passmore, R and Davidson S (1986) Human Nutrition and Dietetics.Living stone Publishers.
11. Robinson, C.H;Lawler, M.R.Chenoweth, W.L;andGarwick,A.E (1986):Normal and Therapeutic Nutrition,17th Ed., Mac Millan Publishing Co

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 2

Course Title: Extension Education and Communication (DSC 5) (Theory)	
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. Understand the Concept of Extension Education and Communication
2. Develop skills in the use of Extension methods and media.
3. Become aware of Extension teaching and Learning.

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 Concept of Extension Education and Communication.		×	×	×								
Develop skills in the use of Extension methods and media.						×	×	×				
Become aware of Extension teaching and Learning.										×	×	×

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 2

Title of the Course: Extension Education and Communication

Course: DSC 5	
Number of Theory Credits	**Number of lecture hours/semester**
3	**45**

CONTENT	**45 Hrs**
Unit – 1 EXTENSION EDUCATION AND ADULT LEARNING	**15 Hrs**
Chapter No. 1. Extension Education Definition, meaning, objectives, principles, scope, and Philosophy. Qualities of an Extension facilitator. Home science extension – Concept, definition, objectives, and philosophy, Contribution of Home Science Extension towards development of society.	**5 Hrs**
Chapter No. 2. Extension Teaching – Concept, goals, characteristics, steps, phases in extension education process. Edgar Dale's cone of experience. Adult learning, factors affecting, types. Teaching process – types of teaching methods, principles of teaching. Qualities of a good teacher.	**5 Hrs**
Chapter No. 3. Leader and leadership – types, styles, qualities, functions, advantages, and disadvantages of working with the leaders. Training camps.	**5 Hrs**
Unit – 2. Extension Teaching Methods & Media Communication	**15 Hrs**
Chapter No. 5. Definition, Aims and objectives, classification. Each of the Extension methods merits and limitations.	**5 Hrs**
Chapter No. 6. Audio visual aids – definition, role of visual aids in teaching, important audio, visual and other extension methods for effective teaching.	**5 Hrs**
Chapter No. 7. Visual Media - it's preparation and usage for the following: - a. Electronic Media - i. Radio ii. Television iii. Films. Group Media and it's usage in Extension b. Print Media - i. News Paper ii. Magazines. Mass media and their uses for extension	**5 Hrs**

c. Folk Media - Meaning and Characteristics ii. Major Indian Folk forms ii. Importance of Folk forms.	
Unit - 3 Diffusion and Adoption of Extension	**15 Hrs**
Chapter No. 8. Diffusion and Adoption, Innovation decision process, its stages, four main elements in diffusion of innovations.	**5 Hrs**
Chapter No. 9. Difference between communication and diffusion.	**5 Hrs**
Chapter No. 10. Steps in adoption process, important factors related to adoption of practices.	**5 Hrs**

Formative Assessment	
Assessment Occasion/ type	Weightage in Marks
Test 1	10
Test 2	10
Assignment + Project	10+10
Total	60 marks+40 marks = 100 marks

Practical: 2 Credits **52 Hrs**

1. Content analysis of news/programmes.
2. Edgar Dale's cone of experience.
3. Selection and preparation of developmental message using different methods and media: -
    a. Planning for the community.
    b. Developing message to the community.
    c. Evaluation of teaching aids used.
4. Using an appropriate example apply the stages of an adoption process.
5. Do an Interviewing/case study about a leader or successful social worker or organization itself which does community development work.
6. Using any communication media design/develop a tool to use for community effectiveness.

Formative Assessment = 35 marks + Summative Assessment = 15 Marks = 50 Marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	-
Project	5
Total	**35 marks + 15 marks = 50 marks**

References:

1. P.M Khan and L. L Somani (2010): Fundamentals of Extension Education. Agrotech publishing company.
2. Wittch and schuller (2002): Audio Visual Materials, Havper& Row publications.
3. Extension Education by S.k. Waghmare (2007) New Age India publications.
4. Fundamentals of Teaching Home Science by Arvind Chandra, Anupam Shah and Uma Joshi (2010) International publishers.
5. A textbook of Audio-Visual aids by Lalit Kishore (2002) United publications.
6. Education and Communication for Development by O.P Dahama and O.P Bhatnagar (2007) revised edition. New Age India publications.

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 2

Course Title: **Human Physiology (DSC 6) (Theory)**	
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. Gain knowledge into the structure and functions of cells, tissues and organs of human body
2. Understand the anatomy and physiology of the various systems in the human body
3. Comprehend the functions of systems.

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**
Gain knowledge into the structure and functions of cells, tissues and organs of human body		×	×	×					×			×
Understand the anatomy and physiology of the various systems in the human body			×					×	×	×		×
Comprehend the functions of systems.			×					×		×		×

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 2

Title of the Course: HUMAN PHYSIOLOGY

Course: DSC 6	
Number of Theory Credits	**Number of lecture hours/semester**
3	**45**

CONTENT	45 Hrs
Unit – 1 INTRODUCTION TO HUMAN BODY	**15 Hours**
(a) Introduction to Physiology **Chapter No. 1:** Basic concepts of Cell structure, tissues, organs and their functions.	**2 Hrs**
Chapter No. 2: Structure and Functions of lymph System	**2 Hrs**
Chapter No. 3: Structure and Functions of Skeletal System	**2 Hrs**
(b) Cardiovascular System and Respiratory System **Chapter No. 4:** Blood and its composition ,Functions; Blood groups , coagulating of blood	**3 Hrs**
Chapter No. 5: Structure and functions of heart Cardiac cycle, Heartrate, Cycle, Heart Rate, Cardiac Output, Blood Pressure (Systolic &Diastolic Blood pressure), Pathophysiology, ECG, Common disorders: anemia, myocardial ischemia and infarction	**3 Hrs**
Chapter No. 6: Physiological Anatomy of Respiratory Tract, Mechanism of Respiration, Transport of Respiratory Gases in Blood, Gaseous Exchange in Lungs and tissues	**3 Hrs**
Unit – 2 PHYSIOLOGY OF DIGESTIVE SYSTEM AND EXCRETORY SYSTEM	**12 Hrs**
(c) Digestive System **Chapter No. 7:** Principal accessory organs- salivary glands, liver, gall bladder, pancreas- structure & function **Chapter No. 8:** Digestion and absorption of food and role of enzymes and hormones, Role of gut hormones & enzymes in Digestion and	**3 Hrs**

mechanisms involved in absorption offood **Chapter No. 9:** Common disorders of the digestive system :Diarrhea, constipation, vomiting, obstructive jaundice, gastroenteritis, and acidity	**2 Hrs**
(d) Excretory System **Chapter No. 10:** Structure of Excretory System- Kidney, Nephron, Urinary Bladder, Role of kidney in homeostasis	**2 Hrs**
Chapter No. 11: Urine Formation, Composition of Urine, micturition, Glomerular Filtration Rate(GFR), Acute glomerulonephritis, Chronic glomerulonephritis, Nephrotic Syndrome and Renal failure	**3 Hrs**
	2 Hrs
Unit – 3 PHYSIOLOGY OF ENDOCRINE SYSTEM, REPRODUCTIVE SYSTEM AND NERVOUS SYSTEM	**18 Hrs**
(e) Endocrine System **Chapter No.12:** Introduction to Endocrinology, Location and functions of endocrine glands	**2 Hrs**
Chapter No. 13: Functions and Hormones secreted by Pituitary Gland, Thyroid Gland ,Parathyroid Gland, Adrenal Gland , Sex glands, Pancreas	**3 Hrs** **2 Hrs**
Chapter No. 14: Disorders of hypo and hyper secretion of the glands **(f) Reproductive System**	**2 Hrs**
Chapter No. 15: Structure, hormones secrete by male and female reproductive organs	**3 Hrs**
Chapter No. 16: Physiology of Menstruation- Estrogen vs Progesterone, -Pregnancy and associated changes, physiology of lactation	**3 Hrs**
(g)Nervous system **Chapter No. 16:** Structure and functions of Neuron, Brain **Chapter No. 17:** Central nervous system - Autonomic Nervous System, Parasympathetic Nervous System	**3 Hrs**

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

References

1. Chatterjee C.C (2016), Human Physiology Volume I, Medical Allied Agency, Kolkata
2. Chatterjee C.C (2004), Human Physiology Volume II, Medical Allied Agency, Kolkata. Sembulingam, K. (2000) Essentials of Medical Physiology, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi
3. Chaudhri, K. (1993) Concise Medical Physiology, New Central Book Agency (Parentral) Ltd., Calcutta.

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

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 2

Course Title: **SUSTAINABLE DEVELOPMENT THROUGH ENERGY CONSERVATION (OE-2) (Theory)**	
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. Understand the environmental aspects of non-conventional and alternate energy resources.
2. Understand greenhouse effect and how greenhouse gases benefit and harm the earth.
3. Understand the technical and commercial aspects of energy conservation.
4. Understand solid waste management and water conservation through the concept of reduce, reuse, recycle and compost.

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 environmental aspects of non-conventional and alternate energy resources				**x**	**x**			**x**	**x**	**x**		
Understand greenhouse effect and how greenhouse gases benefit and harm the earth				**x**				**x**		**x**		
Understand the technical and commercial aspects of energy conservation				**x**				**x**				
Understand solid waste management and water conservation through the concept of reduce, reuse, recycle and compost.				**x**	**x**							

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 2

Title of the Course: SUSTAINABLE DEVELOPMENT THROUGH ENERGY CONSERVATION

Course: OPEN ELECTIVE- OE 2	
Number of Theory Credits	**Number of lecture Hours/semester**
3	**45**

CONTENT	**45 Hrs**
Unit – 1 NON- CONVENTIONAL ENERGY RESOURCES	**11 Hrs**
Chapter No.1: Renewable energy sources: Working principles and application of - Solar, Wind, Hydro, Tidal, Geothermal, Biomass and Bio-fuels, Hydroelectric power, Hybrid systems, Photovoltaic cells.	**6 Hrs**
Chapter No. 2: Energy Conservation, Definition, energy saving devices, Energy conservation at home and community	**2 Hrs**
Chapter No.3: Eco-Friendly Ways to Reduce Energy.	**3 Hrs**
Unit – 2 SUSTAINABLE BUILDING TECHNOLOGIES	**20 Hrs**
Chapter No. 4: Greenhouses: Greenhouse Technology – Advantages, Classification of greenhouse, Construction of a cost effective greenhouse – materials required.	**6 Hrs**
Chapter No. 5: Recent trends for the future of green energy– Green micro grid technology	**4 Hrs**
Chapter No. 6: Heating and cooling systems, screens and auxiliary systems for a greenhouse Sustainable Building Technologies for Greenhouse Gas Emission Reduction, Carbon Foot Prints, Hydroponic greenhouses	**10 Hrs**
Unit – 3 REDUCE, REUSE AND RECYCLE	**14 Hrs**
Chapter No. 7: Meaning and Objectives of Reduce, Reuse and Recycle	**2 Hrs**

Chapter No. 8: Water management and its conservation	**4 Hrs**
Chapter No. 9: Waste management – organic and inorganic wastes	**4 Hrs**
Chapter No. 10: Application of 3 R's for sustainable building	**4 Hrs**

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

References

1. Energy Management and Conservation; K. V. Sharma and P. Venkataseshaiah: I K International Publishing House Pvt. Ltd.
2. Guide to energy management, 7th Edition, Barney L. Capehart, Wayne C. Turner, William J. Kennedy; ISBN-10: 0-88173-671-6, Published by The Fairmont Press, Inc
3. Journal on Energy Conservation and Management: Elsevier, ISSN: 0196-8904
4. Non-Conventional Energy Sources, G.D. Rai (2009), Khanna Publishers, New Delhi
5. Greenhouse Technology (The Future Concept of Horticulture): Ghosh, A.: Kalyani Publishers, New Delhi.

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

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 2

Course Title: **Adolescent Brain and Behaviour (OE – 2) (Theory)**	
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): Minimum understanding of Child Development - DSC3

Course Outcomes (COs):

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

1. Knowledge of brain changes during adolescence.
2. Awareness of influence of brain on behaviour.
3. Develop critical thinking skills.

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**
Knowledge of brain changes during adolescence		**x**	**x**									**x**
Awareness of influence of brain on behaviour.					**x**				**x**			**x**
Develop critical thinking skills		**x**			**x**				**x**			

B.SC. COMPOSITE HOME SCIENCE
SEMESTER 2

Title of the Course: ADOLESCENT BRAIN AND BEHAVIOUR

Course: OE-2	
Number of Theory Credits	**Number of lecture hours/semester**
3	**45**

CONTENT	**45 Hrs**
Unit – 1 THE DEVELOPING BRAIN	**10 hrs**
Chapter No. 1: Brain development during late childhood and Adolescence including cell migration, pruning, and arborisation, development of the grey and white matter and functional implications of those brain changes	**7 Hrs**
Chapter No. 2: Brain Plasticity in late childhood and adolescence	**3 Hrs**
Unit – 2 BRAIN AND COGNITION	**14 hrs**
Chapter No. 3: Overview of thinking in Adolescence	**5 Hrs**
Chapter No. 4: Self-control	**2 Hrs**
Chapter No. 5: Decision making	**5 Hrs**
Chapter No. 6: Resilience	**2 Hrs**
Unit – 3 BRAIN AND SOCIO-EMOTIONAL DEVELOPMENT	**14 hrs**
Chapter No. 7: Identity formation and crisis resolution	**3 Hrs**
Chapter No. 8: Motivation	**3 Hrs**
Chapter No. 9: Fear	**2 Hrs**
Chapter No. 10: Dating	**2 Hrs**
Chapter No. 11: Violence	**2 Hrs**
Chapter No. 12: Risk Taking	**2 Hrs**

Unit – 4 POLICIES AND SAFETY	7 hrs
Chapter No. 13: Social Policies, Judicial Policies, Protective Organizations and Services	**7 Hrs**

Formative Assessment = 60 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	20
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

References

1. Coon Dennis, Mitterer John, “Introduction to Psychology: Gateways to Mind and Behaviour”, Thomson Wadsworth Publishing 11th Edition

2. Peterson Christopher, “Psychology: A BioPsychoSocial Approach” Longman Publishing 2nd Edition

3. Vasta Ross, Haith Marshall, Miller Scott, “Child Psychology: The Modern Science”, John Wiley and Sons

4. Shaffer David, “Developmental Psychology: Childhood and Adolescence”, Brooks / Cole Publishing Company

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

Structure of B.A/ B.Sc Home Science

(Model II A)

Model Curriculum

Name of the Degree Program: B.Sc.

Discipline Core: Home Science **Total Credits for the Program: 185**

Credits 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 ProgramOutcomes)

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

Assessment:

Weightage for assessments (in percentage)

Type of Course	Formative Assessment / IA	Summative Assessment
Theory	**60**	**40**
Practical	**35**	**15**
Projects	**-**	**-**
Experiential Learning (Internships etc.)	**-**	**-**

Contents of Courses for B.Sc. Home Science

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	35	15
	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	35	15
	HSCT2.2	OE- 2	Theory	3	Teaching Materials For Early Childhood Education	60	40

B.Sc. Home Science

Total Credits for the Program: 185 Credits

Starting year of implementation: 2021-22

Name of the Degree Program: BA/BSc Degree

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	DSC A2 Fundamentals of Human Development	PO – 4 PO – 6 PO – 8	12+/Equivalent Pass	• Lecture • Field Visit	Formative and Summative Assessment
	OE- 2 Teaching Materials For Early Childhood Education	PO- 1 PO- 3 PO- 8	12+/Equivalent Pass	• Demonstration • lecture	Formative and Summative Assessment

Syllabus for B.Sc. Home Science & B.Sc

B.Sc. HOME SCIENCE
SEMESTER 1

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

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

Course Outcomes: (COs)

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

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

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

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

B.SC. HOME SCIENCE
SEMESTER 1

Title of the Course: PRINCIPLES OF FOOD AND NUTRITION

Course : DSC A1	
Number of Theory Credits	**Number of lecture hours/semester**
4	**60**

CONTENT	**60 Hrs.**
Unit – 1 Introduction to Nutrition	**12 Hrs**
Chapter No. 1: Definition of nutrition, Malnutrition and Health, Functions of food, Food groups -Types of food pyramids	**6 Hrs**
Chapter No. 2: Balanced diet - Meal planning – steps in meal planning	**6 Hrs**
Unit – 2 Nutrients	**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	**4hrs**
Chapter No. 6. Nutrition through lifecycle Nutritional requirement, dietary guidelines: Adulthood, Pregnancy, Lactation, Infancy -Complementary feeding, Pre-school, Adolescence, Old age.	**11hrs**

Unit – 4 Food Preservation	**15 Hrs**
Chapter No. 7 - Food Preservation- Objectives and principles-Methods: dehydration, temperature regulation ,using preservatives like salt and sugar	**8 hrs**
Chapter No. 8 - Food Handling and storage - freezing thermal and non-thermal methods, Canning	**7hrs**

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Practical Course: 2 Credits **60 Hrs**

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 fat Frying

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.

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	-
Assignment + Project	5
Total	**35 marks + 15 marks = 50 marks**

References

1. Srilakshmi B, (2007), Dietetics. New Age International publishers. New Delhi
2. Srilakshmi B, (2002), Nutrition Science. New Age International publishers. New Delhi
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, New Delhi

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

B.Sc. HOME SCIENCE
SEMESTER 1

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

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

Course Outcomes (COs):

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

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

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

Course Outcomes (COs) / Program Outcomes (POs)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Know the principles of preservation behind the methods of preservation			**x**		**x**							
Understand the stages of sugar cookery, quality of pectin and acidity in the development of preserved food products				**x**	**x**							
Acquire skills to formulate food based products							**x**	**x**				
Explore the principles of preservation in fruits and vegetables based products							**x**		**x**			
Skills to prepare cereals and pulse based preserved products and develop new products with retention of quality course					**x**		**x**					

B.Sc. HOME SCIENCE
SEMESTER 1

Title of the Course: FOOD PRESERVATION

Course: OE 1	
Number of Theory Credits	**Number of lecture hours/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 artificial preservatives	**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 powder etc)	**7 Hrs**
Chapter No. 5- Hands on experience :Drying of vegetables- peas, potato, carrot, French beans, Reconstitution of dried vegetables, Drying & preparation of powders- garlic, ginger, spices mix etc	**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 Visit to Fruits and Vegetable processing industry	**8 Hrs**
Chapter No. 8 - Pickling – Principles Involved and Types of Pickles, Chemical Preservatives – Definition, Role of Preservation, Permitted Preservatives, FSSAI guidelines, Foods fermented by Yeasts and Bacteria, Wine and Cheese Making	**3 Hrs**
Chapter No. 9 - Hands on experience: Pickle making, Visit to Commercial Pickle Manufacturing/ Food Industry / Wine industry	**4 Hrs**

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	5
Test 2	5
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., New Delhi.
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), New Delhi.
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, New Delhi

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

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

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

Course Outcomes (COs) / Program Outcomes (POs)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Explain the need for and importance of studying human growth and development across life span.		**X**		**X**	**X**						**X**	
Identify the biological and environmental factors affecting human development.								**X**	**X**		**X**	
Describe the characteristics, needs and developmental tasks of different stages in the human life cycle								**X**		**X**		**X**
Discuss the special features characteristic of each stage and its impact on the next stage			**X**	**X**								
Explain the broad theoretical perspectives of different researchers.			**X**	**X**					**X**			

B.Sc. HOME SCEINCE
SEMESTER 2

Title of the Course: FUNDAMENTALS OF HUMAN DEVELOPMENT

Course : DSC A2	
Number of Theory Credits	**Number of lecture hours/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**
Chapter No. 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;	**8 Hrs**
Chapter No. 7. Early Childhood Years- Definition, Developmental tasks; physical, motor, intellectual, language, emotional, social developmental milestones. importance of preschool education and Significance of play for all-round development	**8 Hrs**
Chapter No. 8. Piaget's cognitive Theory and Erik Erickson's Personality Theory.	**4 Hrs**

Unit – 3 Middle Childhood Years	20 Hrs
Chapter No. 9 The Middle Childhood Years - Definition, Developmental tasks. Highlights of Physical, Social, Emotional, Intellectual development. Significance of school and functions; Importance of extra-curricular activities, Peers - Importance and Influence, Interest development	12 Hrs
Chapter No. 10 Role of Parents and Disciplinary Techniques; Role of siblings, peers and others in the development; Behavior problems	8 Hrs

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
3 Total	**60 marks + 40 marks = 100 marks**

Practical: 2 Credits **60 Hrs**

List of Experiments to be conducted

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

Formative Assessment 100	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	5
Test 2	5
Assignment /Project	-
Total	35 marks + 15marks = 50 marks

References

1. Berk, L.E. (2005). Child development (5th ed.). New Delhi: Prentice Hall.
2. Bhangaokar, R.,&Kapadia, S. (in press). Human Development Research in India: A historical overview. In G. Misra (Ed.), Hundred years of Psychology in India. New Delhi:Springer.
3. Feldman, R., & Babu, N. (2009). Discovering the life span. New Delhi: Pearson
4. Kakar, S. (1998). The inner world. Psychoanalytic study of childhood and society in India.Delhi: Oxford University Press.
5. Kapadia, S. (2011). Psychology and human development in India. Country paper. International Society for the Study of Behavioural Development Bulletin Number 2, SerialNo. 60, pp.37-42.
6. Keenan, T., Evans, S., & Crowley, K. (2016). An introduction to child development.Sage.
7. Lightfoot, C., Cole, M., & Cole, S. (2012). The development of children
8. (7thed.).NewYork: Worth Publishers.
9. Santrock, J. (2017). A topical approach to life span development (9th ed.). NewNY.: Mcgraw-Hill Higher Education.
10. Singh, A. (2015). Foundations of Human Development: A life span approach. ND:Orient Black Swan.
11. Walsh, B.A., Deflorio, L., Burnham, M.M., & Weiser, D.A. (2017). Introduction to Human Development and Family Studies. NY: Routledge
12. Baradha.G 'Basics of Human Development' Saradalaya Press, Sri Avinashilingam Education Trust Institutions, Coimbatore 2008.
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, Tamil Nadu.

Date **Course Co-ordinator** **Subject Committee Chairperson**

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

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

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

B.Sc. HOME SCIENCE
SEMESTER 2

Title of the Course: TEACHING MATERIALS FOR EARLY CHILDHOOD EDUCATION

Course: OE 2	
Number of Theory Credits	**Number of lecture hours/semester**
3	**45**

CONTENT	**45 Hrs**
Unit-I - Concept & need for teaching learning materials	**15 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.) • Printed teaching aids (children's books, workbooks, etc.). Printed teaching aids	**15 Hrs**

• Digital material (audio & video)	
Unit-II – Development of Materials for Early years	**13 Hrs**
Chapter No. 2- Design and development of developmentally appropriate play materials to foster all round development in children using indigenous materials, Developing stories, songs with music and rhythm appropriate for infancy through early childhood	**8 Hrs**
Chapter No. 3 - Creative Activities - importance, Types and values promoted, method of giving instructions. Process of scripting for puppet plays and creative drama. a) Painting – free hand, finger, thread, wax resist &spray b) Printing -block, leaf, stencil, thumb c) Pasting – collage, paper mosaic, sand d) Miscellaneous-etching, marbling, dough modelling	**5 Hrs**
Unit –III- Development of Materials for developmentally challenged children	**12 Hrs**
Chapter No. 4- Creating teaching learning materials for developmentally challenged children (Blind, Dum& 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	5
Test 2	5
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. New Delhi.
3. Nasim Siddiqi, Suman Bhatia and Suptika Biswas (2007) Early Childhood Care and Education –Book IV, DOABA HOUSE, New Delhi.
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 **Course Co-ordinator** **Subject Committee Chairperson**

Structure of B.A / B.Sc in Home Science

(Model II C)

Model Curriculum

Name of the Degree Program: M.Sc.

Discipline Core: Family Resource Management

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:

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

Assessment:

Weightage for assessments (in percentage)

Type of Course	Formative Assessment / IA	Summative Assessment
Theory	**60**	**40**
Practical	**35**	**15**
Projects	**-**	**-**
Experiential Learning (Internships etc.)	**-**	**-**

Contents of Courses for BA/BSc Home Science : Family Resource Management
Model II C

Semester	Course No.	Course Category	Theory/Practical	Credits	Paper Title	Marks	
						S.A	I.A
1.	HSFRMT1.1	DSC-A1	Theory	4	Introduction to Resource Management	60	40
	HSFRMP1.1		Practical	2	Introduction to Resource Management	35	15
	B1	DSC-B1	Theory	3			
	B2	DSC-B2	Theory	3			
	HSFRM1.2	OEC-1	Theory	3	Basics of art and design	60	40
2.	HSFRMT2.1	DSC-A2	Theory	4	Family finance and Consumer Economics	60	40
	HSFRMP2.1		Practical	2	Family finance and Consumer Economics	35	15
	B3	DSC-B3		3			
	B4	DSC-B4		3			
	HSFRMT2.2	OEC-2		3	Fundamentals of Resource Management	60	40

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

Family Resource Management

Total Credits for the Program: 265 Credits

Starting year of implementation: 2021-22

Name of the Degree Program: B.A / B.Sc.

Discipline/Subject: Family Resource Management 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

Semester	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 Introduction to Family Resource Management	PO – 4 PO - 5 PO – 7	12+/Equivalent Pass	• Demonstration • Lecture	Formative and Summative Assessment
	OEC 1 Basics of Art and Design	PO – 5 PO - 5 PO – 7	12+/Equivalent Pass	• Demonstration • Lecture	Formative and Summative Assessment
2	DSC A2 Family Finance and Consumer Economics	PO – 4 PO – 6 PO – 8	12+/Equivalent Pass	• Lecture • Field Visit	Formative and Summative Assessment
	OEC 2 Fundamentals of Resource Management	PO – 2 PO – 9 PO – 10	12+/Equivalent Pass	• Lecture • Field Visit	Formative and Summative Assessment

B.A/B.Sc. HOME SCIENCE

SEMESTER 1

Course Title: **Introduction to Resource Management (**DSC-A1)	
Total Contact Hours: 60 Hrs.	Course Credits: 6
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):

1. Explain the need for and importance of studying the concepts of management
2. Identify the components of Resources Management.
3. Describe the characteristics and needs of resources at different stages in the Family life cycle
4. Explain the broad theoretical perspectives and frameworks of Family Resources of management
5. Identify understand the importance of management in everyday life
6. Application of Management process to resources- particularly time, and energy

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**
Summarize and critically discuss and understand the concept and components of Resource management		**X**		**X**	**X**						**X**	
Able to Describe the characteristics and needs of resources at different stages in the Family life cycle								**X**	**X**		**X**	
Understand the broad theoretical perspectives and frameworks of Family Resources of management								**X**		**X**		**X**
Understand the importance of management in everyday life							**X**	**X**		**X**		
Application of Management process to resources- particularly time, and energy				**X**			**X**	**X**				

B.A/B.Sc. HOME SCIENCE

SEMESTER 1

Title: Introduction to Resource Management

Course : DSC-A1	
Number of Theory Credits	**Number of lecture hours/semester**
4	**60**

CONTENT	**60 Hrs.**
Unit – 1 Introduction to Family Resources of Management	**16hrs**
Chapter No. 1: **Resource Management:** Introduction and Classification of Resources. Characteristics of resources, Factors affecting the use of resources **Chapter No. 2**: **Concepts of management:** Definition and importance of management. Management Process, Planning – Types and Importance. Controlling – steps in controlling, Evaluation – Types and Importance, Styles in management.	6hrs 10 hrs
Unit – 2 Decision Making in Management	**16hrs**
Chapter No. 3: Decision making in management: Definition and importance of decision making, Types of decision, Process of decision making, Methods of resolving conflicts, **Chapter No. 4:** Motivating factors in decision making – Values: meaning, Types of values. Parker values Goals: Meaning, Types of goals Standards: Meaning, Types of standards Inter relationship between Values, Goals and Standards	8hrs 8hrs

Unit – 3 Management of Resources: Time and Energy	16hrs
Chapter No. 5. Time management: Importance of time, Tools in time management, Time management process.	8hrs
Chapter No. 6. Energy Management: Importance of energy, Types of efforts required for various activities, Fatigue – Types, methods of over-coming fatigue,	8hrs
Unit -4 Work simplification	**12hrs**
Chapter No. 7: Work simplification – Definition, Techniques, Mundell's classification	6hrs
Chapter No. 8: Ergonomics – Definition, scope, and objectives, Domains, Man, Machine and Environment (MME).	6hrs

Formative Assessment = Theory 100 marks + Practical 50 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Practical Course: 2 Credits **60 Hrs**

1. Decision Making –Identify a problem and solve it using steps in decision making
2. Plan a time and activity chart for 3 days – Evaluate and make suggestions for improvement
3. Energy Management

a. Using factorial method calculate energy expenditure and physical activity level

b. Calculate energy cost of selected activities using heart rate monitor

4. Work simplification techniques: Pathway chart, process chart
5. Application of management process for different activities

Formative Assessment = 40 marks + Summative Assessment = 10 Marks = 50 Marks	
Assessment Occasion / type	Weightage in Marks
Test 1	5
Test 2	5
Project	5
Total	35 marks + 15 marks = 50 marks

REFERENCES

1. Nickell and Dorsey – Management of Family Living (2002) 4Th edition CBS Publishers and Distributers, New Delhi.
2. Shashi k, Gupta, Neeti Gupta, (2004), Management Concepts and Strategies, Kalyani Publishers, New Delhi.
3. Sushma Gupta and Anita Aggrawal, (2005), Text Book of Family Resource Management – Hygiene and physiology, Kalyani Publishers, New Delhi.
4. Trupathi.P.C, Reddy. (2006), Principles of Management, Tata McGraw Hills Publishing company Limited, New Delhi.
5. Verghese.M.A, Saha, P.N.Atreya.N,(2000), Ergonomics of Women at Works, Allied Publishers, Mumbai.

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. HOME SCIENCE

SEMESTER 1

Course Title: Basics of Art and Design (OE-1)	
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. Understand the design fundamentals in interiors.
2. Gain knowledge on application of elements of art and principles of design in Interiors.
3. Analyze the traditional and contemporary furniture designs and furnishing styles
4. Evaluate case studies on global market trends and techniques in the area of design.

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 design fundamentals in interiors.	×		×		×							
Gain knowledge on application of elements of art and principles of design in Interiors.	×							×	×			
Analyze the traditional and contemporary furniture designs and furnishing styles								×				×
Evaluate case studies on global market trends and techniques in								×		×		

the area of design												

B.A/B.Sc. HOME SCIENCE

SEMESTER 1

Title: Basics of Art and Design

Course : OE-1	
Number of Theory Credits	**Number of lecture hours/semester**
3	**45**

CONTENT	**45 Hrs**
Unit – 1 DESIGN Fundamentals	**12 Hrs**
Chapter No.1: Objectives of aesthetic planning – Beauty, Expressiveness, Functionalism, significance of good taste. Definition of Design, Characteristics and Types of Design – Structural and Decorative Design: Naturalistic, Stylized, Geometric and Abstract.	**5 Hrs**
Chapter No. 2: Elements of Art – Line, size, Shape, Form, Texture, Pattern, Space, Colour and Light. Principles of Design**:** Proportion, Balance, Rhythm, Emphasis, and Harmony.	**7 Hrs**
Unit – 2 Interior decoration	**15 Hrs**
Chapter No. 3: Fundamentals of Colour: Prang Colour Wheel, Dimensions of Colour, Colour Harmonies, Planning colour schemes for different areas.	**8 Hrs**
Chapter No. 4: Decoration - Flower arrangement, Rangoli and Floral Decorations and Accessories	**7Hrs**
Unit – 3 FURNITURE DESIGN	**18 Hrs**
Chapter No. 5: Window Treatments - Types of Windows, Window treatment and Mechanics of Window Treatment.	**9 Hrs**
Chapter No. 6: History of Furniture Design, Types of Furniture, Factors to be considered in selecting furniture. Principles of furniture arrangement	**9 Hrs**

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

References

1. Ball, Victoria. K (2001), The Art of Interior Design, McMillan and Co, New York.
2. Bhatt.P.D, Goenka.S(2003). Foundation of Art Design, Lakshmi Book Depot, Mumbai.
3. GopalKrishna, K.R, (2006), Fundamentals of Drawing, Subhas Stores Book Corner, Bangalore.
4. Pratap Rao M, (2002) Interior Design, Principles and Practices, Standard Publishers and Distributors
5. John Pile and Judith (2013). A History of Interior Design, Wiley Publishers
6. Penny Spark (2009). Designing the Modern Interior, Berg Publishers
7. Choudhary, A.K.R. (2000). Modern Concepts of Colour and Appearance, Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
8. Hilliard, E. (2000). Brilliant Colour at Home, Kyle Cathie Ltd, London

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

B.A/B.Sc. HOME SCIENCE

SEMESTER 2

Course Title: Family Finance and Consumer Economics (DSC-A2)	
Total Contact Hours: 60 Hrs.	Course Credits: 6
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):

- Understand the need for and importance of studying the concepts of Income
- Identify the role of saving and Credit in financial Management.
- Impart Knowledge of Insurance and Investment.
- An insight into Consumer problems and Protection Identify understand the importance of management in everyday life
- Application of consumer information and education

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 need for and importance of studying the concepts of Income		×		×	×						×	
Able to Identify the role of saving and Credit in financial Management								×	×		×	
Understand to impart Knowledge of Insurance and Investment.								×		×		×
An insight into Consumer problems and Protection Identify understand the importance of management in everyday life							×	×		×		
Application of consumer information and education				×			×	×				

B.A/B.Sc. HOME SCIENCE

SEMESTER 2

Title: Family Finance and Consumer Economics

Course : DSC-A2	
Number of Theory Credits	**Number of lecture hours/semester**
4	**60**

CONTENT	60 Hrs.
Unit – 1 Income Management	**16hrs**
Chapter No. 1: **Income** –Definition, Concepts, Sources, Types –Money Income, Real Income and Psychic Income. Means of supplementing Income.	**6hrs**
Chapter No. 2: **Budget:** Terminology –Budget, Budgeting, Budgetary control. Importance of Budgeting, Types of Budget – Balanced, Surplus and deficit, Steps in budgeting, Levels of involvements in Budgeting Process.	**10 hrs**
Unit – 2 Savings and Investments	**16hrs**
Chapter No. 3: Savings and Credit – Need for saving, Saving Institute-Bank, Post office, UTI and Insurance - Definition and importance of Insurance. Principles of insurance, types of Insurance-Life and health.	**8hrs**
Credit –Source, types, credit instruments, use and abuse of credit, cost of credit, credit and debit cards **Chapter No. 4:** Investment-Principles of investment. Types of Investments-Shares, Debentures, bonds and Mutual funds.	**8hrs**
Unit – 3 Consumer Problems and Protection	**16hrs**
Chapter No. 5. Consumer- Definition, Concept, Consumer buying behaviour, Types of Consumer Problem	**8hrs**
Chapter No. 6. Consumer Protection - Government and Private. Consumer redressal, functioning of consumer courts.	**8hrs**

Unit -4 Consumer information and education	**12hrs**
Chapter No. 7: Consumer Education-, Consumer education and awareness Consumer rights and Responsibilities.	**6hrs**
Chapter No. 8: Consumer Aids – label, brand, trademark and other certification marks.	**6hrs**

Formative Assessment = 100 marks + Practical 50 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Practical: 2 Credits **60 Hrs**

1. Plan a Budget for different Income groups. Prepare a detailed budget for one income group
2. Visit and prepare the Report on the different Saving Institutes - Bank, Post office, UTI and Life Insurance
3. Banking Process: Procedure for opening savings account Writing Cheques, Withdrawal, Demand draft, NEFT
4. Illustrate different types of consumer aids and Design a labels for consumer product
5. Outreach programs on consumer awareness.

Formative Assessment = 35 marks + Summative Assessment = 15 Marks = 50 Marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	5
Test 2	5
Project	5
Total	**35 marks + 15 marks = 50 marks**

REFERENCES:

1. Nickell and Dorsey – Management of Family Living (2002) 4Th edition CBS Publishers and Distributers, New Delhi.
2. Goel Sandeep –Financial Services (2012) PhL Learning Pvt Ltd., New Delhi.
3. Kothari Rajesh (2010) Financial services in India Sage Publication New Delhi
4. Mishra M.N –Insurance, Principles and Practices (1981) S Chand nd Co, New Delhi.
5. .Murthy D.K, Venugopal –Indian Financial System (2006) I K International Publishing House Pvt Ltd., New Delhi.
6. Nickell and Dorsey – Management of Family Living (2002) 4Th edition CBS Publishers and Distributers, New Delhi.
7. Stillman J Richard – Guide to personal finance (1984) Prentice Hall International Inc, New Jersey.

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.A/B.Sc. HOME SCIENCE

SEMESTER 2

Course Title: Fundamentals of Resource Management (OE -2)	
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):

1. Discuss the need for and importance of studying the concepts of management
2. Describe the characteristics and needs of resources at different stages in the Family life cycle
3. Explain the broad theoretical perspectives and frameworks of Family Resources of management
4. Identify understand the importance of management in everyday life
5. Application of Management process to resources- particularly time, and energy

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
Critically discuss and understand the concept and components of Resource management		×		×	×						×	
Able to Describe the characteristics and needs of resources at different stages in the Family life cycle								×	×		×	
Understand the broad theoretical perspectives and frameworks of Family Resources of management								×		×		×
Understand the importance of management in everyday life							×	×		×		
Application of Management process to resources- particularly time, and energy				X			X	X				

B.A/B.Sc. HOME SCIENCE

SEMESTER 2

Title: Fundamentals of Resource Management

Course : OEC-2	
Number of Theory Credits	**Number of lecture hours/semester**
3	**45**

CONTENT	**45 Hrs**
Unit – 1 Fundamentals of resource Management	**12Hrs**
Chapter No. 1: **Concepts of management:** Definition and importance of management. Management Process, Planning – Types and Importance. Controlling – steps in controlling, Evaluation – Types and Importance, Styles in management	**7 Hrs**
Chapter No. 2: **Resource Management:** Introduction and Classification of Resources. Characteristics of resources, Factors affecting the use of resources	**5 Hrs**
Unit – 2 Motivating factors and Decision making process	**15 Hrs**
Chapter No. 3: : Motivating factors in decision making – Values: meaning, Types of values. Parker values Goals: Meaning, Types of goals Standards: Meaning, Types of standards Inter relationship between Values, Goals and Standards	**9 Hrs**
Chapter No. 4: Decision making in management: Definition and importance of decision making, Types of decision, Process of decision making, Methods of resolving conflicts	**6Hrs**

Unit – 3 Management of resources: Time and Energy	18 Hrs
Chapter No. 5: Time management: Importance of time, Tools in time management, Time management process.	**8Hrs**
Chapter No. 6: Energy Management: Importance of energy, Types of efforts required for various activities, Fatigue – Types, methods of over-coming fatigue, Work simplification – Definition, Techniques, Mundell's classification,	**10 Hrs**

Formative Assessment = Th 100 marks + Practical 50 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

REFERENCES

1. Sushma Gupta and Anita Aggrawal, (2005), Text Book of Family Resource Management – Hygiene and physiology, Kalyani Publishers, New Delhi.
2. Shashi k, Gupta, Neeti Gupta, (2004), Management Concepts and Strategies, Kalyani Publishers, New Delhi.
3. Trupathi.P.C, Reddy. (2006), Principles of Management, Tata McGraw Hills Publishing company Limited, New Delhi.
4. Verghese.M.A, Saha, P.N.Atreya.N,(2000), Ergonomics of Women at Works, Allied Publishers, Mumbai
5. Nickell and Dorsey – Management of Family Living (2002) 4Th edition CBS Publishers and Distributers, New Delhi.

Date **Course Co-ordinator** **Subject Committee Chairperson**

Structure of
B.Sc. with

Food Science and Nutrition

M.Sc. Food Science and Nutrition

(Model II A)

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:

1. To impart in-depth knowledge in the area of Food, Nutrition and its relation to health.
2. To Understand human physiological process and importance of nutrients in metabolism
3. To train the students to be inquisitive and think in an innovative way
4. To impart holistic interdisciplinary education in Food Science and Nutrition
5. To train critical thinking, effective communication and social interaction
6. To develop health, ecological and environmental concerns
7. To impart basic and translational research skills with technical excellence and make them research and industry ready.
8. To prepare for higher degree with specializations, create professionals in different related areas, foster research & development, teaching, government and public service and entrepreneurship.

PROGRAM SPECIFIC OBJECTIVES

- Provide and equip students with understanding of food Science and nutrition with evidence-based approach
- Equip students with knowledge and understanding of modern aspects of nutritional science and novel food usage
- Train on innovative recipe development applying the science of food
- Serve in core food industry, which leverages diverse food science domains including food biotechnology, product development, safety & quality control.
- Harness the skills required to be an efficient entrepreneur
- Perform in applied nutrition fields including public health and diet therapy
- Build competent professionals in the field of food industry, health care sector to address societal & national needs
- Enable students to confidently pursue higher studies and research
- Gain an understanding to enable independency to access, analyze and plan nutritional management for disease and critical condition
- Develop feasible solutions against major nutrition related health issues in country
- Develop confidence to implement nutrition education program in community
- Open a window in the field of food microbiology, quality control
- Create competitive nutritionists in various fields – hospitals, health care sectors, sports nutrition and food service institutions.

Contents of Courses for B.Sc. and M.Sc. in FoodScience and Nutrition

Model II A

Semester	Course No.	Theory/ Practical	Credits	Paper Title	Marks	
					S.A.	I.A.
I	FSNT1.1	Theory	4	Human Physiology	60	40
	FSNP1.1	Practical	2	Human Physiology	35	15
	FSNT1.2	Theory	3	A) Fundamentals of Food Science B) Nutrition Education	60	40
II	FSNT2.1	Theory	4	Fundamentals of Human Nutrition	60	40
	FSNP2.1	Practical	2	Human Nutrition	35	15
	FSNT2.2	Theory	3	A) Healthy Lifestyle and Nutrition B) Culinary Science	60	40

Curriculum Structure for the Undergraduate Degree Program

B.Sc Food Science and Nutrition

Total Credits for the Program: 265

Starting year of implementation: 2021-22

Name of the Degree Program: B.Sc.

Discipline/Subject: Food Science & Nutrition

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-I** **A1 (4+2)** Human Physiology	PO- 2 PO- 4	PUC/ 12th Science Stream	• Lectures • Demonstrations • Discussion	Formative and Summative Assessment

	OE-1 **3 Credits** **Culinary Science**	PO- 7	PUC/ 12th Science Stream	• Lectures • Demonstration • Discussion	Formative and Summative Assessment
2	**DSC-2** **A2 (4+2)** Fundamentals of Human Nutrition	PO- 2 PO- 5	DSC I and OE-1	• Lectures • Demonstration • Discussion	Formative and Summative Assessment
	OE-II **3 Credits** Healthy lifestyle and nutrition	PO- 2 PO- 5			

B.Sc. FOOD SCIENCE & NUTRITION
SEMESTER 1

Course Title: HUMAN PHYSIOLOGY	
Total Contact Hours: 60	**Course Credits:4**
Formative Assessment Marks: 40	**Duration of ESA/Exam: 03Hrs**
Model Syllabus Authors:	**Summative Assessment Marks: 60**

Course Pre-requisite(s): Students who have passed Pre-University Board of Examination or Equivalent board with science subjects are eligible for the undergraduate degree B.Sc in Food Science and Nutrition.

Course Outcomes (COs):

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

- Gain the basic knowledge of human anatomy and physiology.
- Define the main structures composing human body.
- Explains structure and functions of cells, tissues and organs, systems of the human body
- Relates structure and functions of tissue.
- Provides excellent preparation for careers in the health professions and/or biomedical research.

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
Gain the basic knowledge of human anatomy and physiology	X											
Define the main structures composing human body	X											
Explains structure and functions of cells, tissues and organs, systems of the human body	X											
Relates structure and functions of tissue.	X											
Provides excellent preparation for careers in the health professions and / or biomedical research.		X										

B.Sc. FOOD SCIENCE & NUTRITION
SEMESTER 1

Title of the Course: HUMAN PHYSIOLOGY

Course: DSC 1	
Number of Theory Credits	**Number of lecture Hours/semester**
4	**60**

CONTENT	**60 Hrs**
Unit – 1 Introduction to Human Body	**14 hrs**
Chapter No. 1 Basic concepts of Organs, tissue and cell,	**4**
Chapter No. 2 Cellular organelles - structure and functions	**3**
Chapter No. 3 Blood - Composition, blood groups and Functions	**4**
Chapter No. 4 Structure and Functions of lymph System	**3**
Unit – 2 Cardiovascular System and Respiratory Systems	**14 hrs**
Chapter No. 5. Cardiovascular System - Structure and functions of heart, Properties of Cardiac Muscle and Functional Tissues.	**4**
Chapter No. 6. Cardiac Cycle, Heart Rate, Cardiac Output, Blood Pressure (Systolic & Diastolic Blood pressure), ECG	**3**
Chapter No. 7. Respiratory System - Physiological Anatomy of Respiratory Tract, Mechanism of Respiration,	**4**
Chapter No. 8. Transport of Respiratory Gases in Blood, Gaseous Exchange in Lungs and tissues	**3**
Unit – 3 Digestive System and Excretory Systems	**14 hrs**
Chapter No. 9. Digestive System- Principal organs of the digestive system: structure & function – Mouth (tongue, Teeth), Esophagus, Stomach, Small Intestine, Large Intestine	**5**
Chapter No. 10. Principal accessory organs: structure & function	**3**

– Salivary glands, liver, gall bladder, Pancreas **Chapter No. 11. Excretory System-** Structure & Function – Excretory system, Kidney, Nephron	**3**
Chapter No. 12. Urine Formation, Glomerular Filtration Rate (GFR), Composition of Urine.	**3**
Unit-4. Neuro-Endocrine System	**14 hrs**
Chapter No. 13. Endocrine Systems- Structure and Functions - Pituitary, Thyroid and Parathyroid, Adrenals and Gonads	**7**
Chapter No. 14. Endocrine Functions of Pancreas, Heart, Liver, Kidney	**2**
Chapter No. 15. Nervous System - Structure and functions of Neuron, Brain	**3** **2**
Chapter No. 16. Central nervous system, peripheral Nervous System,	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Practical: 2 Credits **60 Hrs**

1. Microscope and its uses
2. Histology of epithelial, connective, muscular and nervous tissues.
3. Enumeration of RBC and WBC count
4. Determination of pulse rate in resting condition and after exercise (40 beats /10 beats method)
5. Determination of blood pressure by Sphygmomanometer (Auscultator method).
6. Determination of Bleeding Time (BT) and Coagulation Time (CT).
7. Detection of Blood group (Slide method).

9. Measurement of Hemoglobin level (Sahli`s or Drabkin method).
10. Urine Analysis – Albumin & Glucose Test

Formative Assessment = 35 marks + Summative Assessment = 15 Marks = 50 Marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	-
Project	5
Total	**35 marks + 15 marks = 50 marks**

References Books

- Chatterjee C.C (2016), Human Physiology Volume I, Medical Allied Agency, Kolkata
- Chatterjee C.C (2004), Human Physiology Volume II, Medical Allied Agency, Kolkata.
- Sembulingam, K. (2000) Essentials of Medical Physiology, Jaypee Brothers Medical Publishers(P) Ltd., New Delhi
- Chaudhri, K. (1993) Concise Medical Physiology, New Central Book Agency (Parentral) Ltd., Calcutta.
- Kathleen J. W. Wilson, Anne Waugh, Allison Grant. Ross and Wilson Anatomy (2014),
- Physiology in Health and Illness. 12th Edition, Elsevier Publication, New Delhi
- Jain A K (2012) Text Book of Physiology volume 1 and Vol.2, APC publications New Delhi.

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. FOOD SCIENCE & NUTRITION
SEMESTER 1

Course Title: CULINARY SCIENCE (OE- 1)	
Total Contact Hours: 60	**Course Credits:4**
Formative Assessment Marks: 40	**Duration of ESA/Exam: 03Hrs**
Model Syllabus Authors:	**Summative Assessment Marks: 60**

Course Pre-requisite(s): Students who have passed Pre-University Board of Examination or Equivalent board with science subjects are eligible for the undergraduate degree B.Sc in Food Science and Nutrition.

Course Outcomes (COs):

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

1. Gain knowledge on aims and objectives of cooking
2. Understand the Conservation of nutrients and their importance to life
3. Understand the personal hygiene; environmental Hygiene; food storage and causes of contamination

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
Gain knowledge on aims and objectives of cooking		X										
Understand the Conservation of nutrients and their importance to life	X											

B.Sc. FOOD SCIENCE & NUTRITION
SEMESTER 1
Title of the Course: CULINARY SCIENCE

Course: OE 1	
Number of Theory Credits	**Number of lecture Hours/semester**
3	**45**

CONTENT	45 Hrs
Unit – 1 Introduction to cookery	**15 hrs**
Chapter No. 1 Culinary history, aims and objectives of cooking- Origin of modern cookery; Continental cuisine: Indian cuisine	**3 Hrs**
Chapter No. 2 Pre- processing of foods- Techniques used in pre-preparation, advantages and disadvantages	**2 Hrs**
Chapter No. 3 Methods of cooking- Methods of heat transfer; Classification; Moist heat methods; Dry heat methods; fat as cooking media, Conservation of nutrients	**5 Hrs**
Chapter No. 4 Personal Hygiene; Environmental Hygiene; Food storage and causes of contamination; Food borne illnesses; Food poisoning; Garbage disposal	**5 Hrs**
Unit – 2 Food groups and their nutritional value	**15 hrs**
Chapter No. 5. Cereals, pulses, fats and oils	**5 Hrs**
Chapter No. 6. Fruits and Vegetables	**3 Hrs**
Chapter No. 7. Animal foods and its products	**3 Hrs**
Chapter No. 8. Spices and condiments	**4 Hrs**
Unit – 3 Role of ingredients in cookery and methods of food service	**15 Hrs**
Chapter No. 9 Types & Uses: Fats and Oils, Salt, Raising Agents, Thickening Agents, Herbs, Flour, Rice, Cereals, Pulses, Milk and Milk	**5 Hrs**
	3 Hrs

Products **Chapter No. 10** Uses of sugar and eggs in cookery- bakery and confectionery	**3 Hrs**
Chapter No. 11 Preserved products- jam, jelly, juice, pickle, sauce, ketchup etc **Chapter No. 12** Dining services methods, techniques & styles	**4 Hrs**

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

REFERENCE

1. Food & Beverage Service – R. Singaravelavan - Oxford University Press
2. Food & Beverage Service - Dennis Lillicrap, John Cousins – Bookpower
3. Food & Beverage – F & B Simplified – Vara Prasad & R. Gopi Krishna – Pearson
4. Food & Beverage Service - Vijay Dhawan
5. The Steward - Peter Dias
6. The Waiter - John Fuller & A.J. Currie – Shroff Publishers
7. Parvinder S Bali, International Cuisine and food production management, 2012
8. Avantina Sharma, text book of food science and technology, CBS publication, 2019

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. FOOD SCIENCE & NUTRITION
SEMESTER 2

Course Title: FUNDAMENTALS OF HUMAN NUTRITION (DSC-A2)	
Total Contact Hours: 60	**Course Credits:4**
Formative Assessment Marks: 40	**Duration of ESA/Exam: 03Hrs**
Model Syllabus Authors:	**Summative Assessment Marks: 60**

Course Pre-requisite(s): Students who have passed Pre-University Board of Examination or Equivalent board with science subjects are eligible for the undergraduate degree B.Sc in Food Science and Nutrition.

Course Outcomes (COs):

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

- Knowledge in aspects of nutrition & functions of food in healthy life sustenance
- Understand function of nutrients, dietary sources, consequences of deficiency and excess
- Understand the food composition and concept of energy balance
- Knowledge and understanding role of water in diet

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
Knowledge in aspects of nutrition & functions of food in healthy life sustenance	X											
Understand function of nutrients, dietary sources, consequences of deficiency and excess	X											
Understand the food composition and concept of energy balance					X							
Knowledge and understanding role of water in diet									X			

B.Sc. FOOD SCIENCE & NUTRITION
SEMESTER 2
Title of the Course: FUNDAMENTALS OF HUMAN NUTRITION

Course: DSC-A2	
Number of Theory Credits	**Number of lecture Hours/semester**
4	**60**

CONTENT	**60 Hrs**
Unit – 1 Definition of food, nutrition, health	**15 Hrs**
Chapter No. 1: Introduction : Food & its relation to health, Objectives in the study of nutrition	**4 Hrs**
Chapter No. 2: Energy –Definition, forms of energy, units of measurement, physiological fuel vales of energy, determination of energy value of foods	**4 Hrs**
Chapter No. 3: BMR – definition, Determination and factors affecting, Factors affecting energy requirements, diet induced thermogenesis (SDA)	**4 Hrs**
Chapter No. 4: Water: Functions, requirements, sources	**3 Hrs**
Unit – 2 Macro Nutrients	**15 hrs**
Chapter No. 5: Protein -Classification, functions, Digestion& absorption (in brief), RDA, sources and deficiencies	**4 Hrs**
Chapter No. 6: Carbohydrate - Classification, functions, Digestion & absorption (in brief), RDA, sources and deficiencies	**5 Hrs**
Chapter No. 7: Fat-Classification, functions, Digestion & absorption (in brief), RDA, sources and deficiencies	**3 Hrs**
Chapter No. 8: Dietary fiber- types and functions	**3 Hrs**
Unit - 3Micronutrient – Vitamins and Minerals	**15 hrs**
Chapter No. 9: Fat-soluble Vitamins (A, D, E & K)- Function, RDA, sources and deficiency and excess.	**4 Hrs**
Chapter No. 10:. Water soluble vitamins: Thiamin, Riboflavin, Niacin, B12, Folic acid, Biotin and Vitamin C: functions, RDA, food sources, deficiencies and excess.	
Chapter No. 11: Macro minerals- Calcium, Phosphorus and magnesium, Sodium, Potassium, Chlorine: Functions, absorption, RDA, sources and	**4 Hrs**

deficiencies. **Chapter No. 12:** Micro Minerals- Iron, Zinc, Fluorine and Iodine: function, absorption, RDA, sources and deficiency.	**5 Hrs**
	2 Hrs
Unit – 4 Nutritional management	**15 hrs**
Chapter No.13 : Definition, importance of balanced diet, RDA for various nutrients - age, gender, physiological state, food group system, factors affecting meal planning,	**4 Hrs**
Chapter No.14 : Nutritional deficiency diseases -Causes, symptoms, treatment, Protein Energy Malnutrition (PEM), Vitamin A Deficiency (VAD), Iron Deficiency Anemia (IDA), Iodine Deficiency Disorders (IDD), Zinc Deficiency, Fluorosis.	**5 Hrs**
Chapter No.15: National Nutrition Policy and Program - Integrated Child Development Services (ICDS) Scheme, Mid-day Meal Program (MDMP), National programs for prevention of Anemia, Vitamin A deficiency, Iodine Deficiency Disorders.	**3 Hrs**
Chapter No.16: National and International agencies in uplifting the nutritional status -WHO, UNICEF, CARE, ICMR, ICAR, CSIR, CFTRI. Various nutrition related welfare program, ICDS, SLP, MOM, and others (in brief).	**3 Hrs**

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

PRACTICAL: 2 Credits **60 Hrs**

1. Weights and measures –Household and standard measures used in food science laboratory..
2. Calculation of mean nutritive value of foods
3. Standardization of recipes.
4. Recommended Dietary Allowances/Nutritive values of foods.
5. Enhancing the traditional recipes with specific nutrients (protein, carbohydrate, fat, vitamin A, vitamin C, calcium and iron).

Formative Assessment = 35 marks + Summative Assessment = 15 Marks = 50 Marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	-
Project	5
Total	**35 marks + 15 marks = 50 marks**

Reference:

1. Food & Nutrition - Dr. M. Swaminathan
2. Food facts & principles – Manay & Shadakshara Swamy
3. Food science – Sumathi Mudambi
4. Fundamentals of food and nutrition, Mudambi & Rajgopal 4th edition 2001
5. Principles of Food Science by Borgstrom and Macmillon
6. Food Science by Potter & Hotchkiss Judith E. Brown, Nutrition Now, 3 rd edition. Wads worth, Thomas learning, 10 Davis drive Belmont C A 94002-4098 USA, 2002
7. Barbara A. Bowmaw and Robert M. Russell, Nutrition, Eighth Edition, ILSI press, Washington, DC, 2001.
8. C. Gopalan, B.V. Ramasastri and S.G. Balasubramaniam, Nutritive value of Indian foods, NIN, ICMR, Hyderabad, 500007, INDIA, 2007.
9. Mehtab S Bamji, N Pralhad Rao, Vinod Reddy, Text Book of Human Nutrition, oxford IBH publishing Co. Pvt. Ltd., New Delhi, Calcutta.

10. Sir Stanley Davidson, R Passmore, Human Nutrition and Dietetics. The English language book society and Churchill hivingstome 1969.
11. Kathleen Mahan L., Sylnia Escott-Stump, Krause's food, nutrition and diet therapy (11th edition). Saunders Company, London.
12. Passmore R. and Davidson S. (1986) Human nutrition and Dietetics. Liming stone publishers.
13. Shil's M.E., Alfon J.A., Shike M (1994), Modern nutrition in health and diseases eighth edition.
14. William S.R., Nutrition and Diet Therapy fourth edition C.V. Mos Company

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. FOOD SCIENCE & NUTRITION
SEMESTER 2

Course Title: Healthy lifestyles and Nutrition (OE- 2)	
Total Contact Hours: 45	**Course Credits: 3**
Formative Assessment Marks: 40	**Duration of ESA/Exam: 03Hrs**
Model Syllabus Authors:	**Summative Assessment Marks: 60**

Course Pre-requisite(s): Students who have passed Pre-University Board of Examination or Equivalent board with science subjects are eligible for the undergraduate degree B.Sc in Food Science and Nutrition.

Course Outcomes (COs):

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

- Gain knowledge on healthy life styles
- Understand the relationship between different nutrients and their importance
- Understand the personal hygiene; environmental Hygiene

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
Gain knowledge on Healthy Life styles		X										
Understand the relationship between different nutrients and their importance	X											
Understand the personal hygiene; environmental Hygiene						X						

B.Sc. FOOD SCIENCE & NUTRITION
SEMESTER 2
Title of the Course: HEALTHY LIFE STYLE AND NUTRITION

Course: OE-2	
Number of Theory Credits	**Number of lecture Hours/semester**
3	**45**

CONTENT	**45 Hrs**
Unit – 1 INTRODUCTION TO FOOD AND NUTRITION	**15 Hrs**
Chapter No. 1: History of nutrition, Relationship of food and health	**3 Hrs**
Chapter No. 2: Factors influencing food intake & food habits: Physiologic Factors that determine food intake, Environmental & behavioral factors influencing food acceptance	**3 Hrs**
Chapter No. 3: Energy and macronutrients – Carbohydrates, Protein, Fat - functions, sources deficiency disorders and recommended intakes.	**4 Hrs**
Chapter No. 4: Micronutrients: Minerals – calcium, Iron, Iodine, and other elements, Vitamins – Fat Soluble & Water Soluble.	**5 Hrs**
Unit – 2 Nutrition for life cycle	**15 hrs**
Chapter No. 5: Nutritional assessment - direct and indirect methods	**4 Hrs**
Chapter No. 6: Nutritional requirements for pregnancy and lactation	**3 Hrs**
Chapter No. 7: Nutritional requirements for growing children	**4 Hrs**
Chapter No. 8: Nutritional requirements for adult and elderly	**4 Hrs**
Unit – 3 PLANNING OF DIET	**15 Hrs**
Chapter No. 9: Basic principles of planning diet, Dietary guides and balanced diets**.**	**3 Hrs**

Chapter No. 10: Principles of planning a normal diet: characteristics of a normal diet, meeting nutrient requirements of individuals and family. Use of Dietary guidelines for Indians.	**3 Hrs**
Chapter No. 11:Objectives of diet therapy- Regular diet and rationale for modifications in energy and other nutrients, texture, fluid, soft diets etc.	**4 Hrs**
Chapter No. 12: Nutrition for health and fitness- Role of nutrition in fitness, Nutritional guidelines for health and fitness, Nutritional supplements, Importance and benefits of physical activity	**5 Hrs**

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Reference

1. Food & Nutrition - Dr. M. Swaminathan
2. Srilaksmi. B. Nutrition Science. New age international Pvt. Ltd. New Delhi, 2001.
3. Robinson C. H. Basic Nutrition and Diet therapy, McMillan Pub.co, New York, 1989
4. Food facts & principles – Manay & Shadakshara Swamy
5. Food science – Sumathi Mudambi
6. Fundamentals of food and nutrition, Mudambi & Rajgopal 4th edition 2001
7. Barbara A. Bowmaw and Robert M. Russell, Nutrition, Eighth Edition, ILSI press, Washington, DC, 2001.
8. C. Gopalan, B.V. Ramasastri and S.G. Balasubramaniam, Nutritive value of Indian foods, NIN, ICMR, Hyderabad, 500007, INDIA, 2007.
9. Seth V and Singh K (2006). Diet Planning through the Life Cycle: Part 1 Normal Nutrition. A Practical Manual. Elite Publishing House Pvt. Ltd. New Delhi.
10. Chadha R and Mathur P eds. Nutrition: A Lifecycle Approach. Orient Blackswan, New Delhi. 2015

Date **Course Co-ordinator** **Subject Committee Chairperson**

Structure of
B.Sc. with

M.Sc. Nutrition and Dietetics

(Model II A)

Model Curriculum

Name of the Degree Program: M.Sc.

Discipline Core: Food Science and Nutrition

Total Credits for the Program: 265

Starting year of implementation: 2021-22

Program Outcomes:

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

PO 1	**Disciplinary Knowledge**: Understand the role and importance of food and nutrition for the welfare of the community and acquire the skills in planning diet, health and diseases
PO 2	**Communication Skills:** Learn and apply evidence-based guidelines in the field of dietetics, nutrition counselling, nutrition research laboratory, community
PO 3	**Critical thinking:** Understand the structure and functions of the different organs systems in relation to nutrition
PO 4	**Interpersonal and Problem Solving**: Design solutions and novel food products to meet the specified nutrient needs with appropriate consideration for the public health and safety.
PO 5	**Critical thinking, Communication and problem solving**: Comprehend, communicate effectively, plan, design and implement programs in the field of nutrition and dietetics
PO 6	**Decision making, Analytical and Research skills:** Understand and demonstrate the knowledge of food science, food science and quality control in societal and environmental contexts
PO 7	**Moral and ethical awareness/reasoning and Research skills:** Apply ethical principles and commit to professional ethics and responsibilities in

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

Assessment:

Weightage for assessments (in percentage)

Type of Course	**Formative Assessment / IA**	**Summative Assessment**
Theory	**40**	**60**
Practical	**15**	**35**
Projects	**40**	**60**
Experiential Learning (Internships etc.)	**40**	**60**

Content of Courses for B.Sc. Degree in Nutrition and DieteticsModel 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	35	15
	NDT1.2	OE	Theory	3	Fundamentals of food and health / Health lifestyle and nutrition	60	40
II	NDT2.1	DSC	Theory	4	Principles of Food Science and Preservation	60	40
	NDP2.1	DSC	Practical	2	Principles of Food Science and Preservation	35	15
	NDT2.2	OE	Theory	3	Food safety and Hygiene/ Food Adulteration	60	40

CURRICULUM STRUCTURE FOR UNDERGRADUATE DEGREE PROGRAM

Name of the Degree Program: B.Sc.

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 -Video Materials ➢ Demonstration ➢ Field Visits ➢ Hands On Training ➢ Observation ➢ On The Field Training ➢ Review ➢ Research ➢ Article ➢ Presentations ➢ Nutrition Education Tools And Module Development ➢ Seminars	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

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 life sustenance
2. Understand function of nutrients, dietary sources, consequences of deficiency and excess
3. Understand the food composition and concept of energy balance
4. Equip with knowledge and understanding on importance of water

Course Articulation Matrix:

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

B.Sc NUTRITION AND DIETETICS
SEMESTER 1

Title of the Course: FUNDAMENTALS OF NUTRITION

Course: DSC- 1	
Number of Theory Credits	**Number of lecture Hours/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	30
Presentation / Assignment	10
Total	40

Practical: 2 Credits **60 Hrs**

List of Experiments to be conducted

1. Weights and measures
2. Methods of cooking

a. Water – boiling, steaming, pressure cooking

b. Oil- Shallow frying, deep frying

3. Identification of nutrient rich food
4. Planning and preparation of macro nutrient rich recipes classes

a. Energy b. Protein

5. Planning and preparation of micro nutrient recipes

a. Iron b. Vitamin A

References

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

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc NUTRITION AND DIETETICS
SEMESTER 1

Title of the Course: FUNDAMENTALS OF FOOD & HEALTH

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

Course Outcomes (COs):

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

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 lecture Hours/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	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

References

1. Antia F.P., Philip Abraham, Clinical Dietetics and Nutrition, Oxford University Press; 4th edition.
2. Kathleen Mahan L., 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 New York.
5. Shil's M.E., Alfon J.A., Shike M (1994), Modern nutrition in health and diseases eighth edition.
6. William S.R., Nutrition and Diet Therapy fourth edition C.V. Mos Company.

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc NUTRITION AND DIETETICS
SEMESTER 2

Title of the Course: PRINCIPLES OF FOOD SCIENCE & PRESERVATION

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

Course Pre-requisite(s): PUC SCIENCE

Course Outcomes (COs):

1. Apply basic nutrition knowledge in making foods choices and obtaining an adequate diet
2. Learn to distinguish and relate the characteristics and properties of foods
3. Apply the knowledge gained on characteristics and properties of foods during cooking
4. Develop appropriate food preparation and processing methods to ensure quality 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 lecture Hours/semester**
3	**45**

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

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	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Practical: 2 Credits **60 Hrs**

List of Experiments to be conducted

1. Weights & measures, standardization of common food preparation.
2. Sensory evaluation
3. Starch cookery I-microscopic observation of different starches gel formation and gelatinization.
4. Starch cookery II- Rice and Wheat preparation, factors influencing dough

development, gluten formation.

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

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
CIA	30
Presentation / Assignment	10
Total	40

References

1. Arora K., Gupta K.V.,Theory of cooking
2. Bennen Marion. Introductory foods
3. Lavies. (1998) Food commodities. Heinemann Ltd, London
4. Lowe Bella Experimental cookery
5. Norman N Potter, Joseph H Hotchkiss (1999) Food science Technology
6. Peckham. Foundation of food preparation
7. Srilakshmi. Food Science. New Age International Publishers, New Delhi.
8. Sari Edelstein, 2014, Food Science-An ecological approach, Jones & Bartlett Learning, MA

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc NUTRITION AND DIETETICS
SEMESTER 2

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

Course Outcomes (COs):

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

Course Articulation Matrix:

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

B.Sc NUTRITION AND DIETETICS
SEMESTER 2

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

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

Content	45 Hours
Unit – 1 Introduction to Food Safety	**11 hours**
Concept and meaning of Food Safety, food adulteration, food hazards Food laws and regulations – National (FSSAI) and international (FAO) food laws, Governing bodies 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.	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

References

1. Food Safety-Theory and Practice:Paul L. Knechtges, Jones & Bartlett Learning,2012
2. Food Hygiene and Sanitation With case studies, Sunetra Roday, 2nd Edition, Tata McGraw Hill Education Pvt Ltd.,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 Standard methods.

Date **Course Co-ordinator** **Subject Committee Chairperson**

Structure of
B.Sc 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. 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 Food corporations.

Assessment:

Weightage for assessments (in percentage)

Type of Course	Formative Assessment / IA	Summative Assessment
Theory	**40**	**60**
Practical	**15**	**35**
Projects	**40**	**60**
Experiential Learning (Internships etc.)	**40**	**60**

Contents of Courses for B.Sc. Clinical Nutrition and Dietetics
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	35	15
	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	35	15
	CNDT 2.2	DSC- 5	Theory	3	Essentials of Micronutrients	60	40
	CNDP 2.2		Practical	2	Essentials of Micronutrients	35	15
	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

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 and M.Sc

Discipline/Subject: Clinical Nutrition and Dietetics

Program Articulation Matrix:

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

Sem.	Title /Name of the course	Program outcomes that the course addresses (not more than 3 per course)	Pre-requisite course(s)	Pedagogy	Assessment
1	Fundamentals of Nutrition	PO1	PUC / 10+2 with Chemistry or Biology as one optional	• Seminar Presentation • Quiz	Formative and Summative Assessment
	Essentials of Macronutrients	PO1, PO2	PUC / 10+2 with Chemistry or Biology as one optional	• Seminar presentation • Planning innovative recipes, Low-cost innovative recipes	Formative and Summative Assessment
	Food Sanitation, Hygiene	PO4	PUC / 10+2 with Chemistry or Biology as one optional	• Field study in community • Visits • Awareness programs	Formative and Summative Assessment
2	Human Physiology	PO3	PUC / 10+2 with Chemistry or Biology as one optional	• Seminar and Poster presentation • Model making	Formative and Summative Assessment
	Essentials of Micronutrients	PO2	PUC / 10+2 with Chemistry or Biology as one optional	• Seminar presentation, Quiz • Low-cost innovative recipes	Formative and Summative Assessment
	Food Safety and Security	PO4, PO5	PUC / 10+2 with Chemistry or Biology as one optional	• Visits to fair price shops • Visits to institutes, Debate • Awareness programs	Formative and Summative Assessment

SYLLABUS FOR B.Sc. in CLINICAL NUTRITION ANDDIETETICS

B.SC. CLINICAL NUTRITION AND DIETETICS
SEMESTER 1

Course Title: FUNDAMENTALS OF NUTRITION (DSE 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. To understand the guidelines of diet requirements
2. To learn about different methods and principle of cooking
3. To understand the role of macro nutrients in human nutrition
4. To understand their physiological functions, requirements, and sources of macro nutrients
5. To acquire knowledge on food sanitation and hygiene
6. To understand food laws and food regulations

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

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

B.SC. CLINICAL NUTRITION AND DIETETICS
SEMESTER 1

Course Title: FUNDAMENTALS OF NUTRITION

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

CONTENT	**45 Hrs**
Unit –1 INTRODUCTION	**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 nutrient need **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 – 2 ENERGY	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	10
Test 2	10
Assignment + Project	10+ 10
Total	**60 marks + 40 marks = 100 marks**

Practical – 2 Credits **60 hours**

1. Identification of foods under food groups.
2. Study of My plate and Food Pyramid
3. Weights and measures of common food (Raw and cooked weight)
4. Cooking methods – Planning and Preparing of recipes by
    a. Boiling,
    b. Steaming,
    c. Pressure cooking,
    d. Microwave cooking
    e. Frying (shallow, deep fat), Smoking point of oil
    f. Combination method
5. Identifying food composition table and Usage food exchange list
6. Calculation of energy requirement and energy expenditure for an adult man
7. Calculation of energy requirement and energy expenditure for an adult a woman

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
CIA	30
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, New Delhi
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, New Delhi
4. Bamji, M.S, Reddy, V. (1998), Textbook of Human Nutrition, Oxford & IBH Publishing Co, New Delhi.

5. Gibney M.J, Elia M Ljingquist. O (2005), Clinical Nutrition, Blackwell Science Publishing Co.
6. Robinson C.H and Winely E.S, (1984). Basic Nutrition and Diet Therapy, Macmillan Pub. Co. New York.
7. Swaminathan, M. (2002) Food and Nutrition, Volume I, The Bangalore Printing and Publishing Company Ltd.
8. Guthrie, H.A & Picciano, M.F (1995), Morby Publishing Co, New York.
9. Srilakshmi, B. (2005). Dietetics, New Age International Publishers, New Delhi
10. Williams- Basic nutrition and Diet therapy, Elsevier 12th edition

Date **Course Co-Ordinator** **Subject Committee Chairperson**

B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 1

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

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

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

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

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

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

B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 1

Title of the Course: ESSENTIALS OF MACRO NUTRIENTS

Course: DSC 2	
Number of Theory Credits	**Number of lecture Hours/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 – 2 PROTEINS	**15 Hrs**
Chapter No.3: Proteins: Composition, classification of proteins and amino-acids, functions, digestion, absorption and metabolism, Requirements and Sources, Effect of deficiency. Assessment of Protein quality. BV, PER, NPU and chemical score.	
Unit – 3 LIPIDS	**15 Hrs**
Chapter No.4: Lipids: Classification, functions, digestion, absorption and metabolism, Sources and Requirements - SFA, MUFA, PUFA: functions and deficiency, Role of n-3 and n-6 fatty acids, Trans Fatty Acids, dietary guidelines	

(International and National) for visible and invisible fats in diets.	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Practical – 2 Credits **60 Hours**

1. Planning and preparation of energy dense recipes
2. Planning and preparation of low energy recipes
3. Planning and Preparation of low Glycaemic index recepies. load Calculation of Glycaemic index and Glycaemic
4. Planning and preparation of high & low fiber recipes
5. Planning and preparation of protein dense recipes
6. Planning and preparation of low protein recipes
7. Planning and preparation of n-3 and n-6 rich recipes

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Seminar presentation	10
Planning innovative recipes	5
Low-cost innovative recipes	5
Total	20

References:

1. Shubhangaini A Joshi, (2010), Nutrition and Dietetics, with Indian case studies, Tata McGraw-Hill, New Delhi
2. Srilakshmi B. (2013) human Nutrition for B.Sc. Nursing students, New Age international publications, New Delhi.
3. Mudambi S.R and Rajagopal M.V (2008) Fundamentals of foods, Nutrition and Diet therapy, 6th revised edition, new age international publications, New Delhi
4. Swaminathan M S (2012) Fundamentals of food nutrition Bappcco Publication
5. Longvah T Anathan R, Bhaskarachary K, and Venkaiah k (2017) Indian food composition table, NIN.ICMR Hyderabad
6. Bamji, M.S, Reddy, V. (1998), Textbook of Human Nutrition, Oxford & IBH Publishing Co, New Delhi.
7. Gibney M.J, Elia M Ljingquist. O (2005), Clinical Nutrition, Blackwell Science Publishing Co.
8. Robinson C.H and Winely E.S, (1984). Basic Nutrition and Diet Therapy, Macmillan 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: **Course Co-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 food hygiene
2. Understand the procedure for cleaning and sanitation

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 AND HYGIENE	**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 food storage, refrigerated storage, freezer storage.	**7 Hrs**
Chapter No.4: Hygiene in Service **-** Hygiene procedures in food preparation, holding and display food for service, serving food safely, off-site services, hot holding of foods, Safe use of left - over food, hygiene in food service, protective display of food. Storage and disposal of waste – Classification of waste, methods of disposal.	**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, developing a cleaning Program. Pest control methods and its importance.	**15 Hrs**

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

References

1. De Vries. (1997) Food Safety and Toxicity, CRC, New York.
2. Lawley, R., Curtis L. and Davis, J. (2004) The Food Safety Hazard Guidebook, RSC publishing.
3. Mario Stanga, Sanitation: Cleaning and Disinfection in the Food Industry, Wiley, 2010.
4. Marriott, Norman G. (1985). Principles of Food Sanitation, AVI, New York USA.
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, New Delhi.
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 **Course Co-ordinator** **Subject Committee Chairperson**

B.SC. CLINICAL NUTRITION AND DIETETICS
SEMESTER 2

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

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

Course Outcomes (COs):

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

1 To gain elementary knowledge of functions of organ systems in the human body.

2. To learn about the physiological functions, sources, requirements, micronutrients and its deficiencies

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

4. To understand the major nutritional problems in populations

5. To study the different programs and interventions for improving nutritional status.

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

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

B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 2

Title of the Course: HUMAN PHYSIOLOGY

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

CONTENT	45 HRS
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. Functions of mouth pharynx, oesophagus, stomach, intestine and intestinal villi. Liver, pancreas and gall bladder and their dysfunction Digestive glands: salivary, gastric, liver, pancreas. Digestion of nutrients- Proteins, fats, carbohydrates. Hunger and thirst mechanism. Motility and hormones of	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 of action.	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

PRACTICAL: 2 Credits **60 Hrs**

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

a) Physical examination: volume colour, odour, appearance, pH.
b) Test for abnormal constituents of urine: Sugar, blood, albumin, Bile salts and ketone bodies.

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

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Seminar presentation	10
Planning innovative recipes	5
Low-cost innovative recipes	5
Total	20

References

1. Human Physiology by CC. Chatterjee, 11th edition (1985)
2. Essentials of Medical physiology by K Sambulingam, 3rd edition, 2005
3. The Cell, Copper, Geoffery, M., Oxford University Press, (2001)
4. Textbook of Biochemistry with Clinical correlations; Thomas Devlin [Ed.] (1997), Wiley – Liss.
5. Lehninger- Principles of Biochemistry; DL Nelson and MM Cox [Eds), 6th Edn. Macmillan Publications (2012).
6. Principles of Human Physiology; 4th Edn. Cindy L. Stanfield Pearson, (2010).
7. Principles of Biochemistry: Smith et al., [Ed.] (1986) McGraw Hill.
8. Principles of Biochemistry: General Aspects, Smith et al., [Ed.] (1986) McGraw Hill.
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 American Publication.
13. Cellular Physiology of Nerve and Muscle. Gary G Mathew (1998) Balckwell Scientific Inc

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 2

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

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

Course Outcomes (COs):

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

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

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

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

B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 2

Title of the Course: ESSENTIALS OF MICRONUTRIENTS

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

CONTENT	45 Hrs
Unit –1 - Vitamins	**15 Hrs**
– 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 Vitamin C**.** 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	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Practical: 2 Credits **60 Hrs**

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

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Seminar presentation	20
Quiz, Assignment	10

Low-cost innovative recipes	10
Total	40

References

1. Shubhangaini A Joshi, (2010), Nutrition and Dietetics, with Indian case studies, Tata McGraw-Hill, New Delhi
2. Srilakshmi B. (2013) human Nutrition for B.Sc. Nursing students, New Age international publications, New Delhi.
3. Mudambi S.R and Rajagopal M.V (2008) Fundamentals of foods, Nutrition and Diet therapy, 6th revised edition, new age international publications, New Delhi
4. Swaminathan MS (2012) Fundamentals of food nutrition Bappcco Publication
5. Longvah T Anathan R, Bhaskarachary K, and Venkaiah k (2017) Indian food composition table, NIN.ICMR Hyderabad
6. Bamji, M.S, Reddy, V. (1998), Textbook of Human Nutrition, Oxford & IBH Publishing Co, New Delhi.
7. Gibney M.J, Elia M Ljingquist. O (2005), Clinical Nutrition, Blackwell Science Publishing Co.
8. Robinson C.H and Winely E.S, (1984). Basic Nutrition and Diet Therapy, Macmillan 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: Course Co-Ordinator (S) Subject-Committee Chairperson

B.SC. CLINICAL NUTRITION AND DIETETICS
SEMESTER 2

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

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

Course Outcomes (COs):

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

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

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

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

B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 2

Title of the Course: FOOD SAFETY AND SECURITY

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

CONTENT	45 Hrs
Unit –1	**15 Hrs**
Food Safety - definition of food safety and food spoilage, factors affecting food safety and food spoilage: GMP, GAP, SSOP, GHP, food adulteration - definition, types of 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 food analyst	

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 and micronutrient 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	10
Test 2	10
Assignment + Project	10 + 10
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., New Delhi.
2. Gopalan, C. and Kaur, S. (Eds) (1989): Women and Nutrition in India, Nutrition Foundation of India.
3. Gopalan, C. (Ed) (1987): Combating Undernutrition – Basic Issues and Practical Approaches, Nutrition Foundation of India.
4. Achaya, K.T. (Ed) (1984): Interfaces between agriculture nutrition and food science, The United Nations University.
5. National Family Health Survey I & II (1993, 2000): International Institute for Population Studies, Mumbai.
6. National Plan of Action on Nutrition (1995): Food & Nutrition Board, Dept. Of WCD, Govt. of India.
7. National Nutrition Policy (1993): Dept. of WCD, Govt. of India.
8. Nutrition Education for the Public (1997): FAO Food and Nutrition Paper, 62, FAO.
9. Allen, L. and Ahluwalia, N. (1997) Improving Iron Status Through Diet: The Application of Knowledge Correcting Dietary Iron Bioavailability in Human Populations. OMNI/USAID, Arlington, VA, USA
10. Nestel, P. (ed) (1995). Proceedings: Interventions for Child Survival. OMNI/USAID Arlington, VA, USA
11. Murray, C. and Lopez, A. (eds)(1996) Global Burden of Disease and Injury Harvard University Press, Cambridge, MA, USA.
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 Course Co-Ordinator Subject Committee Chairperson

B.Sc. with Food Technology

M.Sc. Food Technology (One Year)

(Model II A)

Model Curriculum

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

Discipline Core: Food Technology

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 1	**Disciplinary Knowledge**: Bachelor degree in Food Technology helps to apply the knowledge of science, engineering fundamentals, and mathematical concepts to the solution in the field of food technology science and other allied subjects
PO 2	**Communication Skills**: Communicate effectively and write effective reports and design documentation, make effective presentations through seminars, project dissertations
PO 3	**Critical thinking and analytical reasoning:** Recognize the need for, and have the preparation and ability to engage in independent/as an entrepreneur and life-long learning in the broadest context of technological change logical reasoning and capability of recognizing and distinguishing the various aspects of real-life problems.
PO 4	**Problem Solving**: Identify, formulate, review research literature, and analyze complex Food Technology/applications problems and Design solutions for complex problems and design system components or processes that meet the specified needs with appropriate consideration for the food sustainability
PO 5	**Research related skills:** Acquire the practical knowledge and demonstrate the ability to design, conduct/trouble shoot experiments and analyze data in the field of food technology
PO 6	**Information/digital Literacy**: The completion of this programme will enable the learner to use appropriate software's to apply for bulk scale

	/industrial production of technology-based food products
PO 7	**Self-directed learning**: The student completing this program will develop an ability of working independently and to make an in-depth study of various disciplines of food technology.
PO 8	**Moral and ethical awareness/reasoning:** Understand the impact of the professional food technology solutions in societal and environmental contexts, and apply ethical principles and commit to professional ethics and responsibilities
PO 9	**Lifelong learning**: This programme provides self-directed learning and lifelong learning skills to think independently and develop problem solving skills with respect to food industry.
PO 10	Ability to peruse advanced studies and research in Allied fields of Food science.

Assessment:

Weightage for assessments (in percentage)

Type of Course	Formative Assessment / IA	Summative Assessment
Theory	**40**	**60**
Practical	**15**	**35**
Projects	**40**	**60**
Experiential Learning (Internships etc.)	**40**	**60**

Contents of Courses for B.Sc. with Food Technology

Model IIA

Semester	Course No.	Theory/ Practical	Credits	Paper Title	Marks	
					S.A.	I.A.
I	FTT1.1	Theory	4	Fundamentals Of Food Technology	60	40
	FTP1.1	Practical	2	Practical based on Fundamentals of Food Technology	35	15
		Theory	4			
		Practical	2			
	FTT1.2	Theory	3	Food Safety	60	40
			3	Language 1		
			3	Language 2		
			2	Digital fluency /Bioanalytical techniques (optional)		
II	FTT2.1	Theory	4	Food Chemistry	60	40
	FTP2.1	Practical	2	Theory based Practical's on Food Chemistry	35	15
			4			
			2			
	FTT2.2	Theory	3	Food And Nutrition	60	40
		Theory	2	Environmental Studies		
		Theory	3	Language 1		

CURRICULUM STRUCTURE FOR UNDERGRADUATE DEGREE

B.Sc. FOOD TECHNOLOGY
SEMESTER 1

Total Credits for the Program: 265 credits

Starting year of implementation: 2021-2022

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

Discipline/Subject: Food Technology

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

Semester	Course No.	Programme Outcomes thatthe Course Addresses	Pre-Requisite Course(s)	Pedagogy	Assessment
I	DSC- 1 Fundamentals Of Food Technology	PO 1, PO 2, PO 3	12th / Equivalent	• MOOC • PROBLEM SOLVING • LECTURE	Formative and Summative Assessment
	OE- 1 Food Safety	PO 1, PO 2, PO 3	12th / Equivalent	• MOOC • PROBLEM SOLVING • LECTURE	Formative and Summative Assessment
II	DSC -2 Food Chemistry	PO 1, PO 2, PO 3	12th / Equivalent	• MOOC • PROBLEM SOLVING • LECTURE	Formative and Summative Assessment
	OE- 2 Food and Nutrition	PO 1, PO 2, PO 3	12th / Equivalent	• MOOC • PROBLEM SOLVING • LECTURE	Formative and Summative Assessment

Syllabus for B.Sc. with Food Technology

B.Sc. FOOD TECHNOLOGY
SEMESTER 1

Course Title: FUNDAMENTALS OF FOOD TECHNOLOGY (DSC- 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. Utilize advanced instruments and technologies to process and analyze food products and to solve food safety problems.
2. Critically assess and analyze food science information available in the public domain in an innovative and ethical way.
3. Communicate technical and other relevant information effectively in both oral and written format to a diverse audience including supervisors, colleagues, and consumers

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**
Utilize advanced instruments and technologies to process and analyze food products			✓												
Critically assess and analyze food science information in an innovative and ethical way.		✓													
Communicate technical and other relevant information in both oral and written format to a diverse audience		✓													

B.Sc. FOOD TECHNOLOGY
SEMESTER 1

COURSE TITLE: FUNDAMNTALS OF FOOD TECHNOLOGY

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

CONTENT	45 Hrs
Unit 1: Composition And Nutritive Value Of Plant Food	**15 Hrs**
Introduction to Nutrients - Carbohydrates, Protein, Lipids, Vitamins, Minerals. Cereals: General outline, Composition & Nutritive value, Structure of wheat and Rice. Millets – ragi, sorghum, maize, finger millet. PULSES & LEGUMES: Composition, Nutritive value, Anti-nutritional factors. Changes during cooking, Factors affecting cooking time. Germination - Changes during germination. Nuts & Oilseeds: Composition, sources of proteins and oil, Processing of oil seeds - Soya bean, coconut, ground nut and sesame. Protein concentrates and isolates, Texturized vegetable protein.	
Unit II: FRUITS & VEGETABLES Composition, Classification, Nutritive value, Vegetable Cookery, Changes during cooking, Ripening, Changes during ripening - Spices: Definition, Classification, Chemical composition, use of spices - Nutritive value of Sugar cookery - Artificial sweeteners.	**15 Hrs**
Unit III: COMPOSITION AND NUTRITIVE VALUE OF ANIMAL FOODS	**15 Hrs**
Eggs: Structure, Composition, Nutritive value, Grading Changes during storage. Fish: Composition, Nutritive value. Meat: Structure,	

Composition, Nutritive value. Poultry- classification, composition and nutritive value. FUNCTIONAL FOOD: Introduction to Functional foods, Prebiotics, Probiotics, Nutraceutical. Organic Foods and GM foods	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Practical: 2 Credits **60 Marks**

1. Study different types of browning reactions: enzymatic and non-enzymatic.
2. To study gelatinization behaviour of various starches
3. To study the concept of gluten formation of various flours.
4. To study malting and germination.
5. To study dextrinization in foods.
6. Identification of pigments in fruits and vegetables and influence of pH on them.
7. Quality inspection of animal foods.

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Seminar presentation	20
Quiz, Assignment	10
Low-cost innovative recipes	10
Total	40

REFERENCES

1. B. Srilakshmi, Food science, New Age International Publishers (India), 2003
2. N. Shakuntalamanay, M., Foods: Facts and Principles - New Age Publishers, 2004
3. M. Swaminathan., Food science, Chemistry & Experimental Foods, BAPPCO (2003).

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. FOOD TECHNOLOGY
SEMESTER 1

Course Title: FOOD SAFETY (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. Explain the application of food quality and food safety system
2. Identify the hazard of the food chain to ensure food safety
3. Examine the chemical and microbiological quality of food samples
4. Detect the adulteration in food samples
5. Review of legislative approaches for the management of food safety

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**
Explain the application of food quality and food safety system			✓												
Identify the hazard of the food chain to ensure food safety		✓													
Examine the chemical and microbiological quality of food samples		✓													
Detect the adulteration in food samples and review of legislative approaches for the management of food safety		✓													

B.Sc. FOOD TECHNOLOGY
SEMESTER 1

Title of the Course: FOOD SAFETY

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

CONTENTS	45 Hrs
Unit I: INTRODUCTION TO FOOD SAFETY:	15 Hrs
Introduction to concepts of food quality, food safety, food quality assurance and food quality management; objectives, importance and functions of quality control, Current challenges to food safety. SAFETY ACT: Role of national and international regulatory agencies, Bureau of Indian Standards (BIS), AGMARK, Food Safety and Standards Authority of India (FSSAI), Introduction to WTO agreements: SPS and TBT agreements, Codex Alimentarius Commission, USFDA, International organization for standards (ISO) and its standards for food quality and safety (ISO 9000 series, ISO 22000, ISO 15161, ISO 14000).	
UNIT II: SAFETY DURING PROCESSING:	15 Hrs
HACCP; Desirable safety features of some food processing equipment; Personal protective equipment; Safety from adulteration of food. Role of maintenance staff and plant operators; Preventive maintenance; Guidelines for good maintenance& safety precautions; Lubrication & lubricants; Work place improvement through '5S'.	
UNIT III: PLANT MAINTENANCE:	15 Hrs
Hygiene and sanitation requirement in food processing and fermentation industries; Cleaning, sanitizing and pest control in food processing; storage and service areas PERONAL HYGENE: Hygiene and sanitation requirement in food processing and fermentation industries; Cleaning, sanitizing & pest control in food processing; storage and service areas.	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

REFERENCES

1. Food SafetyManagement, A Practical Guide for the Food Industry Editors: Yasmine Motarjemi Huub Lelieveld, eBook ISBN: 9780123815057, Hardcover ISBN:9780123815040, Academic Press.
2. Food Hygiene, Microbiology & HACCP. S J Forsythe, P R Hayes. Springer, 2012.
3. Food Safety Handbook, Author(s): Ronald H. Schmidt, Gary E. Rodrick, Published 2003 John Wiley & Sons, Inc., Print ISBN: 9780471210641.

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. FOOD TECHNOLOGY
SEMESTER 2

Course Title: FOOD CHEMISTRY (DSC- 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. Recognize the mathematical objects called Groups.
2. Link the fundamental concepts of groups and symmetries of geometrical objects.
3. Explain the significance of the notions of Cosets, normal subgroups and factor groups.
4. Understand the concept of differentiation and fundamental theorems in differentiationand various rules.
5. Find the extreme values of functions of two variables.

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
Recognize and link the mathematical objects called Groups.			✓												
Explain the significance of the notions of Cosets, normal subgroups and factor groups.		✓													
Understand the concept of differentiation and fundamental theorems in differentiation and various rule and find the extreme values of functions of two variables		✓													

B.Sc. FOOD TECHNOLOGY
SEMESTER 1

Title of the Course: FOOD CHEMISTRY

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

	45 Hrs
UNIT I: Introduction	**15 Hrs**
Physicochemical properties of water, water weak interactions in Aqueous Systems, ionization of water, weak acids, and weak bases, buffering against pH changes in biological systems, water as a reactant, The fitness of the aqueous environment for living organisms water activity and its influences on food quality and stability. Role of water in food. **Carbohydrate**: Introduction, classification, structure, sources, properties and functions of carbohydrates, functional properties of sugars, starch, cellulose, glucans, hemicelluloses, gums, pectin substances, polysaccharides, Modified starch and dietary fibre. Dietary requirements of carbohydrates, inborn errors of carbohydrates.	
UNIT II: Amino acids and Proteins:	**15 Hrs**
Amino acids, occurrence, structure, classification, physical & chemical properties**.** Peptides, polypeptide, proteins & their properties, major source of proteins, classification, structure, properties, purification and denaturation of proteins, physicochemical and functional properties of protein derived from milk, egg protein, meat protein, fish muscle protein, oil seed protein and cereal protein. Protein- protein interaction, Protein-lipid interaction, protein-lipid complexes and protein-carbohydrate complexes. Modified proteins and application in food industry. Dietary requirements of proteins, metabolic defects such as Kwashiorkor associated with proteins.	

UNIT III: Enzymes and Lipids	15 Hrs
General introduction to Enzymes, classification and functions of Enzymes and its activity in different food systems, factors affecting rate of enzymatic action, commercial availability, immobilization of enzymes, importance of enzymes in food processing. **Lipids:** General introduction, classification, physical and chemical properties, functions and Dietary requirements of food lipids, refining of crude oil and fats, hydrogenation, winterization shortenings and low fat spreads. Vegetable and animal fat, margarine, lard, butter. Flavour changes in fats and oils, lipid oxidation, auto oxidation, factors affecting lipid oxidation and its biological significance, metabolic defects such as cardiovascular disease associated with lipids. **Vitamins**: Physiological and biochemical role of fat and water soluble vitamins, functions and sources. Vitamin C, Vitamin B complex, Iron and Folic acid. Requirements and recommended allowances. Deficiency diseases.	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Practical: 2 Credits **60 Marks**

1. Safety measures in the Laboratory
2. Qualitative Tests of Carbohydrate (Molisch's Test, Fehling's Test, Benedict Test, Iodine Test, etc.)
3. Quantitative Determination of Carbohydrate by Phenol Sulphuric acid method
4. Isolation of starch from given sample.
5. Determination of total sugar/reducing sugar in food.

6. Determination of iodine value/acid value/saponification value of oil
7. Test for detection of different oils (Baudouin test, Halphens test, hexabromide test)
8. Estimation of lysine content
9. Determination of ascorbic acid by dye method
10. Determination of phosphorus/estimation of calcium
11. Estimation of tannins from food
12. Determination of total carotenoids

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Seminar presentation	20
Quiz, Assignment	10
Low-cost innovative recipes	10
Total	40

REFERENCES

1. Lillian Hoagland Meyer(1974) Food Chemistry, The AVI Publishing Co Inc., Connecticut, MA, USA
2. Eskin NAM, Henderson HM and Townsed RJ(1971)Biochemistry of Foods, Academic Press, New York
3. John W. Brady(2013) Introductory Food Chemistry, Cornell University Press, Ithaca, USA
4. H.-D. Belitz, W. Grosch and P. Schieberle(2009) Food Chemistry, 4th Ed. Springer-Verlag. Berlin Heidelberg
5. Meyer, L.H.(1987) Food Chemistry. CBS publishers and Distributors, New Delhi.

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. FOOD TECHNOLOGY
SEMESTER 2

Course Title: FOOD AND NUTRITION (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. Understanding the basic processes involved in the preparation, transformation and conservation of foods of both animal and vegetable origin.
2. Understanding the microbiology, parasitology and toxicology of food.
3. Examining and evaluating the relationship between food and nutrition in health and/or illness.
4. Applying scientific knowledge of physiology, pathophysiology, nutrition and food to individual or group diet planning and counselling, both in healthy (dietetics) and ill (diet therapy) clients, at every stage of life.

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
Understanding the basic processes involved in the preparation, transformation and conservation of foods of both animal and vegetable origin.			✓												
Understanding the microbiology, parasitology and toxicology of food.		✓													
Examining and evaluating the relationship between food and nutrition in health and/or illness.		✓													
Applying scientific knowledge to individual or group diet planning and counselling, both in healthy (dietetics) and ill (diet therapy) clients, at		✓													

every stage of life.														

B.Sc. FOOD TECHNOLOGY
SEMESTER 1

Title of the Course: FOOD AND NUTRITION

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

CONTENTS	45 Hrs
Unit I: FATS & LIPIDS:	**15 Hrs**
Understanding relationship between food, nutrition and health. Functions of food-physiological, psychological and social. Concept of balanced diet. Lipids - Classification, Composition function - essential fatty acids, deficiency, food sources of EFA, Function of TGL, Characteristics of animal and vegetable fats, sterols - cholesterol - function, food sources, phospholipids - function, ketone bodies - fat requirements - food sources, dietary lipids and their relation to the causation of Atherosclerosis and Ischaemic heart disease. **NUTRIENTS, VITAMINS ANDMINERALS** Nutrients – Classification, Functions, Dietary sources, RDA. Fat soluble vitamins - A, D, E and K. Water soluble vitamins - thiamin, riboflavin, niacin, pyridoxine, folate, vitamin B12 and vitamin C. Minerals- Role of Ca, P, Fe, Na, K, I, F, Se.	
Unit II: CARBOHYDRATES AND PROTEINS:	
Proteins - Composition - structure and classification, function of protein, Amino acids Indispensable and dispensable amino acids - special function of amino acids - protein deficiency - Protein Energy Malnutrition - KWASHIORKOR and MARASMUMS - etiology, clinical features, treatment and prevention - Evaluation of protein quality -	

PER, BV, NPU and NPR, chemical score mutual and amino acid supplementation of proteins.	
Unit III: BASICS OF ENERGY	**15 Hrs**
Energy units - Kilocalories, Megajoules, determination of energy value of foods, using Bomb calorimeter, diagram of Bomb Calorimeter - gross calorific values, Physiological energy, value of foods, relation between oxygen used and calorific value. **METABOLISM:** Determination of energy requirements, direct calorimetry. Relation between Respiratory quotient and energy output - Specific dynamic action of food (Thermogenic food in REE) indirect calorimetry - Basal metabolism - definition, determination - benedict Roth basal Metabolism Apparatus - factors affecting BMR - determination of energy metabolism, during work - energy requirements for various types of activities, factorial methods for calculation of the daily energy requirements of an adult for varying degrees of physical activity - recommended allowances for calories, energy requirements of adults expressed in terms of reference man and reference woman - FAO committee and ICMR committee percent calories supplied by carbohydrates, fats and proteins in average Indian diets - Energy requirements for different age groups.	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

REFERENCES

1. B. Srilakshmi, Food Science, New Age International Publishers (India), 2003.
2. NIN, ICMR (1990). Nutritive Value of Indian Foods.
3. Raina U, Kashyap S, Narula V, Thomas S, Suvira, Vir S, Chopra S (2010). Basics Food Preparation: A Complete Manual, Fourth Edition. Orient Black Swan Ltd.
4. Seth V, Singh K (2005). Diet planning through the Life Cycle: Part 1. Normal Nutrition. A Practical Manual, Fourth edition, Elite Publishing House Pvt. Ltd.
5. Guthrie H.A. - Introductory Nutrition C.V. Mosby Co. St. Louis, 2006.

Date **Course Co-ordinator** **Subject Committee Chairperson**

Structure of

B.A/B.Sc with Human Development and

M.Sc Human Development (one year)

B.A/B.Sc Human Development /Care and Welfare

(Model II A)

MODEL CURRICULUM

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

Discipline Core: Human Development

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:

1. Demonstrate an understanding of the complexity of individual and family development across the life span in diverse contexts and changing environments
2. Learn how people and families develop--biologically, intellectually, psychologically, socially and spiritually.
3. Design, implement and evaluate inclusive and play-based early learning curriculum and programs that support children's holistic development.
4. Demonstrate pedagogical practices that are connected to theoretical approaches of learning, thinking and teaching in the field of early childhood care and education.
5. Use their own knowledge, appropriate early learning outcomes, and other resources to design, implement, and evaluate developmentally meaningful and challenging learning materials for children and infants.
6. Study individuals and families in their own and other cultures, and learn how the family, the workplace, schools, the community, and the larger culture affect and are affected by the individual.
7. Solid understanding of problems such as child, spouse and elder abuse, substance use, and divorce.
8. Learn skills for helping individuals, families, or groups through prevention programs and other intervention techniques, in addition to examining specific problems and learn how human service agencies and professionals deal with these problems.
9. Graduates work in careers that promote healthy development and positive family functioning across the lifespan, such as: a Social Services Case Worker, Provider at

Residential Treatment Center, Youth Organization Worker, Program Director for Youth, Family or Senior Citizen Center.

10. Demonstrate an ability to evaluate and apply research and theory to practice.
11. Analyze processes, policies, and contextual factors that affect the delivery of human services to individuals and families.
12. Demonstrate professional, ethical, and culturally sensitive standards of conduct.
13. Demonstrate the ability to develop resources and initiatives (programs) using appropriate strategies and technologies to support the well-being of children, families, schools, and communities through presentations, research, and service learning.

Assessment:
Weightage for assessments (in percentage)

Type of Course	Formative Assessment / IA	Summative Assessment
Theory	**40**	**60**
Practical	**15**	**35**
Projects	**100**	**100**
Experiential Learning (Internships etc.)	**15**	**35**

Contents of Courses for B.A./B.Sc. with Human Development & B.A./B.Sc. Human Development

Model II A

Sem	Course code	Category of course	Theory/ Practical	Credits	Paper Title	Marks	
						SA	IA
1	HDT1.1	DSC 1	Theory	4	Fundamentals of Child Development	60	40
	HDP1.1	DSC 2	Practical	2	Fundamentals of Child Development	35	15
	HDT1.2	OE 1	Theory	3	Elements of Human Behavior	60	40
2	HDT2.1	DSC 3	Theory	4	Early Childhood care and Education	60	40
	HDP2.1	DSC 4	Practical	2	Early Childhood care and Education	35	15
	HDT2.2	OE 2	Theory	3	Family and Relationship Management	60	40

List of Discipline Specific Electives (DSE)

1. Women Studies
2. Culture and Psychology
3. Care of Children with Disabilities and Illness
4. Human Ecology
5. Research Methodology
6. Crime and Violence
7. Developmental Assessment
8. Human Rights
9. Entrepreneurship in Human Development
10. Life skill Education
11. Assistive Technology and devices for individuals with Special Needs
12. Behavioral Problems and Management in Young Children
13. Human Resource Management
14. Statistical and Computer Applications in Human development

Curriculum Structure for the Undergraduate Degree Program

B.Sc. Human Development

Total Credits for the Program: 265

Starting year of implementation: 2021-22

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

Discipline/Subject: Human Development

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- 1 Fundamentals of Child Development	PO1 PO2	PU/XII with Science	Lecture, audio visual materials,	Formative and Summative Assessment
	OE- 1 Elements of Human Behaviour	PO1 PO2	PU/XII with Science	case studies, activities, content review	Formative and Summative Assessment
2	DSC-2 Early Childhood Care and Education	PO1 PO2 PO4	PU/XII with Science	Lecture, group discussion, academic debates, audio visual materials, activities, content review	Formative and Summative Assessment
	OE- 2 Family and Relationship Management ,	PO1, PO2, PO3	PU/XII with Science	case studies, activities, content review	Formative and Summative Assessment

Syllabus for B.Sc. with Food Technology & B.Sc. Human Development

B.Sc. HUMAN DEVELOPEMENT
SEMESTER 1

Course Title: FUNDAMENTALS OF CHILD DEVELOPMENT (DSC- 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 the interplay between biology and behaviour.
2. Understand the process and principles underlying growth and development.
3. Describe young children's diverse characteristics and needs, from birth through age 6.
4. Design, implement and evaluate inclusive and play-based early learning curriculum and programs that support children's holistic development.
5. Establish and maintain responsive relationships with individual children, groups of children and families.
6. Assess, develop and maintain safe, healthy and quality early learning environments which meet the requirements of current legislation, agency policies and evidence-based practices in early learning.

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 interplay between biology and behavior	X											
Understand the process and principles underlying growth and development		X										
Describe young children's diverse characteristics and needs, from birth through age 6.	X											
Design, implement and evaluate inclusive and play-based early learning curriculum and programs that support children's holistic development.			X									
Establish and maintain responsive relationships with individual children, groups of children and families.		X										
Assess, develop and maintain safe, healthy and quality early learning environments which meet the requirements of current legislation, agency policies and evidence-based practices in early learning.											X	

B.Sc. FOOD TECHNOLOGY
SEMESTER 1

Title of the Course: FUNDAMENTALS OF CHILD DEVELOPMENT (DSC- 1)

Number of Theory Credits	Number of lecture hours/semester
4	60

CONTENT	60 Hrs
Unit – 1: Introduction to Human Development	10 Hrs
Chapter No. 1: Definition, need and scope of Human Development; Human Development as a multidisciplinary science; Principles of growth and development, Constraints and facilitators in growth and development (nature and nurture); Individual differences in human development, stages of human development.	
Unit – 2: Overview of Biological Processes in Human Development	20 Hrs
Chapter No. 2: Evolution and Genetics - Principles of genetics and evolution, the genetic material - its nature, and manipulation; genetic mutation and Sex linked genetic inheritance. **Chapter No. 3: Biology and Behavior** **i) Brain development and neurological implications:** Neurons: Structure of neurons, neural impulse transmission-electrical and chemical, role of neurotransmitters. Brain: structure and significance of left and right hemispheres, brain Lateralization. **ii) Endocrine Glands**: Effects of hormones on behavior. **iii) Sensory**: Sensation: Basic concepts and Processes in sensation. Types of senses (an overview)- visual, auditory, gustatory, olfactory, tactile, vestibular, kinesthetic and organic senses.	

Unit – 3: Prenatal & Neonate	10 Hrs
Chapter No. 4 Prenatal development and parturition; Stages of labor, Types of birth, Socio cultural variations in child birth practices; Prenatal &Postnatal environmental influences **Chapter No. 5.** Neonate- Definition, Characteristics, reflexes; growth & development, adjustments, care of the newborn& the mother.	
Unit – 4: Infancy	10 Hrs
Chapter No. 6: Definition, characteristics, growth and development, milestones, developmental tasks, areas of development- physical, social, sensory, cognitive, language and emotional development	
Unit – 5: Childhood Years	10 Hrs
Chapter No.7: Early Childhood Definition, characteristics, developmental tasks, development milestones, overview and highlights of early childhood years – areas of development- physical, motor, cognitive, language, socio-emotional and personality **Chapter No. 8: Late Childhood** Definition, characteristics, developmental tasks, overview of physical-motor, cognitive- language, socio- emotional, personality and moral development, interests of school children, school& peer group –its significance and influence.	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Practical: 2 Credits **60 Hrs**

List of Experiments to be conducted:

1. Report and preparation of a handbook on Developmental Milestones throughout Lifespan.
2. Hospital visit to observe and report on neonatal characteristics and reflexes
3. Anthropometric measurements of preschool children
4. Conduct an experiment for young children on the concept of: number / size / shape/volume and conservation
5. Design and develop a questionnaire for any one of the following:

- Comparative study on play interest among pre-school boys and girls.
- Study of peer group influences and its impact on personality.

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Seminar presentation	20
Quiz, Assignment	10
Low-cost innovative recipes	10
Total	40

References:

1. Baron, R.A. Psychology.(1995). 3rd edition. Delhi: Prentice Hall.
2. Berk, L.C. (2008). Child Development, New Delhi: Prentice Hall of India (Pvt.) Ltd.
3. Craig, G. (1999); Human Development, N.J.; Prentice Hall.
4. Feldman Robert S. (2013), Development Across the Life Span, 7th edition, United States, Pearson Education
5. Hurlock Elizabeth B. (2001), Child Development, 6thEdition, New Delhi, McGraw Hill Education.
6. Munn, N.L., Fernald, L.D., & Fernald, P.S.(1997) Introduction to Psychology. Delhi: Houghton Mifflin.
7. Papalia, D.E. (2004). Human Development. 9thEdition, New Delhi: Tata McGraw Hill.
8. Rice Philip. K (2001) Human development, Prentice Hall, New Jersey

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. HUMAN DEVELOPEMENT
SEMESTER 1

Course Title: ELEMENTS OF HUMAN BEHAVIOUR (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. Analyze elements of human behavior such as learning, perception etc
2. Understand structure, composition, functioning and changes in brain
3. Identify areas of brain development
4. Ability to suggest help and resources to handle the crisis by the change of attitude.

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 elements of human behavior such as learning, perception etc	X											
Understand structure, composition, functioning and changes in brain		X										
Identify areas of brain development	X											
Ability to suggest help and resources to handle the crisis by the change of attitude			X									

B.Sc. HUMAN DEVELOPEMENT
SEMESTER 1

Title of the Course: ELEMENTS OF HUMAN BEHAVIOUR (OE- 1)

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

CONTENT	45 Hrs
Unit – 1 Introduction to human behaviour and overview	**5 Hrs**
Chapter No. 1 Definition, characteristics, classification, models **Chapter No. 2** Elements of human behaviour- Learning, Perception, Sensation and Attitude, Memory and Forgetting, Factors affecting human behaviour.	
Unit – 2 Biological bases of human behaviour	**5 Hrs**
Chapter No. 3. The Brain and Human Behaviour, Nervous system, Heredity and Behaviour.	
Unit – 3 Learning	**10 Hrs**
Chapter No. 4 Definition, Meaning and process of learning. **Chapter No. 5.** Learning theories- Classical and Operant conditioning	
Unit – 4 Perception, Sensation and attitude	**10 Hrs**
Chapter No. 6. Perception-Nature of perception, object recognition, face recognition, sensory factors in perception. **Chapter No. 7.** Sensation- Vision, Hearing, Touch, Smell and Taste. **Chapter No. 8.** Attitude- Concept and functions, Approaches to attitude change, Factors of attitude change.	

Unit- 5 Memory	**10 Hrs**
Chapter No. 9. The nature of memory, attention, level of processing **Chapter No. 10.** types of memory-sensory memory, working memory, long-term memory system, strategies to enhance memory, Forgetting	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

References

1. Andrade, J., May, J. (2004). BIOS Instant Notes in Cognitive Psychology. United Kingdom: CRC Press.
2. Baron, R. A., Kalsher, M. J. (2001). Psychology. United Kingdom: Allyn and Bacon.
3. Feldman, R. S. (1999). Understanding Psychology. United Kingdom: McGraw-Hill College.
4. Lahey. B.B. (1989), Psychology An Introduction, Georgia, Wm. C. Brown Publishers
5. Santrock. J.W. (2005), Psychology; essentials, New Delhi, Tata McGraw-Hill publishing company Ltd.
6. https://www.bioscience.com.pk/topics/psychology/item/1311-types-of-human-behavior-in-psychology

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. HUMAN DEVELOPEMENT
SEMESTER 2

Course Title: EARLY CHILDHOOD CARE AND EDUCATION (DSC- 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. Holistic Development of the child
2. Understanding of specific domain development
3. Knowledge of a stimulating environment

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**
Holistic Development of the child	X											
Understanding of specific domain development		X										
Knowledge of a stimulating environment	X											

B.Sc. HUMAN DEVELOPEMENT
SEMESTER 2

Title of the Course: EARLY CHILDHOOD CARE AND EDUCATION (DSC- 2)

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

CONTENT	45 Hrs
Unit – 1 Importance and care during Early childhood years	5 **Hrs**
Chapter No. 1 Overview of needs, rights, behavioral problems, habits, importance care during early childhood years. **Chapter No. 2** Discipline, accidents and preventions, ailments.	
Unit – 2 Importance and scope of Early Childhood Education	10 **Hrs**
Chapter No. 3 Need, scope, methods (project, play and holistic) **Chapter No. 4.** Types of ECCE centres, essentials of ECCE centers **Chapter No. 5.** Curriculum and programme planning, parent education programs, readiness activities.	
Unit – 3 Philosophical perspectives of ECCE	10 **Hrs**
Chapter No. 6. Overview of ECCE movement in India (pre and post-independence period) **Chapter No. 7.** A brief outline of the contribution of Comenius, Rosseau, Pestalozzi, Froebel, Dewey, Montessori, Vivekananda, Tagore, Gandhi, Tarabai Modak, Jijubai Badeka.	
Unit – 4 Administration and maintenance	10 **Hrs**
Chapter No. 8. Administrative setup, infrastructure **Chapter No. 9.** Records and registers- types and maintenance, job profiles of personnel.	

Unit-5 Recent Developments	10 **Hrs**
Chapter No. 10. Policies, Institutions and contributions of NGOs and National organizations – overview of the national policy on children **Chapter No. 11.** Yashpal Committee- Learning without burden, Sarva Shiksha Abhiyaan, ICDS, NIPCCD, IAPE, ICCW, UNESCO and WHO	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Practical: 2 Credits **60 Hrs**

1. Visit-to places that enhance understanding of ECCE and conduct a Comparative study of the approaches and programs in Montessori, laboratory nursery school, balwadi, anganwadi, crèche (mobile crèche) and a school for special needs children.
2. Plan and conduct activities for creativity and conceptual development in pre-school children.
3. Case study on normal children- a boy and a girl.
4. Plan a field trip to various places: parks / Museum / Zoo / Post / bank / library etc.

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Seminar presentation	20
Quiz, Assignment	10
Low-cost innovative recipes	10
Total	40

References

1. Aggarwal J C , S Gupta (2007), Early Childhood Care And Education: Principles & Practices, ND, Shipra Publications.
2. Arnold M. (2005). Effective Communication Techniques for Child Care. Thomson Learning Asia Pvt. Ltd. Singapore.
3. “CHETANA” booklet on Pre-school Education
4. Essa E. (2003). A Practical Guide to Solving Pre-school Problems. Thomson Learning Asia Pvt. Ltd. Singapore.
5. Gordon A. (2006) Beginning Essentials in Early Childhood Education. Thomson Learning Asia Pvt. Ltd. Singapore.
7. Gupta Sen M (2009),Early Childhood Care And Education, New Delhi, Phi Learning Pvt. Ltd
8. Krishnammacharyulu V. (2006). Classroom Dynamics, Neelkamal, Hyderabad.
6. Kshirsagar O.M./Girgaonkar B.G. []History of Early Childhood Education, New Delhi, DK Publishers and Distributors,
7. Mishra L. (2012), Early Childhood Care and Education, New Delhi, APH Publishing Corporation
8. Russell B. [2006], On Education Especially In Early Childhood, Cosmo Publication

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. HUMAN DEVELOPEMENT
SEMESTER 2

Course Title: FAMILY AND RELATIONSHIP MANAGEMENT (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. Analyze recent trends and functioning with an emphasis on culture
2. Understand structure, composition, functioning and changes in concept of family
3. Identify areas of potential conflicts
4. Ability to suggest help and resources to handle the crisis

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 recent trends and functioning with an emphasis on culture	X											
Understand structure, composition, functioning and changes in concept of family		X										
Identify areas of potential conflicts	X											
Ability to suggest help and resources to handle the crisis												

B.Sc. HUMAN DEVELOPEMENT
SEMESTER 2

Title of the Course: FAMILY AND RELATIONSHIP MANAGEMENT (OE- 2)

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

CONTENT	45 Hrs
Unit – 1: Marriage	8 Hrs
Chapter No. 1: Concept, definition, types; functions, changes and challenges; factors influencing mate selection, changing trends, Preparation for marriage, areas of marital adjustment, planned parenthood.	
Unit – 2: The Family	10 Hrs
Chapter No. 2: Concept, Definition, The family as an institution, (past and present). The family as an institution, across cultures, functions, types (with reference to India), subsystems, Changing trends in family, factors influencing (social change, family values and ideologies, family structures), Family Life Cycle – Stages, The importance of research on the family.	
Unit – 3: Families with Problems	12 Hrs
Chapter No. 3 Vulnerable families: Families with marital disharmony and disruption (dimension and causal factors); Families in distress, violence and abuse, dowry victimization, violence against women and family crises, challenges faced by these families.	
Unit – 4: Interventions for Families in Trouble	6 Hrs

Chapter No. 4 Scope, needs and assessment, Balancing work and family, Counselling: premarital and marital, increasing resilience of families, family therapies, welfare and rehabilitation policies and programs, State and central support systems for welfare of families.	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

References

1. Augustine, J.N. (Ed.) (1982): The family in Transition, New Delhi: Vikas Publishing House.
2. Benokraitis Nijole V (2014), Marriages and Families, 8 th edition, Pearson
3. Coleman, J.C. (1986): Intimate Relationships, Marriage and the Family, Chicago: Macmillan Publishing Co.
4. Dole Dawn Cooperrider , Jen Hetzel Silbert , Ada Jo Mann (2008), Positive Family
5. Dynamics: Appreciative Inquiry Questions to Bring Out the Best in Families, Taos Institute Publications
6. Ferraro Carter McGoldrick (1989), Changing Family Life Cycle: A Framework For Family Therapy, 2nd Edition, Allyn & Bacon
7. Gore M.S. (1968): Urbanization and Family Change in India, Bombay: Popular Prakashan.
8. Hutter, Mark (1981): The Changing Family: Comparative Perspectives, New York: John Wiley & Sons.

9. Jenkins Suzanne (2012) Family Dynamics, CreateSpace Independent Publishing Platform
10. Lal, A.K. (1990): The Urban Family: A Study of Hindu Social System, New Delhi: Vikas Publications.
11. Tambatamba Jocelyn (2012), Filtering Marriage Counselling: Biblical Reasons For Filtering Out Traditions New Delhi, Notion Press
12. Wachtel , WachtelWachte (1991), Family Dynamics in Individual Psychotherapy : A Guide to Clinical Strategies, Guilford Publications

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.A/B.Sc with Care and Welfare (Human Development) and

M.Sc Care and Welfare (Human Development) (oneyear)

(Model I C)

MODEL CURRICCULUM

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

Discipline Core: Care and Welfare

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 1-** To instill in students an enthusiasm for Human development, by enabling them to understand about growth and development across the life span.
- **PO 2 -** To provide knowledge about early childhood care, education and development and prepare students to become effective early childhood care and education personnel
- **PO 3**-Preparing students to cater to the needs of children with special needs through individualized educational program, individualized family service plan, and individualized vocational plan in special and inclusive education setup
- **PO 4-**To build competent individuals who can serve as mental health workers, counsellors, developmental specialists, sexual and reproductive health workers.
- **PO 5-**To equip learners to work with individuals and families as family life educators and life coaches
- **PO 6**-To equip learners to work with vulnerable groups in diverse capacities as skill trainers, counsellors, educators and others
- **PO 7**-To hone the skills of research in students and enable them to apply it in the field of human development
- **PO8-** To provide knowledge about mental health and wellness of individuals across life span
- **PO 9-** To become effective evaluators of various welfare programmes and projects.
- **PO 10-** To develop entrepreneurial skills among students to take up new business ventures in the field of human development

Assessment:

Weightage for assessments (in percentage)

Type of Course	Formative Assessment / IA	Summative Assessment
Theory	40	60
Practical	15	35
Projects	100	100
Experiential Learning (Internships etc.)	15	35

Contents of Courses for B.Sc. with Human Development / Care and Welfare & B.A./B.Sc. Human Development/Care and Welfare

Model IC

Sem	Course code	Category of course	Theory/ Practical	Credits	Paper Title	Marks	
						SA	IA
1	HDCWT1.1	DSC	Theory	3	Fundamentals of Human Development	60	40
	HDCWP1.1	DSC	Practical	2	Fundamentals of Human Development	35	15
	HDCWT1.2	DSC	Theory	3	Prenatal and Infant care	60	40
	HDCWP1.2	DSC	Practical	2	Prenatal and Infant care	35	15
	HDCWT1.3	DSC	Theory		Stimulation and Assessment	60	40
	HDCWT1.4	OE	Theory	3	Crèche Management	35	15
2	HDCWT2.1	DSC	Theory	3	Early Childhood Years	60	40
	HDCWP2.1	DSC	Practical	2	Early Childhood Years	35	15
	HDCWT2.2	DSC	Theory	3	Early Childhood Care and Welfare	60	40
	HDCWP2.2	DSC	Practical	2	Early Childhood Care and Welfare	35	15
	HDCWT2.3	DSC	Theory	3	Basics of Food and nutrition	60	40
	HDCWT2.4	OE	Theory	3	Teaching Learning Materials	60	40

Curriculum Structure for the Undergraduate Degree Program

B.Sc. CARE AND WELFARE (HUMAN DEVELOPMENT)

SEMESTER 1

Course Title: Fundamentals of Human Development (DSC- 1)	
Total Contact Hours: 60 Hrs.	**Course Credits: 6**
Formative Assessment Marks: 40 marks	**Duration of ESA / Exam: 3 Hrs.**
Model Syllabus Authors	**Summative Assessment Marks: 60**

Course Outcomes (COs):

1. Providing an overview of Human development
2. Providing students with a comprehensive understanding of the significance and scope, stages of Human Development.
3. Understanding the developmental foundations, tasks and domains of Human Development.
4. Facilitating the understanding of the concept of prenatal and infant development.

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**
Providing an overview of Human development		X					X	X	X			
Providing students with a comprehensive understanding of the significance and scope, stages of Human Development.		X	X		X				X			
Understanding the developmental foundations, tasks and domains of Human Development.	X	X	X		X				X			
Facilitating the understanding of the concept of prenatal and infant development.	**X**	**X**	**X**				X		X			

B.Sc. CARE AND WELFARE (HUMAN DEVELOPMENT)
SEMESTER 1

Title of the Course: Fundamentals of Human Development

Number of Theory Credits	Number of lecture hours/ semester
4	60 Hrs

CONTENT	60 hrs
Unit – 1 Introduction to Human Development- Developmental Concepts, laws, domains and Developmental tasks	**15 Hrs**
Chapter No. 1. Meaning, Definition, need of Human Development **Chapter No. 2.** Significance and scope of study, stages of Human Development. **Chapter No. 3. Meaning, Definition of** Growth, Development, Difference between growth and development. **Chapter No. 4.** Laws of developmental direction, Cephalocaudal and Proximodistal law, Principles of growth and development. **Chapter No. 5.** Developmental domains-Physical, Emotional, Cognitive, Social. **Chapter No. 6**. Havighurst's Developmental tasks	
Unit – 2 Developmental Foundations **Male and female reproductive systems**	**20 Hours**
Chapter No. 7. Structure and functions of male and female reproductive systems, study of Sex cells- Sperm and ovum, menstruation and menstrual cycle **Chapter No. 8.** Genes chromosomes, DNA- structure and functions. **Chapter No. 9**.Cell division, Mitosis ,Meiosis, Types of inheritance, sex determination **Chapter No.10**. Meaning and definition of heredity and environment, Influence and interaction of heredity and environment on growth and development	

Unit – 3 Study of Prenatal and Infancy stages	25 hours
Pre-natal Stage **Chapter No.11**. Conception, signs and symptoms of pregnancy **Chapter No.12.** Stages of pre-natal period **Chapter No.13.** Factors influencing pre-natal growth and development **Chapter No.14.**Process of child birth, types of child birth **Infancy stage** **Chapter No.15**. Neonate: characteristics, sensory capacities, reflexes. **Chapter No.16.** adjustments of a neonate **Chapter No.17.** Infancy: physical, cognitive, language, social and emotional development, **Chapter No.18.** Developmental milestones, development of attachment	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Practical: 2 Credits **60 Hrs**

1. Organize a guest lecture on the scope of Human Development .
2. Develop a resource file on the stages of Human Development.
3. Prepare a visual aid related to Developmental Foundations.
4. Observe/watch a video related to neonatal characteristics and sensory capacities and reflexes.
5. Develop an educational aid to foster physical/ cognitive/ language/ development of an infant.

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Seminar presentation	20
Quiz, Assignment	10
Low-cost innovative recipes	10
Total	40

References

1. Berk, L.E. (2005). Child development (5th ed.). New Delhi: Prentice Hall.
2. Bhangaokar, R.,&Kapadia, S. (in press). Human Development Research in India: A historical overview. In G. Misra (Ed.), Hundred years of Psychology in India. New Delhi: Springer.
3. Feldman, R., & Babu, N. (2009). Discovering the life span. New Delhi: Pearson
4. Kakar, S. (1998). The inner world. Psychoanalytic study of childhood and society in India. Delhi: Oxford University Press.
5. Kapadia, S. (2011). Psychology and human development in India. Country paper. International Society for the Study of Behavioural Development Bulletin Number 2, Serial No. 60, pp.37-42.
6. Keenan, T., Evans, S., & Crowley, K. (2016). An introduction to child development. Sage.
7. Lightfoot, C., Cole, M., & Cole, S. (2012). The development of children (7thed.).NewYork: Worth Publishers.
8. Santrock, J. (2017). A topical approach to life span development (9th ed.). New NY.: Mcgraw-Hill Higher Education.
9. Singh, A. (2015). Foundations of Human Development: A life span approach. ND: Orient Black Swan.
10. Walsh, B.A., Deflorio, L., Burnham, M.M., & Weiser, D.A. (2017). Introduction to Human Development and Family Studies. NY: Routledge
11. Baradha.G ‘Basics of Human Development’ Saradalaya Press, Sri Avinashilingam Education Trust Institutions, Coimbatore 2008.

12. Hurlock.B.Elizabeth ‘Developmental Psychology – A Life Span Approach’ Tata McGraw Hill Publications, New Delhi Latest Edition. 3.
13. Suriakanthi. A. (2015) ‘Child Development’ Kavitha Publications, Gandhigram, Tamil Nadu.

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. CARE AND WELFARE (HUMAN DEVELOPMENT)
SEMESTER 1

Course Title: BSC HDBCW - PRENATAL AND INFANT CARE (DSC- 2)	
Total Contact Hours: 112 Hrs.	**Course Credits: 6**
Formative Assessment Marks: 40 marks	**Duration of ESA / Exam: 3 hrs.**
Model Syllabus Authors: Dr. Indiramma B S	**Summative Assessment Marks: 60**

Course Outcomes (COs):

1. The course is designed to provide students with a comprehensive understanding the care during ante-natal and puerperium period.
2. This course provides the understanding of the essentials of care of the neonate and infant.
3. It facilitates the understanding of the concept of welfare programmes for Pregnant, Lactating women and Infants.

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
The course is designed to provide students with a comprehensive understanding the care during ante-natal and puerperium period .		X	X						X			
This course provides the understanding of the essentials of care of the neonate and infant.		X	X									
It facilitates the understanding of the concept of welfare programmes for Pregnant, Lactating women and Infants.			X		X	X	X	X	X			

B.Sc. CARE AND WELFARE (HUMAN DEVELOPMENT)
SEMESTER 1

Title of the Course: Prenatal and Infant care

Number of Theory Credits	Number of lecture hours/ semester
4	60

Content of Course	60 hrs
Unit – 1 Ante-natal Care and Care during puerperium period (0 to 6 weeks after delivery)	**20 Hrs**
Chapter No 1. Overview of Prenatal development, **Chapter No 2,**Ante-natal care- meaning, need and significance, general health check-up during prenatal period **Chapter No 3.**Physical, nutritional and psychological care, common discomforts and solution s, do's and don'ts, complications of pregnancy. Preparation for labour- Physical and emotional. **Chapter No 4.** Meaning, need and importance, health and hygiene, diet and exercise, Complications during puerperium.	
Unit -2 Care of the new-born and Care of infants Infancy (Birth- 2 years)	**28 Hrs**
Chapter No 5. Assessment, reflexes, capabilities, care, adjustment, immunization, breast feeding- exclusive breast feeding, advantages. weaning, Complementary feeding/supplementary foods **Chapter No 6.** Health care-immunization, clothing, sleeping, diapering bathing. **Chapter No 7.** Physical and psychological care **Chapter No 8.** Common accidents-causes, Prevention-Providing safe environments for young children - childproofing the home, school and playground against common accidents.	

Chapter No 9. Common illnesses- causes, prevention, Roles and responsibilities parents **Chapter No 10.** **First aid** – Definition, first aid for temperature/ fever, respiration, asphyxia, cuts and bruises, insect bites, diarrhoea, falls and poisons. Preparation of ORS	
Unit 3-Welfare programmes	**12 Hrs**
Chapter No 11. Overview of welfare programmes for women and children **Chapter No 12.** Need and importance of welfare programmes for-Pregnant women, Lactating women and Infants	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Practical: 2 Credits **60 Hrs**

1. Collect information on ante natal care services and report the same.
2. Conduct an interview on a pregnant woman/lactating mother on care taken during the period/ knowledge of services available and report the same.
3. Prepare an audio visual aid on common accidents/ illnesses of infancy period OR Prepare a basic aid kit
4. Plan weaning/ supplementary food for infants.
5. Make a classroom presentation on-complications of pregnancy/welfare programmes for women

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Seminar presentation	20
Quiz, Assignment	10
Low-cost innovative recipes	10
Total	40

REFERENCES

1. Berk E. Laura,(2005). “Child Development”, Pearson Prentice Hall, Indian Branch, New Delhi.
2. Suriakanthi (2009) Child Development, Kavitha Publications, Gandhigram, Tamil Nadu.
3. Jaya and Subhadra **,** Parenting children below two years**,** Abacus Foundation, Coimbatore
4. Santrock W John (2012), “A topical approach to life span development”, Tata McGraw-Hill Company, Delhi.
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8. NeelamKetrapaul, (2001), Health and Nutrition, Kalyani Publishers, New Delhi, ISBN81-272-0232-0

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. CARE AND WELFARE (HUMAN DEVELOPMENT)
SEMESTER 1

Course Title: **BSC HDBCW – Stimulation and Assessment (DSC-3)**	
Total Contact Hours: 60 Hrs.	Course Credits: 5
Formative Assessment Marks: 40 marks	Duration of ESA / Exam: 3 hrs.
Model Syllabus Authors:	Summative Assessment Marks: 60

Course Outcomes (COs):

1. To overview about prenatal development and its stages
2. Understand the significance of stimulation and assessment.
3. Gain an insight about the different types of gestational stimulation and Infant stimulation.
4. Learn the role of expectant father.
5. Understand the need of assessment.
6. Study tools and methods to carryout assessment.

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 overview about prenatal development and its stages		X	X				X			X		
Understand the significance of stimulation and assessment	X	X								X		X
Gain an insight about the different types of gestational stimulation and Infant stimulation.	X	X		X	X							
Learn the role of expectant father.			X	X				X	X			
Understand the need of assessment.	**X**	**X**		**X**						X		
Study tools and methods to carryout assessment	**X**	**X**		**X**						X		

B.Sc. CARE AND WELFARE (HUMAN DEVELOPMENT)
SEMESTER 1

Title of the Course: Stimulation and Assessment

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

CONTENT	45 Hrs
Unit – 1 Overview of prenatal development and its stages and Gestational stimulation	**15 Hrs**
Chapter No1. Gestational stimulation Concept, definition, significance **Chapter No 2.** Prenatal developmental milestones, Role of central nervous system, Stimulating Baby's Senses **Chapter No 3.** Types of Gestational/prenatal stimulation : Touch, light, music, sound, read and sing during gestational period. Chapter No 4. Do's and don'ts of expectant father.	
Unit -2 Infant stimulation and Guide to early Intervention and stimulation	**15 Hrs**
Chapter No 5. Brain development, **Chapter No 6**. Meaning, Definition, Importance, need of Infant stimulation. **Chapter No 7.** Types of stimulation- Vestibular stimulation-Rhythmic, Natural (Kangaroo care) Rocking and Holding type of stimulation, Touch (Tactile) stimulation, massage therapy, Auditory stimulation-Music, Speech and other. Oral stimulation-talking, reading, narration and rhymes **Chapter No 8**. The need and rationale for intervention for stimulation of infants Planning and implementation of stimulation activities Traditional methods, games, songs for infant stimulation	

Unit 3- Assessment and Methods and tools used in assessment of infants	**15 Hours**
Chapter No. 9. Meaning, Importance, need, reasons, ethical issues involved in assessment. **Chapter No 10.** Developmental milestones checklists, creating awareness among parents of infants about assessments and intervention. **Chapter No 11. prenatal assessment**: ultra sound, amniocentesis, chronic villus sampling , embryoscopy **Chapter No 12.** **Infant Assessment**: Bayley Scale of Infant Development, Assessing the Impact of the Home Environment, Children requiring special attention**:** Identifying children with physical and mental disabilities at an early age, referral services, importance of early stimulation.	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

REFERENCES

1. Berk, L.E., (2007), Development through the Life Span, Pearson Education, New Delhi.

2 Devadas, R.P; Jaya, N(2002), A Textbook on Child Development, Macmillan India Limited, Madras.

3. Digumarti Bhaskara Rao (1997), Care of the Child, vol and II, Discovery Publication House, New Delhi.

4.JegannathMohanty and Bhagyadhar Mohanty (1994), Early Childhood Care and Education (ECCE), Deep and Deep pub,New Delhi.

5. Hurlock, E.B., (2004), Child Growth and Development, Tata Mc.Graw Hill Company

6. Papalia, D.E., and Olds, S.W., (2005), Human Development, Tata Mc.Graw Hill Company,New York.

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8. Santrock, J.W., (2006), Child Development, Tata Mc.Graw Hill Publishing Company, NewDelhi

9. Suriakanthi, A., (2005), Child Development, Kavitha Publications, Gandhigram, Tamil Nadu

10 Khanna et.al (2009) DOABA Pre-Primary and Nursery Teachers' Training/ Education Guide, Doaba house, New Delhi.

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. CARE AND WELFARE (HUMAN DEVELOPMENT)
SEMESTER 1

Course Title: **CRÈCHE MANAGEMENT (OE-1)**	
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

Course Outcomes (COs):

1. Understand the concept of management of a creche
2. Gain an insight into the essentials of a crèche
3. Know the common safety measures to be followed in crèche
4. Create an awareness about the common records and registers maintained in a creche

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 concept of management of a creche		x	x			x	x		x			
Gain an insight into the essentials of a crèche	x		x		x	x	x		x			
Know the common safety measures to be followed in crèche				x	x		x				x	x
Create an awareness about the common records and registers maintained in a creche	**x**	**x**				x						X

B.Sc. CARE AND WELFARE (HUMAN DEVELOPMENT)
SEMESTER 1

Title of the Course: Creche Management (OE-1)

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

CONTENT	45 Hrs
Unit – 1 Creche Management and Essentials of Crèche	**15 Hrs**
Chapter No 1 Meaning, need and importance, changing concept of child care and role of crèche, Factories act of 1948, **Chapter-2** Physical set up- building, site plan-rooms, walls floors, windows, doors, sanitary facilities, play area • Curriculum-goals, factors to be considered in planning • Programme- principles, types • Equipment selection, types-outdoor and indoor activities for infants, toddlers	
Unit- 2 Needs of Children and Health and Safety Measures	**15 Hrs**
Chapter No -3 Importance, Physical,social,emotional • Maslow's hierarchy of needs • Understanding child behavour and fostering good behavior in children. **Chapter No- 4** Habit and Habit formation **Chapter No- 5 Health and Safety Measures:** • Normal growth chart, Common accidents and ailments-prevention and management • Importance of immunization, immunization schedule. • First aid, Role of caregivers, parent-care giver relationship	

Unit-3 Records and registers	15 Hrs
Chapter No- 6 Meaning, need, types: **Chapter No- 7 Administration-**Recruitment registers, Accounts ledger, Stock registers, Parent teacher meeting records, visitors book, suggestion book **Chapter No- 8 Personnel-** Personal files, Attendance registers, Salary register **Children-** Admission registers, Health register, daily log book, activity files, developmental domain observation forms	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

REFERENCES

1. Agarwal, J C, (1997), Methods and Materials of Nursery Education, DOABA HOUSE, New Delhi
2. AparajithaChowdhary and Rita Choudhary,(2002) PRE –School Children Development, Care and Education, New Age Publications, New Delhi.
3. Berk E. Laura, Child Development, Person Prentice Hall, Indian Branch, New Delhi. (2005).
4. Blackwell Handbook of Early Childhood Development, Edited by: Kathleen McCartney and Deborah Phillips (2005), e ISBN: 9781405120739.
5. Diane E. Papalia and Sally Wendkos Olds, “Human Development”, McGraw Publications Latest Edition.

6. Hurlock B. Elizabeth, Development Psychology – “A life Span Approach”, Tata McGraw HILL Publications Latest Edition.

7. Jaya and SubhadraNarasimhan(2006) Parenting children below two years. Abacus Founation. Coimattore, Tamil Nadu.

8. MujibulHasanSiddiqui (2008)Early Childhood Education, APH Publishing corporation, New Delhi
9. Santrock W John (2007), “A Topical approach to life span development”, Tata McGraw-Hill Company, Delhi

10. Suriakanthi (2009) Child Development, Kavitha Publications, Gandhigram, Tamil Nadu.

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. CARE AND WELFARE (HUMAN DEVELOPMENT)
SEMESTER 2

Course Title: EARLY CHILDHOOD YEARS (DSC- 4)	
Total Contact Hours: 60 Hrs.	**Course Credits: 5**
Formative Assessment Marks: 40 marks	**Duration of ESA / Exam: 3 Hrs.**
Model Syllabus Authors:	**Summative Assessment Marks: 60**

Course Outcomes (COs):

1. Understand the significance of development during early childhood years.
2. Understand the need and importance of development during early years.
3. To understand the role of nutrition, health, immunisation and importance of play during early years.

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 significance of development during early childhood years.	x	x							x			x
Understand the need and importance of development during early years.		x	x		x		x			X		
To understand the role of nutrition, health, immunisation and importance of play during early years	x		x		x			x		x	x	x

B.Sc. CARE AND WELFARE (HUMAN DEVELOPMENT)
SEMESTER 2

Title of the Course: Early childhood years (DSC-4)

Number of Theory Credits	Number of lecture hours/ semester
4	60

CONTENT	60 hrs
Unit – 1 Child Development – meaning and definition of child development,	**20 Hrs**
Chapter No-1 Growth and development of young children. Nature and Scope of child development. Milestones during early childhood years. **Chapter No-2** Maturation and learning, health and nutrition. **Chapter No-3** Factors determining development. Developmental areas and developmental tasks. Importance of studying children in the contemporary context	
Unit-2 Physical growth and development, motor development and Socio- development	**20 Hrs**
Chapter No-4 A brief overview of the physical and physiological changes, important milestones. **Chapter No-5** Normal course of development, growth chart **Chapter No-6** Milestones in motor development : Gross and finer muscle skills, Factors influencing growth and development. **Chapter No-6 Socio- development** - Important milestones Components and stages of social and emotional development Socialization and agents of socialization, Parents and other caregivers, Disciplinary techniques.	

Unit-3 Emotional development and Cognitive and Language Development	**20 Hrs**
Chapter No-7 Important milestones Components and stages of social and emotional development Socialization and agents of socialization, Parents and other caregivers, Disciplinary techniques. **Chapter No-8** Nature and types of children's emotions. Factors affecting emotional development, Positive emotions and negative emotions. Temperaments of children, common behavioural problems and management. **Chapter No-9** Development of resilience and emotional competence in children **Chapter No-10** Importance of play during early childhood years, Role of family and school in facilitating socio emotional development. **Chapter No-11 Cognitive Development**:Meaning and definition of cognition, Stages of cognitive growth in childhood, Concept development in young children. Creativity in relation to cognitive development. Role of family and school in facilitating cognitive development. **Chapter No-12 Language Development: Meaning** and defining language development. Sequence of language development including its social andcultural aspects. Role of family and school in facilitating language development.	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Practical: 2 Credit **60 Hrs**

1. Conduct an anthropometrics of preschool children and compare with standard measurement..
2. Survey available app to conduct cognitive development during early childhood years.
3. Prepare a Language Kit (anyone) - Colours and Shapes/ Vegetables/Fruits/Flowers/Visual discrimination booklets.
4. Conduct a nutritional awareness programme for parents.
5. Observe the social /emotional behavior of children and report the same.

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Seminar presentation	20
Quiz, Assignment	10
Low-cost innovative recipes	10
Total	40

REFERENCES:

1. Berk E. Laura, Child Development, Person Prentice Hall, Indian Branch, New Delhi. (2005).
2. Blackwell Handbook of Early Childhood Development, Edited by: Kathleen McCartney and Deborah Phillips (2005), eISBN: 9781405120739.
3. Diane E. Papalia and Sally Wendkos Olds, “Human Development”, McGraw Publications Latest Edition.
4. Hurlock B. Elizabeth, Development Psychology – “A life Span Approach”, Tata McGraw HILL Publications Latest Edition.
5. Jeffrey Trawick-Smith (2013)Early Childhood Development: A Multicultural Perspective, (6th Edition) Paperback, ISBN-13: 978-0132868594.
6. Shonkoff, J.P., Phillips D.A., (2000) (eds). The Science of Early Childhood Development National Research, Committee on Integrating the Science of Early Childhood Development, Council, Institute of Medicine. National Academy Press. Washington, D.C.
7. SiddiquiNasim; Bhatia Suman; BiswasSuptika, “Early Childhood Care and Education”, Doaba House, Book sellers and publishers, Delhi (2005).
8. Diane E. Papalia and Sally Wendkos Olds, “Human Development”, McGraw Publications Latest Editio

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. CARE AND WELFARE (HUMAN DEVELOPMENT)
SEMESTER 2

Course Title: **EARLY CHILDHOOD CARE AND WELFARE (DSC-5)**	
Total Contact Hours: 60 Hrs.	Course Credits: 5
Formative Assessment Marks: 40 marks	Duration of ESA / Exam: 3 hrs.
Model Syllabus Authors:	Summative Assessment Marks: 60

Course Outcomes (COs):

1. Know the importance of child care and understand the need and importance of child welfare.
2. To gain insight in to child welfare in five year plans.
3. To understand the role of National and International Organization working towards the welfare of child care and welfare.
4. Develop insight into the historical developments – global and Indian including the currentprograms and policies in ECCE.
5. Develop awareness of ECCE programs in different contexts in India.
6. Familiarize with indigenous models of Early Childhood Education and explore the current early childhood research, theoretical trends, issues and legislative measures.

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**	**7**	**8**	**9**	**10**	**11**	**12**
Know the importance of child care and Understand the need and importance of child welfare.		x	x		x	x		X			
To gain insight in to child welfare in five year plans.	x	x		x	x				x	x	x
To understand the role of National and International Organization working towards the welfare of child care and welfare.	x	x	X	x	x				x	x	x
Develop insight into the historical developments – global and Indian including the currentprograms and policies in ECCE.	**x**	**x**				x		x			
Develop awareness of ECCE programs in different contexts in India.			**x**	**x**	x			x	x		
Familiarize with indigenous models of Early Childhood Education and explore the current early childhood research, theoretical trends, issues and legislative measures.		**x**	**x**			x			x	x	x

B.Sc. CARE AND WELFARE (HUMAN DEVELOPMENT)
SEMESTER 2

Title of the Course: Early Childhood care and welfare (DSC- 5)

Number of Theory Credits	Number of lecture hours/ semester
4	60

CONTENT	60 Hrs
Unit – 1 Child development programmes and Historical development of five year plans	**20 Hrs**
Chapter No-1 Meaning of child care, importance of childcare. Child profile with reference to Indian context – role of nutrition and immunization, malnutrition, infant mortality, need for family and community education. **Chapter No-2 -** Child welfare- Meaning, definitions, Child Welfare in five year plans of India	
Unit-2 Organization and programmes for child welfare in India	**20 Hrs**
Chapter No-3 International organization programme-WHO, UNESCO, CASA. **Chapter No-4 National organization program –** NCERT, NIPCCD, ICCW, ICDS, and BetiBachao and BetiPadhau **Chapter No-5 State welfare programs -** Midday meal programme, Child line services, Day-Cares,Bhagyalakshmi scheme and Ksheerabhagya scheme. **Chapter No-6** NGO'S - CRY, Red Cross, SOS, Akshara foundation, BOSCO MANE(for the street children), ASHA for **children** with disabilities and Shristi special academy for children with special needs.	

Unit-3 Legislature measures for children and Communication and child welfare programmes	**20 Hrs**
Chapter No-7 Advocacy for children's rights, selected policies and legislations of children. **Chapter No-8** UN convention on the rights of the child, National policy for children, Child Marriage Restraint Act **Chapter No-9** Prevention of Immoral Traffic Act, The Child Labour (Prohibition and Regulation) Act, Child Adoption act. **Chapter No-10** Importance of communication, audio visual aids, Role of communication in empowering family and community about child welfare programmes	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

Practical: 2 Credits **60 Hrs**

1. Organise a special talk on child welfare programme
2. Visit a National/ State/ NGO welfare centre and report the same.
3. Interview a beneficiary of a selected welfare scheme. Report the same.
4. Organize an educational programme on care during early childhood years.
5. Collect information on any two National/ State/ NGO welfare programmes and report the same.

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Seminar presentation	20
Quiz, Assignment	10
Low-cost innovative recipes	10
Total	40

REFERENCES

1. Country Report (2009), Department of women and child development, Government of India; New Delhi.
2. Govinda, R and RahsmiDiwan (2003) Community participation and empowerment in primary education; Sage publications, India Pvt. Ltd, Noida India.
3. ICDS – An Evaluation, NIPCCD, New Delhi.
4. Sachadeva D.R (2003) Social Welfare Administration in India, 4th Edition KitabMahal, Allahabad.
5. World Bank Reports

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. CARE AND WELFARE (HUMAN DEVELOPMENT)
SEMESTER 2

Course Title: **BASICS OF FOOD AND NUTRITION (DSC-6)**	
Total Contact Hours: 60 Hrs.	Course Credits: 5
Formative Assessment Marks: 40 marks	Duration of ESA / Exam: 3 Hrs.
Model Syllabus Authors:	Summative Assessment Marks: 60

Course Outcomes (COs):

1. Learn the concept of health, nutrition, macro and micro nutrients and their functions.
2. Obtain the knowledge of different nutrients, food groups, balanced diet and food pyramid.
3. Understand the method of conservation of nutrients
4. Develop the knowledge and skills of cooking methods and meal planning

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**
Learn the concept of health, nutrition, macro and micro nutrients and their functions.	x	x	x		x				x	x		
Obtain the knowledge of different nutrients, food groups, balanced diet and food pyramid.	x		x		x	x		x	x	x		
Understand the method of conservation of nutrients		x	x		x	x	x			x		x
Develop the knowledge and skills of cooking methods and meal planning		**x**		**x**	x	x		x	x	X	x	

B.Sc. CARE AND WELFARE (HUMAN DEVELOPMENT)
SEMESTER 2

Title of the Course: Basics of Food and Nutrition (DSC-6)

Number of Theory Credits	Number of lecture hours/ semester
4	60

CONTENT	60 hrs
Unit – 1 Introduction to Food and Nutrition	**20 Hrs**
Chapter No-1 Food – Definition and functions, classification of foods **Chapter No-2** Nutrition – Definition, Nutritional Status, Malnutrition – over nutrition and under nutrition.	
Unit-2 Macro and Micro nutrients	**20 Hrs**
Chapter No-3 Macronutrients **Classification, Functions, Sources, Requirements, Deficiencies- symptoms and management** • Carbohydrates, • Proteins, • Fats, **Chapter No-4 Micronutrients and Protective Nutrients** **Classification, Functions, Sources, Deficiencies- symptoms and management** • Minerals- Calcium, Iron, Iodine, • Vitamins - A,D,E ,and K, B (Thiamine, Riboflavin, Niacin) and Vitamin C. **Water-** Functions, Sources and Water Balance. **Fiber** – Functions and Sources	

Unit-3 Balanced Diet and Nutrition Education	20 Hrs
Chapter No-5 Balanced Diet • Concept of Balanced Diet, Daily Food Guide, Basic Five Food groups, Food Pyramid. • Concept of RDA and BMI **Chapter No-6 Nutrition Education** • Conservation of Nutrients, • Methods of cooking -advantages and disadvantages Basics of meal planning	

Formative Assessment = 40 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

References

1. Dietary Guidelines for Indians. ICMR (2011) Published by National Institute of Nutrition,Hyderabad.
2. Chadha R and Mathur P (eds)(2015). Nutrition: A Lifecycle Approach. Orient Blackswan,Hyderabad, Chapter
3. Rekhi T and Yadav H (2014). Fundamentals of Food and Nutrition. Elite Publishing House Pvt Ltd., Delhi
4. Srilakshmi, B. (2013), *Dietetics*, New Age International (P) Ltd., New Delhi.

Date **Course Co-ordinator** **Subject Committee Chairperson**

B.Sc. CARE AND WELFARE (HUMAN DEVELOPMENT)
SEMESTER 2

Course Title: **BSC HDBCW – TEACHING LEARNING MATERIALS (OE-2)**	
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

Course Outcomes (COs):

1. Learns professional way of preparing the teaching learning materials for children.
2. Promotes a holistic approach in designing and developing various activities for the children.
3. Become aware about the developmentally and culturally appropriate practices for working with children.
4. Understand the importance of stimulating environment using effective teaching learning materials for young children.
5. Learns to use the locally available indigenous material/ resources.
6. Develop sensitivity to the socio-cultural contexts, including gender, while working with children and learn effective ways to communicate and guide children.

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

Course Outcomes (COs) / Program Outcomes (POs)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Learns professional way of preparing the teaching learning materials for children.		X	x		x		x			X		
Promotes a holistic approach in designing and developing various activities for the children	x	X	x		x	x			x	X		x
Become aware about the developmentally and culturally appropriate practices for working with children.				x	x	x				X	x	X
Understand the importance of stimulating environment using effective teaching learning materials for young children		**X**	**x**	**x**			x	x	X	x		
Learns to use the locally available indigenous material/ resources.				**x**	x	x				X	x	X
Develop sensitivity to the socio-cultural contexts, including gender, while working with children and learn effective ways to communicate and guide children.			**x**	**x**		x	x		x	x		

B.Sc. CARE AND WELFARE (HUMAN DEVELOPMENT)
SEMESTER 2

Title of the Course: Teaching Learning Materials

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

CONTENT	45 Hrs
Unit – 1 Introduction to TLMs	**15 Hrs**
Chapter No-1 Definition, concept, need and importance of TLMs in early childhood education. **Chapter No -2** Identification, selection and evaluation of TLMs. Teaching – Audio, visual aids and audio visual aids –Importance in early childhood education.	
Unit-2 Types of TLMs	**15 Hrs**
Chapter-3 Meaning, concept, advantages and disadvantages. **Printed:** Story books, charts, flash cards, picture cards, illustrations, activity books and maze. **Games:** Puzzles, board games and traditional games. **Creative Expressions:** Puppets, music and movement, demonstrations, drama and artistic experiences. **Audio Aids:** Radio, tape-recorder and CDs. **Audio-visual aids:** Videos and films. **Digital Media -** Movies/TV Clips/ videos, slideshows, YouTube's, podcasts, screencasts and virtual Classrooms	

Unit-3 Learning and TLMs	15 Hrs
Chapter No-4 Learning • Activity based learning, individual, group learning, observational and incidental learning. • Learning materials- Worksheets and supplementary materials, games, classroom display and reference materials. • Role of parents' and teachers'. **Chapter No-5 TLMs** • Features of TLMs • Advantages and Disadvantages of TLMs • Preparation of low cost teaching learning materials from available local resources	

Formative Assessment = 40 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment + Project	10 + 10
Total	**60 marks + 40 marks = 100 marks**

References

1. Bruke, E (1990): Literature for the young child, Needham Heights: Allyn and Bacon.
2. Catron Carol E. , Jan Allen (1998), Early Childhood Curriculum: A Creative Play, Publisher: Pearson,
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