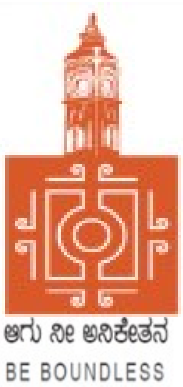

BENGALURU CITY UNIVERSITY

CHOICE BASED CREDIT SYSTEM
(As per SEP)

Syllabus for BA/B.Sc.
Home Science

2025-26

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

As one

Discipline Major

(Model II)

Curriculum titles for BA/BSc Home Science – I to VI Semester.

Semester	Course Code.	Category of course	Theory/ Practical	Credits	Paper Titles	Marks	
						S.A	I.A
I	HSCT1.1	Major	Theory	3	Nutrition and Meal Management	80	20
	HSCP1.1	Major	Practical	2	Nutrition and Meal Management	40	10
II	HSCT2.1	Major	Theory	3	Human Development	80	20
	HSCP2.1	Major	Practical	2	Human Development	40	10
III	HSCT3.1	Major	Theory	3	Early Childhood Education	80	20
	HSCP3.1	Major	Practical	2	Early Childhood Education	40	10
	HSCT3.2	OE	Theory	2	Food Preservation	40	10
IV	HSCT4.1	Major	Theory	3	Introduction to Textiles	80	20
	HSCP4.1	Major	Practical	2	Introduction to Textiles	40	10
	HSCT4.2	OE	Theory	2	Fashion Designing	40	10
V	HSCT5.1	Major	Theory	3	Traditional Textiles and Costumes in India	80	20
	HSCP5.1	Major	Practical	2	Traditional Textiles and Costumes in India	40	10
	HSCT5.2	Major	Theory	3	Resource Management	80	20
	HSCP5.2	Major	Practical	2	Resource Management	40	10
VI	HSCT6.1	Major	Theory	3	Extension Education	80	20
	HSCP6.1	Major	Practical	2	Extension Education	40	10
	HSCT6.2	Major	Theory	3	Interior Decoration	80	20
	HSCP6.2	Major	Practical	2	Interior Decoration	40	10

SEMESTER 1

NUTRITION AND MEAL MANAGEMENT

Code: HSCT 1.1 **Total Marks :100**

Hours: 56 **Theory Exams: 80**

Instruction hrs./week:04 **Internal Assessment:20**

Program Outcomes:

1. To understand the functions of food and the role of various nutrients
2. To understand the practical guidelines for the dietary needs of human nutrition at different stages of life.

Content	56 Hrs
Unit – 1 Introduction	**16 hours**
Chapter 1- Introduction to Nutrition a) Definition of Nutrition, Malnutrition, EAR, and Health. b) Functions of food, Food group, My plate &Balanced diet.	
Chapter 2-Methods of Cooking - Advantages and Disadvantages of a) Water–Boiling, steaming, pressure cooking b) Oil/Fat–Shallow frying, deep frying c) Air– Baking	
Chapter 3-Water& Energy a) Water–Functions, sources, and water balance b) Energy- definition, BMR, factors affecting BMR	
Unit - 2 Macro & Micronutrients	**16 hours**
Chapter 4-Nutrients Macro and Micronutrients-classification, Sources, functions, and deficiency. A) Carbohydrates B) Proteins C) Fats	
Chapter 5-Minerals Calcium, Iron, Iodine	
Chapter 6 - Vitamins – A) Fat-soluble vitamins A, D, E & K B) Water-soluble vitamins – vitamin C and vitamin B complex (Thiamine, Riboflavin, Niacin)	
Unit – 3 Meal planning and Diet therapy	**16 hours**
Chapter 7 -Meal planning	

a) Steps in meal planning b) Determinants of food choice	
Chapter 8 -Diet therapy a) Routine hospital diets –Clear, full fluid, soft, and bland diet. b) Dietary guidelines for: Underweight, Obesity, Diarrhea, and Constipation.	
Unit 4: Nutrition Through Life Cycle	**8 hours**
Chapter 9 - Nutrition through the life-cycle a) Indian reference Man and Woman b) Dietary guidelines: Adulthood, Pregnancy, Lactation. c) Infancy– Complementary feeding, Pre-school, Adolescence, Old age	

Pedagogy – Theory

Lecture, demonstration, hands-on learning through ICT presentations, Group discussion, case studies, and workshops.

Formative Assessment = 20 marks	
Assessment Occasion/type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL

NUTRITION AND MEAL MANAGEMENT

Code: HSCP 1.1 **Total Marks: 50**

Hours: 42 **Practical Exam: 40**

Hours/Week: 03 **InternalAssessment:10**

1. Weights and Measures
2. Methods of Cooking:
   a. Boiling
   b. Pressure Cooking

c. Frying–Shallow/Deep Fat

d. Baking

3. Identification of nutrient-rich foods

4. Planning and preparation of macronutrient-rich recipes

a. Energy

b. Protein

5. Planning and preparation of micronutrient-rich recipes

a. Iron

b. Calcium

Formative Assessment:10 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	5
Class Performance	5
Total	Exam- 40MARKS + IA-10 Marks =50

References:

1. Srilakshmi, B. (2007), Dietetics. New Age International Publishers. NewDelhi
2. Srilakshmi B (2002). NutritionScience.NewAgeInternationalpublishers. NewDelhi
3. SwaminathanM.(2002), Advanced Textbook on Food and Nutrition.Volume I.Bappco.
4. Gopalan, C, Rama Sastry B.V., and S.C.Balasubramanian (2009), Nutritive value of Indian foods.NIN-. ICMR.Hyderabad.
5. Mudambi andRajagopal M V,(2008),Fundamentals ofFoods,Nutrition &diettherapyby New AgeInternational Publishers, New Delhi

SEMESTER 2

HUMAN DEVELOPMENT

Code: HSCT 2.1 **Total Marks :100**

Hours: 56 **Theory Exams: 80**

Instruction hrs./week:04 **Internal Assessment:20**

Program Outcomes:

1. To create awareness about the stages of prenatal development, childbirth, and post-natal care.
2. To acquaint students with the domains of development across the life span- neonate, infant, childhood, adolescence, and adulthood.

Content	56 Hrs
Unit – 1 Introduction to Prenatal Development	**14 hours**
Chapter 1 -Concept and Principles. Concept and definition of human development Need to study human development. Principles of growth and development Factors influencing growth and development.	
Chapter 2-Prenatal development Pregnancy–Signs and Symptoms, discomforts and complications, prenatal assessment. Stages of the prenatal period–period of the ovum, embryo, and fetus. Prenatal influences –physical care, diet, emotional care, and environmental hazards. Birth process–stages of the birth process and types of birth.	
Unit – 2: Infancy	**14 hours**
Chapter 3: Neonate Physical characteristics, reflexes-grasping, Moro, sucking, palmar, and tonic neck reflex. Adjustments of the neonates, sensory capacities.	
Chapter 4Infancy Characteristics, developmental tasks, physical, motor, social, cognitive, and Emotional. Breastfeeding, weaning, supplementary foods, and immunization.	
Unit – 3: Childhood and Adolescence	**14 hours**
Chapter5-Early Childhood Characteristics, developmental tasks, physical, motor, social, cognitive,	

emotional, and language development.	
Chapter 6 -Late Childhood and Adolescence Late Childhood-Characteristics, developmental tasks, physical, motor, social, cognitive, emotional, and language development, Interests, Influence of peer group. **Adolescence -** Characteristics, developmental tasks, physical changes, puberty, primary and secondary sexual characteristics, social, emotional, cognitive development, and identity formation. Interests and problems of adolescents, need for sexual health education.	
Unit 4: Adulthood	**14 hours**
Chapter 7-Early Adulthood Characteristics and developmental tasks, physical, social, cognitive, emotional, and moral development.	
Chapter 8- **A) Middle Adulthood** – Characteristics and developmental tasks, Physical, physiological, and socio-emotional changes. Adjustments in middle age. **B) Late Adulthood –** Characteristics and developmental tasks, physical, physiological, social, and emotional changes; decline in cognitive abilities; Adjustments, problems faced by the elderly, Retirement.	

Pedagogy – Theory

Lecture, demonstration, hands-on learning through ICT presentations, Group discussion, case studies, and workshops.

Formative Assessment = 100 marks	
Assessment Occasion/type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL

HUMAN DEVELOPMENT

Code: HSCP 2.1 **Total Marks: 50**

Hours:42 **Practical Exam: 40**

Hours per week: 3 **Internal Assessment:10**

1. Prepare an album on the stages of prenatal development
2. Planning and preparing weaning foods.
3. Develop an activity to foster cognitive development in school children
4. Prepare a visual aid to create awareness of any one problem among adolescents.
5. Visit to an old age home.

References:

1. Baradha. G 'Basics of Human Development 'Sarada Laya Press, Sri Avinashilingam Education Trust Institutions, Coimbatore2008.
2. Hurlock. B. Elizabeth, 'Developmental Psychology–A LifeSpanApproach'TataMcGraw Hill Publications, New Delhi, Latest Edition.
3. Santrock. W. John (2015) 'Atopical approach to life span development', Tata McGraw-Hill Company, Delhi.
4. Suryakanthi A.(2015). Child Development, Kavitha Publications, Gandhigram, Tamil Nadu.

SEMESTER 3

EARLY CHILDHOOD EDUCATION

Code: HSCT 3.1 **TotalMarks:100**

Hours: 56 **Theory Exams: 80**

Instructionhrs. /week:04 **Internal Assessment:20**

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

1. Explain the importance of early childhood years and the significance of programs for early childhood development.
2. Describe the historical developments–global and Indian, including the current programs and policies in ECCE.
3. Identify various models of Early Childhood Education and their application
4. Analyze curriculum models and pedagogical approaches in early childhood education.
5. Create developmentally appropriate programs for young children.

Content of Course	56 hrs
Unit – 1 Early Childhood Care and Education - History & Importance	14 hrs
Chapter 1: Meaning and Importance of ECCE; Goal and Objectives of ECE History of Early Childhood Care and Education in Indian, Contribution of educators -Frederich Froebel, Maria Montessori, Gandhiji, and John Dewey	
Chapter 2- Types of ECE Programs - Day Care, Montessori, Kindergarten, Balwadi, Anganwadi, Crèche, and Play Group. Overview of ICDS and SSA	
Unit – 2 Infrastructure and Program Planning	14 hrs
Chapter 3- Location, Building, Space – indoor and outdoor amenities and facilities for indoor and outdoor activities, garden, playground, and storage. Equipment and Materials Required for Play and Learning – Selection and Care of Equipment.	
Chapter 4- Program planning – Principles, Types and Factors influencing Program planning, Program evaluation. Concept of Curriculum models- Child Centre, Teacher Centre, and Knowledge Centre, Importance and Steps of Theme-based planning	
Unit – 3 Developmentally Appropriate Programs and Parent Involvement	14 hrs

Chapter 5- Activities for Young Children in ECE – Age/Developmentally appropriate activities, Art and creative activities, Music and Rhythmic Activities, Mathematics, Language and Communication activities; Nature and Science Activities,3 R's – Reading readiness, writing readiness, and readiness for arithmetic; Literature for Children; Indoor and outdoor Play activities	
Chapter 6- Parent Education and Involvement – Need and Importance, Methods, and Benefits.	
Unit - 4 Administration and Management of ECE Centers	14 hrs
Chapter 7- Personnel Management – Personnel required in ECE Centre – Selection and recruitment, Supervision and monitoring. Role and qualities of teachers and support staff.	
Chapter no 12 - Documentation and Financial Management – Importance and Principles of Record Keeping, Types of records; Financial allocations and budgetary considerations, budget making, and Resource generation avenues	

Pedagogy -Theory

Lecture, demonstration, hands-on learning through ICT presentations, Group discussion, case studies, and workshops.

Formative Assessment = 20 marks	
Assessment Occasion/type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL

EARLY CHILDHOOD CARE AND EDUCATION

Code: HSCP 3.1 **Total Marks: 50**

Hours: 42 hours **Practical Exams: 40**

Instruction hrs./week:03 **Internal Assessment:10**

1: Visit to Nursery School, Day Care/ Crèches, Anganwadi/ Balwadi – Observe the early childhood education program and write a report

2: Plan and prepare teaching aids for gross and fine motor development, storytelling, creative activities, Environmental Science, and science activities

3: a) Develop low-cost and indigenous play materials for cognitive development or

b) Prepare a scrapbook/picture book/ resource book for toddlers

4: a) Plan daily schedules on any three themes used in the ECE or

b) Design a parent handbook/ brochure to provide information about an early childhood education Centre.

Formative Assessment:10 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	5
Class Performance	5
Total	Exam- 40MARKS + IA-10 Marks =50

References

1. Agarwal, J. C. (2007). Early childhood care and education: principles and practices. New Delhi: Shipra
2. Agarwal, S.P. and Usmani, M. (2000). Children's education in India: from Vedic times to the twenty-first century, New Delhi: Shipra.
3. OECD. (2004). Curricula and pedagogies in early childhood education and care. Retrieved from http://www.oecd.org/education/school/31672150.pd
4. Burtonwood, N. (2002). Anthropology, Sociology, and the Preparation of Teachers for a Culturally Plural Society. Pedagogy, Culture and Society. 10(3), 367-387.
5. Clarke, P. (2001). Teaching & learning: the culture of pedagogy. New York: Sage
6. Kress, J.S., Norris, J. A., Schoenholz, D. A., Elias, M.J., and Seigle, P. (Nov., 2004). Bringing Together Educational Standards and Social and Emotional Learning: Making the Case for Educators. American Journal of Education, 111 (1), pp 66-89
7. Moyles, J. & Hargreaves, L. (1998). The primary curriculum. Learning from an international perspective. London: Routledge
8. National association for the education of young children, July 1998. Learning to read and Write: developmentally appropriate practices for young children. 53 (4), 30-46.
9. NCERT (2007). Handbook of arts in education
10. Neuman, S., Dwyer, J. &Koh, S. (2007). Child/Home early language and literacy observation. Baltimore: Brookes Publishing House

FOOD PRESERVATION (OPEN ELECTIVE)

Code: HSCT 3.2 **Total Marks:50**

Hours: 24 **Theory Exams: 40**

Instruction hrs./week: 2 **Internal Assessment:10**

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, the 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

CONTENT	24 hrs.
Unit I: Concept of Food Preservation	**6 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	
Chapter No. 2- Starting a food preserving unit, Product Promotion strategies, and marketing skills	
Unit-II Preparation of dehydrated products	**6 hrs.**
Chapter No.3 Methods of drying and dehydration, different types of driers, freeze drying- lyophilization, packing & storage	
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.)	
Chapter No. 5- Hands-on experience: Drying of vegetables- peas, potato, carrot, French beans, Reconstitution of dried vegetables, Drying & preparation of powders- garlic, ginger, spices mix, etc	
Unit -III Preservation by Using Sugar, Chemicals, Salts, and Fermentation	**12 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 the Fruits and Vegetable processing industry.	
Chapter No. 8 - Pickling – Principles Involved and Types of Pickles, Chemical Preservatives – Definition, Role of Preservation, Permitted Preservatives, FSSAI guidelines, Foods fermented by Yeasts and Bacteria, Wine and Cheese Making	
Chapter No. 9 - Hands-on experience: Pickle making, Visit to Commercial Pickle Manufacturing/ Food Industry / Wine industry	

Pedagogy – Theory

Lecture, demonstration, hands-on learning through Assignment, ICT presentations, Group discussion, case studies, and workshops.

Formative Assessment = 10 marks	
Assessment Occasion/type	**Weightage in Marks**
Test 1	5
Assignment /Project	5
Total	**40 marks + 10 marks = 50 marks**

Reference:

1. Maney S (2008). Foods, Facts and Principles, 3rd 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. Shafiur, Rahman, M. (2007), Handbook of Food Preservation, 2 nd edition, CRC Press, New Delhi.

SEMESTER 4

INTRODUCTION TO TEXTILES AND CLOTHING

Code: HSCT 4.1 **Total Marks:100**

Hours:56 **Theory Exams: 80**

Instruction hrs./week:04 **Internal Assessment:20**

Course Outcomes (COs):

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

1. Understand the structure and production techniques of various natural and manmade fibers and their physical properties.

2. Understand the various conventional and non-conventional techniques of yarn spinning.

3. Demonstrate an understanding of various types of fabric-forming methods.

4. Gain understanding of quality parameters for fiber, yarn, and fabrics.

5. To introduce the basic scientific concepts related to the processing and production of textiles.

Content	
Unit –1 FIBRE, YARN AND FABRIC CONSTRUCTION	**14 HRS**
Chapter 1: Meaning, Importance and Scope of Textiles, Classification of Textile Fibers; General Properties -Physical, Chemical and Biological. Elementary study of Cotton, Linen, silk, wool, nylon, and polyester Manufacturing Process of Cotton, Silk, Nylon, Classification of Yarns, and Twist	
Chapter 2: Parts of a Basic Loom; Weaving operations Basic and Decorative Weaves – Plain Weave, Basket Weave, Rib, Twill, Satin, Leno, Pile, and Jacquard.	
Unit –2 FINISHING	**14 hrs**
Chapter 3- Objectives, Classification, types (Mechanical Finishes, Tentering, Shrinking, Weighting, Calendaring, Sizing, Embossing, and Napping).	
Chapter 4- Chemical Finishes, Singing, Bleaching, Mercerization and Functional Finishes, Fireproof, Waterproof, and Mildew-proof.	
Unit 3- WET FINISHING	**14 hrs.**
Chapter 5 -Dyeing- Classification of Dyes, Methods of dyeing dope, fiber, yarn,	

fabric, and garment.	
Chapter 6 Printing: Methods of Printing -Direct, Resist, and Discharge techniques	
Unit –4 FUNDAMENTALS OF CLOTHING	**14 hrs**
Chapter 7 -Clothing – factors to be considered while selecting clothing for different age groups – infants, toddlers, preschoolers, school age, adolescent adults, and elderly/ Individuals with special needs	
Chapter 8- Tools for clothing construction – cutting, measuring, marking, and pressing. Sewing Machine – Parts, care, and maintenance. Body Measurements – principles of Body Measurements.	

Pedagogy – Theory

Lecture, demonstration, hands-on learning through Assignment, ICT presentations, Group discussion, case studies, workshops, and Field visit

Formative Assessment: 20 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Assignment / Project	5+5
Total	THEORY 80 MARKS +IA 20 Marks =100

PRACTICAL

INTRODUCTION TO TEXTILES and CLOTHING

Code: HSCP 4.1 **TotalMarks:50**

Hours:42 **Practical Exams: 40**

Hours per week:03 **Internal Assessment:10**

1. Fiber Identification Tests: a) Visual test. b) Burning test and c) microscopic test (Cotton, Silk, Wool, Rayon, Polyester & Nylon fibers)
2. Dyeing & Printing –Block/stencil/tie &dye/batik
3. Basic Stitches – running, hemming, back, and whipping
4. Embroidery – Chain. French knot, blanket, stem, Herringbone, and lazy daisy

5. Parts of a sewing machine, Basic seam construction.

Formative Assessment = 10 marks	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	5
Class performance	5
Total	**Exam-40 marks + IA 10 marks = 50 marks**

References

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

FASHION DESIGNING (OPEN ELECTIVE)

Code: HSCT 4.2 **TotalMarks: 50**

Hours: 24 **Theory Exams: 40**

Instruction hrs./week:2 **Internal Assessment:10**

Course Outcomes (COs):

1) Adapt their artistic abilities to support their future design careers.
2) Assess, propose, and apply various techniques related to drafting, draping, and constructing garments.
3) Develop a systematic, critical approach to problem-solving at all levels of the design process.

4) Relate the design process to the appropriate manufacturing process.

Content	24 Hrs
Unit –1 FASHION DESIGN	**8 HRS**
Chapter No. 1: Definition, Classification, terminologies, cycle, Factors, Fashion psychology and forecasting.	
Chapter No. 2: Introduction to Textiles, Textile Terminology, Textile Fibres and their classification, physical and chemical properties of fibres.	
Unit –2 ELEMENTS OF ART AND DESIGN	**8 HRS**
Chapter No. 3: Elements of Design and Colour– Definition, Types, Elements, Principles, and their application in dress design in dress design.	
Chapter No. 4: Selection of suitable clothing and design, factors affecting the selection of clothing, Clothing of different age groups.	
UNIT –3 FASHION ILLUSTRATION	**8 HRS**
Chapter No. 5: Definition, terminology, importance, and theories, tools for fashion drawing, sketching principles of Human anatomy: - Basic human proportion of male and female.	
Chapter No. 6: Illustration for apparel using the themes- Casual, formal, ethnic, office wear, winter, summer, and spring	
Chapter No. 7: Fashion Designer – meaning, classification, Male and Female Designers of National repute	

Pedagogy – Theory

Lecture, demonstration, hands-on learning through Assignment, ICT presentations, Group discussion, case studies, workshops, and Field visits

Formative Assessment = 10 marks	
Assessment Occasion/type	**Weightage in Marks**
Test 1	05
Assignment /Project	5
Total	**40 marks + 10 marks = 50 marks**

References

1. The Fashion Design Reference & Specification Book: Everything Fashion By Jay Calderin
2. Singer Sewing Essentials - Cy De Cosse Incorporated, Minnesota (1997)
3. Practical Clothing Construction - I and II, Mary Mathews, Cosmic Press, Chennai (1986)
4. The Complete book of Sewing Dorling Kindersley, Dorling Kindersley limited, London (1996)
5. Practical clothing construction — part I & II ; Mary Mathews;(1997)
6. Pattern grading (or women's clothes, the technology of sizing; Gerry Cookline; Backwell Science Ltd;(1980)
7. Creative clothing constructions; Bane, A: McGraw-Hill Book Company, New York

SEMESTER 5

TRADITIONAL TEXTILES AND COSTUMES OF INDIA

Code: HSCT 5.1 **Total Marks: 100**

Hours: 56 **Theory Exams: 80**

Instruction hrs./week: 04 **Internal Assessment: 20**

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

Acquainted with the Indian Textile and Clothing culture

- Analyse traditional textiles based on the process of making them.
- Understand the physical, geographical, and cultural influences on costumes and textiles.
- Differentiates traditional textiles from different parts of the country.
- Appreciates the traditional Textiles and Costumes
- Utilize traditional costumes and textiles in a contemporary context.
- Understands the techniques of traditional embroidery

Content	
Unit I -Introduction to Traditional Textiles and Costumes of India	**14 HRS**
Chapter 1 - History of India Textiles and Costumes of India	
Chapter 2 - Classification and origin of Traditional textiles of India.	
Unit –2 Traditional textiles of India -Origin, Method, Design/ Pattern	**14 hrs**
Chapter 3 - Painted Textiles of India - Patachitra, Pichwai, and Phad Printed Textiles - Bagru, Sanganer, Ajrak, Kalamkari	
Chapter 4- Resist dyed textiles of India (Yarn and fabric) Ikat- Patola, bandhas, telia, Rumal, and Pochampalli Bandani, Bandhej, and Lehariya	
UNIT –3 Woven Textiles &Embroidery of India - Region, techniques, motifs, and styles	**14 hrs**
Chapter 5 - Woven textiles Sarees - Banaras, Jamdani and Baluchari, Paithani, Kanchipuram, Chanderi, Maheshwari Shawls - Kashmir, Kullu and Kinnaur, Himroo Floor coverings- carpets, rugs, and durries	

Chapter 6- Kashida, phulkari, Kutch and Kathiawar, Kasumi, chickankari, Kantha, Chamba Rumal, Pimpli applique, Lambadi, Manipuri	
UNIT 4 – Costumes and ornaments of India – Men and Women and Ornaments	**14 hrs**
Chapter 7- Jammu and Kashmir, Punjab, Haryana, Rajasthan, Gujarat, Maharashtra, West Bengal, Odisha, Assam, Uttar Pradesh, Bihar,	
Chapter 8 - Karnataka, Andhra Pradesh, Kerala, Tamil Nadu, Goa, Manipur, Nagaland, Odisha, West Bengal, Assam, Arunachal, Mizoram, Tripura, Madhya Pradesh.	

Pedagogy – Theory

Lecture, demonstration, hands-on learning through Assignment, ICT presentations, Group discussion, case studies, and workshops.

Formative Assessment: 20 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Assignment / Project	5+5
Total	THEORY 80 MARKS + 20 Marks =100

PRACTICAL

TRADITIONAL TEXTILES AND COSTUMES OF INDIA

Code: HSCP 5.1 **Total Marks: 50**

Hours: 42 **Practical Exams: 40**

Instruction hrs./week: 03 **Internal Assessment: 10**

1. Prepare samples for Kasuti, Embroidery of India /Kashida, Chamba Rumal, Phulkari, Chikankari, and Kantha.
2. Prepare samples for Embroidery of India/Gujarat, Manipuri, Gold and silver, Bead work.
3. Traditional textiles of India/ Preparation of portfolio with descriptive analysis.
4. Traditional textiles of India/ Preparation of portfolio with descriptive analysis

Formative Assessment:10 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	5
Class Performance	5
Total	Exam- 40MARKS + IA-10 Marks =50

References

1. Bhatnagar P. (2004), Traditional Indian Costumes and Textiles, Abhishek Publications, New Delhi
2. Chisti R.K., (2013) Sari tradition and beyond, Roli Publication
3. Ghurye G. S. (1995), Indian Costume, Popular Prakashan, Bombay
4. Irwin, J. H. & Hall, M. (1973). Indian Embroideries. Ahmedabad: Historic Textiles of India at Calico Museum of Textiles
5. Karolia, A. (2019), Traditional India Handcrafted Textiles: Techniques, Processes and Designs Vol.I and II, Niyogi books, Delhi
6. Pathak A. (2006), Indian Costumes, Roli Books, Mumbai
7. Saraf, D. N. (1982). Indian Crafts. New Delhi: Vikas Publishing House Limited.
8. Singh M. (2011). Traditional and Beyond Handcrafted Indian Textile, Roli Books Pvt. Ltd, New Delhi.

RESOURCE MANAGEMENT

Code: HSCT 5.2 **Total Marks: 100**

Hours: 56 **Theory Exams: 80**

Instruction hrs./week: 04 **Internal Assessment: 20**

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

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

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

Content	
Unit-I. Introduction to Resource Management	**14 HRS**
Chapter No. 1 Resources: Definition and Classification–Human and Non-Human Resources, Renewable and Non-Renewable resources, Energy conservation and sustainability	
Chapter No. 2 Management: Definition, types, process, Motivating factors-Values, goals, and standards. Managerial Process, Decision Making, and Problem Solving	
Unit-II. Resource management	**14 hrs**
Chapter No. 3 Money Management Budget plan, Account Keeping methods, Saving Process, and Practice	
Chapter No. 4 Time Management Time plan, Tools, Process, and practices Energy Management, Fatigue, Work Simplification	
Unit-III. Ergonomics	**14 hrs**
Chapter No. 5 Ergonomics – Concept, Definition, Objectives, Man-Machine and Environment, Occupational factors affecting the worker.	
Chapter No. 6– Anthropometry, Definition, Structural and Functional dimensions– Eye height, Elbow height, Sitting height, Shoulder and Elbow breadth, Thigh clearance and Popliteal height, Minimum Vertical and Horizontal reach.	
Unit-IV. Consumer Education	**14 hrs**
Chapter No. 7 Definition, objectives, and Purpose, Role of consumers in the economy, Types of consumer problems – products and service related, Causes and solutions	
Chapter No. 8 Consumer Protection, Consumer rights and responsibilities, Consumer Protection Act – Salient Features, Limitations and Guidelines for filing consumer complaints	

Pedagogy – Theory

Lecture, demonstration, hands-on learning through Assignment, ICT presentations, Group discussion, case studies, and workshops.

Formative Assessment: 20 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Assignment / Project	5+5
Total	THEORY 80 MARKS + 20 Marks =100

PRACTICAL
RESOURCE MANAGEMENT

Code: HSCP 5.2 **Total Marks: 50**

Hours: 42 **Practical Exams: 40**

Instruction hrs./week: 03 **Internal Assessment: 10**

1. Preparation of time plans for self.
2. Budget planning and banking procedures
3. Standards of Weights and Measures Act, 1976, ISI, BIS, FPO, AGMARK, ISO, Eco mark, Wool mark, Silk mark, Cotton mark, Handloom mark, BEE star labeling, FSSAI, Codex, HACCP, Food laws
4. Anthropometry and work simplification

Formative Assessment:10 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	5
Class Performance	5
Total	Exam- 40MARKS + IA-10 Marks =50

References:

1. Umesh Prasad, (2011). Essentials of Ergonomics. Sonali Publications, New Delhi

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

SEMESTER 6

INTERIOR DECORATION

Code: HSCT 6.1 **Total Marks: 100**

Hours: 56 **Theory Exams: 80**

Instruction hrs./week: 04 **Internal Assessment: 20**

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

1. To Learn about housing and its principles
2. To understand colour and its application in interiors
3. To apply elements and principles of design in interior decoration
4. To know about furniture, window treatment, and accessories in interiors

Content	
Unit–I Design Fundamentals	**14 HRS**
Chapter 1. Types of Design- Structural and Decorative, Naturalistic, Stylized, Geometric, Abstract	
Chapter 2 Elements of Art- Line, form, color, space, texture, Pattern, light	
Chapter 3. Principles of design- Harmony, Proportion, Balance, Rhythm, Emphasis	
Unit -II Colour and Colour Applications	**14 hrs**
Chapter 4-Dimension of color- Hue, Value, Intensity, Advancing and receding colors, cool and warm colors. Concept, Perception of Colors:- Prang color system- Primary, secondary, and Tertiary colors, color wheel. Color Harmonies- Related and Non-Related Color Harmonies, Factors considered while selecting colour schemes	
Unit -III Furniture and Window Treatment	**14 hrs**
Chapter 5- Factors to be considered in Selection, Principles of Furniture Arrangement, Furniture Arrangement for different rooms. Styles of Furniture and materials used to make furniture	
Chapter 6: Windows- Types of windows- casement, bay window, sliding window, awing window, picture window. Window treatment- Modes of Hanging Curtains- Cafe, Tier, Priscilla, Criss Cross, Glass, Pleated	
UNIT IV Accessories & Flower Arrangement	**14 hrs**
Chapter 7: Accessories – Definition, classification, types, importance, selection, and placements of accessories.	
Chapter 8: Flower Arrangement -styles and shapes, mechanics, care of cut flowers and foliage.	

Pedagogy – Theory

Lecture, demonstration, hands-on learning through Assignment, ICT presentations, Group discussion, case studies, and workshops.

Formative Assessment: 20 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Assignment / Project	5+5
Total	THEORY 80 MARKS + 20 Marks =100

PRACTICAL

INTERIOR DECORATION

Code: HSCP 6.1 **Total Marks: 50**

Hours: 42 **Practical Exams: 40**

Instruction hrs./week: 03 **Internal Assessment: 10**

I: Sketch different types of Design- Structural and Decorative design.

Illustrate the Elements of Art and Principles of Design

II: Illustrate Colour wheels, colour harmonies.

III: Furniture arrangement and Window treatment

IV: Flower arrangement

Formative Assessment:10 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	5
Class Performance	5
Total	Exam- 40MARKS + IA-10 Marks =50

References

1. Prathap Rao (2003). Interior Design Principles - Standard Publishers and Distributors, New Delhi.
2. Raja Rao and Subramanya (2003), Planning and Designing Residential Buildings - Standard Publishers and Distributors, New Delhi.

3. Sita Ram Premavathy, Pannuparveen (2005). Interior Design and Decoration - CBS Publishers, New Delhi.
4. Premlatha Mullick (2015). Textbook Of Home Science - Kalyani Publishers, New Delhi..

EXTENSION EDUCATION

Code: HSCT 6.2 **Total Marks: 100**

Hours: 56 **Theory Exams: 80**

Instruction hrs./week: 04 **Internal Assessment: 20**

Course Outcomes :

1. Understand the concept and principles of Extension Education
2. Familiarize with the teaching learning process
3. Know about the concept of community, Development, and Community Development
4. Become aware of the concept, methods, and media of communication

Content	
Unit I: Concept of Extension Education	**12 HRS**
Chapter 1: Definition, Meaning, Objectives, and Principles Types: Formal, Informal, and Non-Formal Education	
Chapter 2 Role and qualities of the extension facilitator Role of Home Science in Extension Education	
Unit 2: Teaching - Learning Process	**14 hrs**
Chapter 3: Teaching: Concept and Principles, Process Types: Trainee-Trainee-dominated method, Trainer-dominated method, Co-Operative method, Functional method Learning–Concept, Principles, Elements	
Chapter 4 Extension teaching methods – Roleplay, Workshop, and Game stimulation Motivation: Definition, Importance, and Functions. Value aspects of motivation – Intrinsic and extrinsic. Factors affecting motivation – Organic needs or physiological motives, wants, emotions as motives, feelings and attitudes as motives, and social motives.	
Unit 3: Communication	**14 hrs**
Chapter 5: Definition, Concept, Importance, Types, Elements, Functions, and Models of Communication	
Chapter 6: Process, Feedback, and Barriers of Communication.	

Unit 4: Methods and Media of Communication	**14 hrs**
Chapter 7- Methods: Individual and Group. Mass Media: Audio, Visual, Audio-Visual Classification of Audio-Visual aids: Audio Aids–Radio, Tape recorder, Telephone Visual Aids: i. Projected–Overhead projector, Slide projector, Camera ii. Non-Projected–Posters, Charts, FlashCards, Exhibitions, Printed materials	
Chapter 8 Audio-Visual Aids i. Projected–Television, Cinema ii. Non-Projected–Puppets, Drama/Street play/Theatre, Dance, Traditional media- Folk songs, Folk dance, Folk art, Folklore, Modern media	

Pedagogy – Theory

Lecture, demonstration, hands-on learning through Assignment, ICT presentations, Group discussion, case studies, and workshops.

Formative Assessment: 20 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Assignment / Project	5+5
Total	THEORY 80 MARKS + 20 Marks =100

PRACTICAL
EXTENSION EDUCATION

Code: HSCP 6.2 **Total Marks: 50**

Hours: 42 **Practical Exams: 40**

Instruction hrs./week: 03 **Internal Assessment: 10**

1. Prepare a plan of work and a calendar of events for an educational/awareness activity/programme.
2. Prepare audio-visual aids for conducting a programme

3. Organise educational/awareness activity using Roleplay/Workshop/Games simulation for a community by using the aids prepared in Ex. 2
4. Conduct a programme with the help of audio-visual aids using the group method of communication.

Formative Assessment:10 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	5
Class Performance	5
Total	Exam- 40 MARKS + IA-10 Marks =50

References:

1. Dahama. O. P. and O. P. Bhatanagar: Education and Communication for Development, 2nd Edition; Oxford and IBH Publishing Co. Pvt .Ltd, New Delhi, 1985
2. Khan. Somani, Fundamentals of Extension Education, Agrotech Publishing Academy, Udaipur,2009
3. Ray, G.L.: Extension Communication and Management, Naya Prakash, Calcutta,1999
4. Reddy, Extension Education, Bapatia, India, Srilakshmi Press,1987
5. Rodgers, Alan: Teaching methods in Extension Education for development, West Wood Row, Woodmans, 1989

Date

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

STRUCTURE OF B.SC. NUTRITION AND DIETETICS
AS ONE DISCIPLINE MAJOR
(Model II)

Curriculum titles for BSc Nutrition and Dietetics – I to VI Semesters

Semester	Course Code.	Category of course	Theory/ Practical	Credits	Paper Titles	Marks	
						S. A	I. A
I	NDT 1.1	Major	Theory	3	Fundamentals of Nutrition	80	20
	NDP 1.1	Major	Practical	2	Fundamentals of Nutrition	40	10
II	NDT 2.1	Major	Theory	3	Principles of Food Science and Preservation	80	20
	NDP 2.1	Major	Practical	2	Principles of Food Science and Preservation	40	10
III	NDT 3.1	Major	Theory	3	Nutrition through Life span	80	20
	NDP 3.1	Major	Practical	2	Nutrition through Life span	40	10
	NDT 3.2	Elective-1	Theory	2	Traditional Foods in Health	40	10
IV	NDT 4.1	Major	Theory	3	Human Physiology	80	20
	NDP 4.1	Major	Practical	2	Human Physiology	40	10
	NDT 4.2	Elective-2	Theory	2	Nutrition in Weight Management/ Food Adulteration	40	10
V	NDT 5.1	Major	Theory	3	Clinical Nutrition and Dietetics -I	80	20
	NDP 5.1	Major	Practical	2	Clinical Nutrition and Dietetics -I	40	10
	NDT 5.2	Major	Theory	3	Food Microbiology	80	20
	NDP 5.2	Major	Practical	2	Food Microbiology	40	10
VI	NDT 6.1	Major	Theory	3	Clinical Nutrition and Dietetics -II	80	20
	NDP 6.1	Major	Practical	2	Clinical Nutrition and Dietetics -II	40	10
	NDT 6.2	Major	Theory	3	Principles and Practices of Public Health Nutrition	80	20
	NDP 6.2	Major	Practical	2	Principles and Practices of Public Health Nutrition	40	10

SEMESTER 1

FUNDAMENTALS OF NUTRITION

Program Name	**B.Sc. Nutrition and Dietetics**		Semester	**I**
Course Title	**Fundamentals of Nutrition (Theory)**		Instruction/week	**4 hours**
Course No.	**NDT 1.1**	**DSC 1**	No. of Credits	**3**
Contact hours	**56 Hrs**		Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**20**		Summative Assessment Marks	**80**

Course Outcomes (COs)

1. To understand the basic concepts of nutrition and methods of cooking
2. To identify the essential nutrients and their functions
3. To learn the importance of macro and micronutrition in maintaining health across the life cycle

Content	**56 Hrs**
Unit – 1: Introduction to Nutrition	**16 hours**
Chapter-1: Concept of nutrition - nutrients, nutritional status, malnutrition, balanced diet & health, Functions of food, Food groups, Food pyramid – Indian and USDA, My plate, Preliminary preparation of food, Methods of enhancing nutritive value	
Chapter-2: Methods of cooking – Boiling, Steaming, Pressure cooking, Shallow frying, Deep fat frying, Baking,	
Chapter 3: Water: Functions, sources, and water balance	
Unit – 2: Macronutrients	**12 hours**
Chapter 4: Classification, Sources, Functions, and Deficiency of Carbohydrates, Proteins, and Fats	
Unit - 3 Energy Metabolism	**14 hours**
Chapter-5: Significance, components, factors influencing body composition, energy metabolism, BMR, Measurement methods – Direct and Indirect, Energy expenditure in activities, Influence of energy excess & deficit on body composition – obesity and undernutrition	
Unit – 4 Micro Nutrients - Sources, Functions, and Deficiency	**14 hours**

Chapter-6: Minerals: Calcium, Phosphorus, Iron, Iodine, Zinc Fat Fat-soluble vitamins (Vitamin A, D, E, K)	
Chapter-7: Water-soluble vitamins (B complex vitamins: Thiamine, Riboflavin, Niacin, Folic acid, and Vitamin C)	

Pedagogy

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

Assessment

Formative Assessment = 100 marks	
Assessment Occasion/type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL

FUNDAMENTALS OF NUTRITION

Course Title	**Fundamentals of Nutrition (Practical)**		Number of weeks	**16**
Course No.	**NDP 1.1**	**DSC 1**	No. of Credits	**2**
Contact hours	**42 hrs**		Hours per week	**3 Hours**
Internal Assessment Marks	**10**		Summative Assessment Marks	**40**

1.	Weights and measures
2.	Standardization of recipes
3.	Methods of cooking
	a. Water – boiling, steaming, pressure cooking
	b. Oil- Shallow frying, deep frying
	c. Baking
4.	Identification of nutrient-rich food

Assessment:

Formative Assessment: 20 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Assignment / Project	5+5
Total	THEORY 80 MARKS +IA 20 Marks =100

References

1. Raheena Begum (2009), A Textbook 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

SEMESTER 2

PRINCIPLES OF FOOD SCIENCE

Program Name	**B.Sc. Nutrition and Dietetics**		Semester	**II**
Course Title	**Principles of Food Science (Theory)**		Instruction/week	**4 hours**
Course No.	**NDT 2.1**	**DSC 2**	No. of Credits	**3**
Contact hours	**56 Hrs**		Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**20**		Summative Assessment Marks	**80**

Course Outcomes (COs):

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

Content	56 hrs
UNIT-1 Introduction to Food Science	**18 hrs**
Chapter 1: **Concepts of Food Science:** (a) Colloids - sols, gels, foam, and emulsions (b) Bound and free water (c) pH Value (d) Properties of water- osmosis and osmotic pressure, boiling, melting, and freezing points (e) Sensory Evaluation- Subjective and objective.	
Chapter 2: **Cereals & Millets**- importance, composition & types of cereals and millets Starch – Types, effect of cooking, Gelatinization, Retrogradation, and Dextrinization Malting, non-enzymatic reactions, Leavening agents	
Chapter 3: **Pulses-** composition, toxic constituents, and cooking of pulses, variety and processing	

Unit – 2 Fruit, Vegetable, Milk, and Egg Cookery	**18 rs**
Chapter 4: **Fruits and vegetables** – Classification, Composition, Pigments, Flavors, Changes during Cooking, and Enzymatic Browning.	
Chapter 5: **Milk and milk products**- composition, storage, processing of milk, coagulation & Milk products	
Chapter 6: **Egg-** structure, composition, storage, quality & grading, role of egg in food preparation, coagulation.	
Unit – 3 Sugar, Oil & fats and fleshy food cookery	**14 hours**
Chapter 7: **Sugar, Jaggery, and honey** - Composition, sugar and related products, Behaviors of syrups at different temperatures, Crystallization and caramelization.	
Chapter 8: **Oil and Fats-** Composition, storage, Refining and processing – Hydrogenation, plasticity, winterization & shortening of fats. Effect of heating, Rancidity, Specific fat (Lard, Butter, Margarine)	
Chapter 9: Fleshy foods **Meat** - Structure of meat, composition, Storage, post-mortem changes in meat, curing of meat, Tenderization, Aging of meat, Grading. **Fish and poultry**- Composition, preservation & storage	
Unit – 4 Food Preservation	**6 hours**
Chapter 10: Principles of Food Preservation, Scope, Objectives, and Food Spoilage Method of preservation by: a) low temperature b) high temperature c) dehydration d) food irradiation e) Drying	

Pedagogy

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

Assessment

Formative Assessment = 100 marks	
Assessment Occasion/type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL
PRINCIPLES OF FOOD SCIENCE

Course Title	**PRINCIPLES OF FOOD SCIENCE (Practical)**		Number of weeks	**16**
Course No.	**NDP 2.1**	**DSC 2**	No. of Credits	**2**
Contact hours	**42 hrs**		Hours per week	**3 Hours**
Internal Assessment Marks	**10**		Summative Assessment Marks	**40**

1.	Starch cookery I - microscopic observation of different starches' gel formation and gelatinization.
2.	Starch cookery II- Rice cookery, gluten formation, leavened & unleavened products.
3.	Pulse and legume cookery – Sprouting & effect of added substance.
4.	Fermented products
5.	Milk cookery – casein formation and curd setting.
6.	Vegetable cookery- Effect on pigments and enzymatic browning in fruits and vegetables
7.	Egg cookery
8.	Fat and oil cookery.
9.	Sugar and Jaggery- Syrup formation, crystallization, and caramelization.
10.	Sensory evaluation.

Assessment

Formative Assessment: 20 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Assignment / Project	5+5
Total	THEORY 80 MARKS +IA 20 Marks =100

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

SEMESTER 3

NUTRITION THROUGH LIFE SPAN

Program Name	**B.Sc. Nutrition and Dietetics**		Semester	**III**
Course Title	**Nutrition Through Life Span (Theory)**		Instruction/week	**4 hours**
Course No.	**NDT 3.1**	**DSC 3**	No. of Credits	**3**
Contact hours	**56 Hrs**		Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**20**		Summative Assessment Marks	**80**

Course Outcomes (COs):

1. Understand nutritional needs across different life stages by explaining the changing nutritional requirements from infancy to old age.
2. Apply nutrition guidelines for special conditions such as pregnancy, lactation, and aging.
3. Encourage proper dietary habits and lifestyle choices to prevent malnutrition and diet-related diseases.
4. Develop skills in diet counseling and nutritional education by providing personalized dietary recommendations for individuals at different life stages.

UNIT-1: Nutrition during Pregnancy and Lactation	**16 hours**
Chapter 1: Life cycle nutrition – Introduction, Concept, and Importance of nutrition at different life stages, Growth monitoring and Nutritional status, Recommended Dietary Allowances (RDA)and Estimated Average Requirement across different life stages, Factors influencing life cycle nutrition	
Chapter 2: Nutrition during Pregnancy and Lactation A) **Pregnancy** – Pre-conception nutrition, physiological changes, nutritional requirements, dietary guidelines, dietary habits, and food planning for pregnant women, nutrition-related problems in pregnancy, maternal weight gain, and complications – gestational diabetes, anemia B) **Lactation** – Physiology of milk production, nutritional requirements for lactating mothers, dietary guidelines, composition of breast milk, challenges in breastfeeding,	
UNIT-2: Nutrition during Infancy and Early Childhood (Pre-school)	**14 hours**
Chapter 3: **Infancy**–Physiological growth and development, nutritional needs, *Dietary requirements* – Breastfeeding – composition and its benefits, introduction to complementary feeding, N*utritional challenges*- feeding-related issues, growth	

and development, common infection and illness, Infants at risk	
Chapter 4: **Pre-School**–Growth during early childhood, nutritional needs and dietary requirements, *Nutrition problems* – malnutrition (Underweight, Overweight), PEM and Micronutrient deficiencies, Food allergies	
UNIT-3: Nutrition during Late childhood and Adolescence	**14 hours**
Chapter 5: **Late Childhood** – Physical growth and development, Food habits and nutritional requirement, school meal program, menu planningand healthy packed meal. *Common nutritional problems* – undernutrition, overweight and obesity, and micronutrient deficiencies	
Chapter 6: **Adolescence** – Growth and development, physiological changes during adolescence, nutritional requirements, *Common nutritional challenges* – nutritional deficiencies, eating disorders, Nutritional care during Teen pregnancy	
UNIT-4: Nutrition in Adults and Geriatrics	**12 hours**
Chapter 7: **Adulthood–** Nutritional needs in adulthood, factors influencing nutritional requirement, role of nutrition in work efficiency, balanced diet for adults, role of diet and exercise in Non-communicable Diseases. Preventive measures.	
Chapter 8: **Old age-** Physiological changes, nutritional requirements, common health issues, and altered nutritional care. Role of diet in healthy aging and longevity	

Pedagogy

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

Assessment

Formative Assessment = 100 marks	
Assessment Occasion/type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL

NUTRITION THROUGH LIFE SPAN

Course Title	**Nutrition Through Life Span (Practical)**		Number of weeks	**16**
Course No.	**NDP 3.1**	**DSC 3**	No. of Credits	**2**
Contact hours	**42 hrs**		Hours per week	**3 Hours**
Internal Assessment Marks	**10**		Summative Assessment Marks	**40**

1.	Plan a nutritionally balanced diet for different stages of the life span.
	a. Pregnant and Lactating women, b. Infants, Toddlers and Preschoolers, c. School children, Adolescents, d. Adults and elderly.
2.	Formulating and preparing complementary/supplementary foods,

Assessment

Formative Assessment: 20 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Assignment / Project	5+5
Total	THEORY 80 MARKS +IA 20 Marks =100

References:

1. Dietary guidelines for Indians (2024), ICMR - National Institute of Nutrition, Hyderabad, Telangana.
2. Webster-Gandy J., Madden A., and Holdsworth M. (2020). Oxford handbook of nutrition and dietetics, third edition, Oxford University press, United Kingdom.
3. Raymond J. L., and Marrow K. (2021). Krause and Mahan's Food and the Nutrition Care Process, 15th Edition, Elsevier publisher, Missouri.
4. Sharlin J., and Edelstein S. (2011). Essentials of life cycle nutrition, Jones and Bartlett Publishers, Canada.
5. Begum M. R. (2009). A textbook of foods, nutrition and dietetics, 3rd Edition, Sterling Publishers Private Limited, New Delhi.

TRADITIONAL FOODS IN HEALTH [ELECTIVE]

Program Name	**B.Sc. Nutrition and Dietetics**		Semester	**III**
Course Title	**Traditional foods in health (Theory)**		Instruction/week	**2 hours**
Course No.	**NDT 3.2**	**Elective**	No. of Credits	**2**
Contact hours	**24 Hrs**		Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**10**		Summative Assessment Marks	**40**

Course Outcomes (COs)

1. Understand the nutritional value and health benefits of traditional foods.
2. Recognize the cultural and regional significance of traditional foods.
3. Understand the Role of Traditional Foods in Sustainability and Food Security
4. Develop Skills for Community-based Food Awareness and Promote the Use of Traditional Foods in Modern Contexts

Content	**24 Hrs**
Unit – 1: Introduction to Traditional Foods	**8 hrs**
Chapter 1: History of Indian foods and food ethos. Traditional and modern methods of processing foods - advantages and disadvantages, methods of nutrient conservation, significance to health. Integrating Tradition into Modern Nutritional Strategies for Optimal Health	
Unit – 2: Traditional Food Environment	**6 hrs**
Chapter 2: Traditional Food Environment - Factors affecting traditional food environment, Traditional Indian food dietary patterns, the changing Indian diets - major drivers of transformation,	
Unit – 3: Indian Cuisine	**6 hrs**
Chapter 3: Indian cuisine- history, culture, religious and dietary considerations, dietary rules and etiquette, regional cuisines, beverages, snacks and sweets	
Unit – 4: Staples, Spices, and Herbs	**4 hrs**
Chapter 4: Trends in consumption of various staples, spices, and herbs and their nutritional and medicinal value. Traditional festive foods, functional properties of traditional foods	

Pedagogy

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

Assessment

Formative Assessment = 100 marks	
Assessment Occasion/type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

Reference textbooks

1. Achaya K T. Indian Food Historical Companion, Oxford University Press, New Delhi. 1998.
2. Raghunatha Suri's Bhojanakutahalam. Edited and Translated by Institute of Ayurveda and Integrative Medicine (I-AIM), FRLHT, Bangalore.

SEMESTER IV

HUMAN PHYSIOLOGY

Program Name	**B.Sc. Nutrition and Dietetics**		Semester	**IV**
Course Title	**Human Physiology (Theory)**		Instruction/week	**4 hours**
Course No.	**NDT 4.1**	**DSC 4**	No. of Credits	**3**
Contact hours	**56 Hrs**		Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**20**		Summative Assessment Marks	**80**

Course Outcomes (COs)

1. Describe the structure and functions of the major organ systems of the human body
2. Explain the physiological mechanisms that maintain homeostasis
3. Illustrate the process of digestion, absorption, and metabolism of nutrients
4. Apply knowledge of human physiology to identify common physiological disorders

Content	56 hours
Unit 1: An introduction to the Human body	**14 hours**
Chapter 1: Definition of physiology and anatomy, structural organization of the human body, Cell- cell organelles and their function, Fluid Mosaic Model.	
Chapter 2: Tissue types (epithelial, connective, skeletal, muscle, and cardiac tissue)-structure and function, bone-structure and classification	
Unit 2: Cardiovascular system and Respiratory system	**14 hours**
Chapter 3: Blood – Components (plasma, WBC, RBC, and platelets), coagulation of blood, Blood groups, and Rh factor Heart- structure and function of Blood Vessels, Blood Pressure	
Chapter 4: The Respiratory System- Organs and Structures of the Respiratory System, the process of breathing, and gas exchange	
Unit 3 Digestive system and Excretory system	**14 hours**
Chapter 5: Digestive system- structure and function of organs of the Gastrointestinal tract, process of digestion, absorption, and assimilation.	
Chapter 6: Excretory system- Structure and function of kidneys, structure of nephron, physiology of urine formation	
Unit 4 Nervous system and Endocrine system	**14 hours**
Chapter 7: Structure and functions of neuron, Brain and spinal cord- structure and function, Types of nervous system	
Chapter 8: Endocrine system- Hormones and glands, Structure and function of endocrine glands (pituitary, thyroid, parathyroid, pancreas, and adrenal gland)	

Pedagogy

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

Formative Assessment = 100 marks	
Assessment Occasion/type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL

HUMAN PHYSIOLOGY

Course Title	**Human Physiology (Practical)**		Number of weeks	**16**
Course No.	**NDP 4.1**	**DSC 4**	No. of Credits	**2**
Contact hours	**42 hrs**		Hours per week	**3 Hours**
Internal Assessment Marks	**10**		Summative Assessment Marks	**40**

1	Identification of tissue slides – epithelial tissues, neurons, muscular tissues, Cardiac tissues, blood
2	Blood grouping and Rh typing
3	Estimation of haemoglobin- Sahili's method
4	Determination of body temperature, pulse rate and heart rate, and blood pressure
5	Visit to the physiology/pathology units.

Assessment

Formative Assessment: 20 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Assignment / Project	5+5
Total	THEORY 80 MARKS +IA 20 Marks =100

REFERENCES:

1. John, N. A. (2018). *CC Chatterjee's Human Physiology*. CBS Publishers & Distributors Private Limited
2. Sembulingam, K., & Sembulingam, P. (2012). *Essentials of medical physiology*. JP Medical Ltd.
3. Waugh, A., & Grant, A. (2010). Ross & Wilson anatomy and physiology in health and illness. Elsevier Health Sciences

NUTRITION IN WEIGHT MANAGEMENT [ELECTIVE]

Program Name	**B.Sc. Nutrition and Dietetics**		Semester	**IV**
Course Title	**Nutrition in Weight Management (Theory)**		Instruction/week	**2 hours**
Course No.	**NDT 4.2**	**Elective**	No. of Credits	**2**
Contact hours	**24 Hrs**		Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks		**10**	Summative Assessment Marks	**40**

Course outcomes (Cos):

1. **Understand energy balance and metabolism** – Learn how the body uses and regulates energy.
2. **Analyze nutrient roles in weight management** – Examine how food and hydration affect metabolism and weight.
3. **Apply diet and lifestyle strategies** – Develop practical approaches for healthy weight management.

Content	**24 hours**
Unit 1: Energy Balance and Metabolism	**12 hrs**
Chapter 1: Macronutrient metabolism: Metabolism of Carbohydrates, protein, and Fat. Factors influencing metabolism, Role of Macronutrients in weight management.	**7 hrs**
Chapter 2: Energy balance, Components of energy expenditure: BMR, TEF, physical activity. Methods to measure energy use	**5 hrs**
Unit 2: Diet and Lifestyle for Weight Management	**12 hrs**
Chapter 3: Overweight and Obesity - classification, Causes, health risks,	**4 hrs**
Chapter 4: Popular weight management diets.Meal timing, portion control, and mindful eating.Meal planning and Physical activity for weight control.	**8 hrs**

Pedagogy

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

Assessment

Formative Assessment = 100 marks	
Assessment Occasion / Type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marsks + 20 Marks = 100 marks**

Reference:

1. Mahan, L. K., & Raymond, J. L. (2017). *Krause's food & the nutrition care process* (14th ed.). Elsevier.
2. Gropper, S. S., & Smith, J. L. (2022). *Advanced nutrition and human metabolism* (8th ed.). Cengage Learning.
3. Summerfield, L. M. (2015). *Nutrition, exercise, and behavior: An integrated approach* (3rd ed.). Cengage Learning.
4. Bray, G. A., & Bouchard, C. (Eds.). (2019). *Handbook of obesity* (2nd ed.). CRC Press.

SEMESTER V

CLINICAL NUTRITION & DIETETICS – I

Program Name	**B.Sc. Nutrition and Dietetics**		Semester	**V**
Course Title	**Clinical Nutrition and Dietetics – I (Theory)**		Instruction/week	**4 hours**
Course No.	**NDT 5.1**	**DSC - 5**	No. of Credits	**3**
Contact hours	**56 Hrs**		Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**20**		Summative Assessment Marks	**80**

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

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

Content	56 Hrs
Unit – 1: Introduction to diet therapy	**24 Hrs**
Chapter 1: Introduction to Diet therapy – objectives. Nutrition assessment in a clinical setup, Nutrition Care Process- (ADIME). Role of a dietician, responsibilities, and code of ethics.	
Chapter 2: Therapeutic meal planning - factors to be considered, food groups, exchange list. Types of hospital diet: modification of the normal diet to a therapeutic diet.	
Chapter 3: Food sensitivity and Allergies **-** Definition, diagnosis, and Nutrition management	
Unit – 2: Dietary Management in Febrile and Lifestyle Diseases	**14 Hrs**
Chapter 4: Weight management: Underweight and Overweight - etiology, risk factors, assessment, and dietary management.	
Chapter 5: Infections and febrile conditions: host defense mechanism, Dietary management in acute and chronic fever – typhoid, malaria, tuberculosis.	
Unit – 3: Dietary Management in Gastrointestinal, Hepatic-biliary, and Genetic Diseases	**18 Hrs**
Chapter 6: Gastrointestinal disorders: Diarrhoea, Constipation, GERD, Peptic ulcers, Irritable Bowel Syndrome, Inflammatory Bowel Disease (Lactose intolerance and gluten intolerance) - etiology, risk factors, dietary management.	

Chapter 6: Liver & biliary system: Viral hepatitis, Cirrhosis, cholecystitis, cholelithiasis, acute & chronic pancreatitis - etiology, risk factors, dietary management.	
Chapter 7: Inborn errors of metabolism – PKU, Galactosemia, GSD, MSUD	

Pedagogy

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

Assessment

Formative Assessment = 100 marks	
Assessment Occasion/type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL

CLINICAL NUTRITION AND DIETETICS I

Course Title	**Clinical Nutrition and Dietetics (Practical)**		Number of weeks	**16**
Course No.	**NDP 5.1**	**DSC 5**	No. of Credits	**2**
Contact hours	**42 hrs**		Hours per week	**3 Hours**
Internal Assessment Marks		**10**	Summative Assessment Marks	**40**

	Diet planning in:
1	Typhoid
2	Tuberculosis
3	GI Condition- peptic ulcer, lactose, and gluten intolerance
4	Overweight/obesity
5	Underweight
6	Cirrhosis
7	Hepatitis

Assessment

Formative Assessment: 20 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Assignment / Project	5+5
Total	THEORY 80 MARKS +IA 20 Marks =100

References:

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

FOOD MICROBIOLOGY

Program Name	**B.Sc. Nutrition and Dietetics**		Semester	**V**
Course Title	**Food Microbiology (Theory)**		Instruction per week	4
Course No.	**NDT 5.3**	**DSC 6**	No. of Credits	**3**
Contact hours	**56 Hrs**		Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**20**		Summative Assessment Marks	**80**

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

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

Content	**56 Hrs**
UNIT – 1: Introduction to Microbiology	**18 Hrs**
Chapter No. 1: Food Microbiology: its origins - historical roots, Germ	

theory of Disease.	
Chapter No.2: Bacteria, Fungi, and viruses - Naming, Classification, and identification, morphological characteristics. **Microbial growth**-Growth and cell division, Bacterial Growth.	
UNIT – 2: Growth and Death of Microorganisms; Food Safety System	**18 Hrs**
Chapter No. 3: Factors affecting the growth of micro-organisms-Temperature, water activity, pH, oxygen, Redox, and nutritional factors. **Factors affecting the death of microorganisms: Microbial Death-**Death of microorganisms and microbial populations –Heat preservation of foods, Chemical agents, and Radiation.	
Chapter 4: Food Safety Assurance System and Tools - FSSAI, HACCP, GMP, GHP, SOP, SSOP	
UNIT -3: Role of Food Microbes; Food Spoilage And Food-Borne Disease	**20 Hrs.**
Chapter 5: Food Spoilage and Food-borne disease - Nature, Causes, Contamination, Changes in foods caused by spoilage organisms. **Spoilage of important food commodities and food products**- Cereals, Milk, Fruits and Vegetables, Meat, Fish, Eggs	
Chapter 6: Food-borne disease – Cause of disease, investigations, and origins of food poisoning outbreaks. **Food poisoning** - caused by Bacteria, viruses, and Fungi.	
Chapter 7: Microorganisms in fermented foods- Fermented-baked food preparations, Fermented vegetable foods, dairy products, economically important fermentation products (Beer & Wine).	

Pedagogy

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

Assessment

Formative Assessment = 100 marks	
Assessment Occasion/type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

FOOD MICROBIOLOGY

Course Title	**FOOD MICROBIOLOGY (Practical)**		Number of weeks	**16**
Course No.	**NDP 5.2**	**DSC 6**	No. of Credits	**2**
Contact hours	**42 hrs**		Hours per week	**3 Hours**
Internal Assessment Marks	**10**		Summative Assessment Marks	**40**

1	An observation of Good Microbiological Laboratory Practice (GMLP)
2	a. Stained preparations – identification of fungi b. Preparing a smear, a Simple stain, and Differential stain (Gram's staining method)
3	Sterilization and disinfection- Use of autoclave
4	Preparation of fermented products and analyzing of Fermented products
5	Case studies – quality operation cycle of commercial kitchen / College canteen / Safe food-waste disposal strategies/Disinfection and sanitation measures
6	Visit to the Food Manufacturing Industry/Commercial Kitchen to understand the HACCP process.

Assessment

Formative Assessment: 20 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Assignment / Project	5+5
Total	THEORY 80 MARKS +IA 20 Marks =100

References:

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

SEMESTER VI

CLINICAL NUTRITION AND DIETETICS – II

Program Name	**B.Sc. Nutrition and Dietetics**		Semester	**VI**
Course Title	**Clinical Nutrition and Dietetics – II (Theory)**		Instruction per Week	**4**
Course No.	**NDT 6.1**	**DSC-7**	No. of Credits	**3**
Contact hours	**56 Hrs**		Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks	**20**		Summative Assessment Marks	**80**

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

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

Content	**56 Hrs**
Unit – 1 Nutritional counseling, Nutrition support, and drug-nutrient interaction	**22 Hrs**
Chapter No. 1: Nutritional counseling – objectives, importance, process.	
Chapter No. 2: Enteral and parenteral nutrition: access routes, formulation, challenges, indications, and contraindications.	
Chapter No. 3: Nutrient & drug interactions: Effect of drug on food intake; food and nutrients on drugs.	
Unit – 2: Dietary management in Metabolic and Renal diseases	**16 Hrs**
Chapter No. 4: Diabetes: Classification, Risk factors, Diagnosis, Complications, Dietary management – Type 1 & Type 2.	
Chapter No. 5: Renal: Etiology, Dietary management – Glomerulonephritis, nephrotic syndrome, chronic kidney disease, dialysis, renal calculi.	
Chapter No. 6: Cancer: Risk factors, prevention, and dietary management.	
Unit -3: Dietary management in Critical care and Cardiovascular diseases	**18 Hrs**
Chapter No. 7: Starvation, Stress, Trauma. Burns – Assessment, Fluid and electrolyte repletion, nutrition management.	
Chapter No. 8: Cardiovascular disorder: Atherosclerosis, Dyslipidemia, hypertension – etiology, risk factors, dietary management.	

Pedagogy

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

Assessment

Formative Assessment = 100 marks	
Assessment Occasion/type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL

CLINICAL NUTRITION & DIETETICS II

Course Title	**Clinical Nutrition & Dietetics – II (Practical)**		Number of weeks	**16**
Course No.	**NDP 6.1**	**DSC 7**	No. of Credits	**2**
Contact hours	**42 hrs**		Hours per week	**3 Hours**
Internal Assessment Marks		**10**	Summative Assessment Marks	**40**

1	Survey on nutrition supplement – enteral and parenteral formula tube feeding
2	Type 2 Diabetes
3	Type 1 DM (carbohydrate counting)
4	Planning an antioxidant-rich recipe for cancer
5	Chronic kidney disease
6	Renal Calculi
7	Hypertension

Assessment

Formative Assessment: 20 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10

Assignment / Project	5+5
Total	THEORY 80 MARKS +IA 20 Marks =100

References:

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

PRINCIPLES AND PRACTICES IN PUBLIC HEALTH NUTRITION

Program Name	**B.Sc. Nutrition and Dietetics**		Semester	**VI**
Course Title	**Principles and Practices in Public Health Nutrition (Theory)**		Instruction/week	**4 hours**
Course No.	**CND 6.2**	**DSC 8**	No. of Credits	**3**
Contact hours	**56 Hrs**		Duration of SEA/Exam	**3 Hours**
Formative Assessment Marks		**20**	Summative Assessment Marks	**80**

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

1. Understand the definition, utility, and applications of epidemiology in nutritional sciences.
2. Understand the multifaceted nature of problems in public nutrition.
3. Gain an understanding of the food and nutrition security in India
4.

Content	**48 Hrs**
Unit – 1: Concept of Public Health and Nutritional Epidemiology	**12 Hrs**
Chapter No. 1: **Introduction** to Nutritional Epidemiology and Public Health Nutrition. Scope and principles of Public Health Nutrition – Definition, aims, and objectives. Multidisciplinary nature of public nutrition, Role of the public nutritionist.	
Chapter No. 2: **National and International agencies in community nutrition**- Role of	

WHO, UNICEF, FAO, WORLD BANK, ICMR, NIN.	
Unit – 2: Nutritional problems, their implications, and ongoing nutrition programmes	**12 Hrs**
Chapter No. 3: Etiology, prevalence, clinical features, and preventive strategies of Protein energy malnutrition; Dual Nutrition Burden: i. Undernutrition and Overnutrition, Nutritional Anemia, Vitamin A deficiency, Iodine deficiency disorders, Obesity, coronary heart disease, Diabetes Mellitus.	
Chapter No. 4: National Nutrition Policy and Programmes - Integrated Child Development Services (ICDS) Scheme, Midday Meal Programme (MDMP). **National Programmes -** for prevention of Anaemia, Vitamin A deficiency, Iodine Deficiency Disorders, National Programme for Prevention and Control (NPCDCS), POSHAN Abhiyaan 2.0.	
Unit -3: Nutrition Assessment; Security and Education	**16 Hrs**
Chapter No. 5: **Nutrition Assessment – DIRECT Methods –** Anthropometric (Body Height, Weight, MUAC), Biochemical, Clinical, Dietary Assessment (Induvidual:24-Hr Recall, FFQ; Family Dietary Survey), Standards (NCHS – Weight-for-height, Weight-for-age).	
Chapter No. 6: **Food and Nutrition Security:** Basic Concepts & Policies. Overview of National Food Security Act and the ongoing public sector programmes for improving food and nutrition security- PDS, AAY, APS	
Unit -4: Nutrition Education	**8 Hrs**
Chapter No. 8: **Nutrition Education:** Objectives, principles, and scope of nutrition and health education and promotion. Framework for planning nutrition promotion and education programs for the public information, education, and communication. Purpose, advantage, and constraints of nutrition education	

Pedagogy

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

Assessment

Formative Assessment = 100 marks	
Assessment Occasion/type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRINCIPLES & PRACTICES IN PUBLIC HEALTH NUTRITION

Course Title	**Principles & Practices In Public Health Nutrition (Practical)**		Number of weeks	**16**
Course No.	**NDP 6.2**	**DSC-8**	No. of Credits	**2**
Contact hours	**42 hrs**		Hours per week	**3 Hours**
Internal Assessment Marks		**10**	Summative Assessment Marks	**40**

1	Study and compilation of the latest NFHS, DHS, and Comprehensive Nutrition Survey data for vulnerable groups (vital statistics).
2	Assessment of nutritional status in a community set-up: • Anthropometry – weight, height, and MUAC measurements, comparison with standards, and interpretation • Plotting and interpretation of growth charts for children • Identification of clinical signs of common nutritional deficiencies • Dietary assessment – FFQ, 24 hour diet recall and diet diversity using standardized tools
3	Preparation of a communication material (booklets, digital) for nutrition promotion.
4	Planning and demonstration of low-cost recipes using locally available ingredients to combat nutrition deficiencies.
5	Planning and conducting nutrition education sessions in the community
6	Visit to an ongoing nutrition and health promotion programme (ICDS, MDM, IYCF practices). Report writing on field visit

Assessment

Formative Assessment: 20 MARKS	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Assignment / Project	5+5
Total	THEORY 80 MARKS +IA 20 Marks =100

References:

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

Date

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

STRUCTURE OF

B.Sc. CLINICAL NUTRITION AND DIETETICS

AS A MAJOR SUBJECT

(Model IV)

Contents of Courses for B.Sc. Clinical Nutrition and Dietetics as a Major Subject
Model IV C

Semester	Course code.	Course Category	Theory/ Practical	Credits	Paper Title	Marks	
						S. A	I.A
I	CNDT 1.1	DSC- 1	Theory	3	Principles of Nutrition	80	20
	CNDP 1.1		Practical	2	Principles of Nutrition	40	10
	CNDT 1.2	DSC- 2	Theory	3	Essentials of Macronutrients	80	20
	CNDP 1.2		Practical	2	Essentials of Macronutrients	40	10
	CNDT 1.3	DSC- 3	Theory	3	Food Sanitation and Hygiene	80	20
	CNDP1.3		Practical	2	Food Sanitation and Hygiene	40	10
II	CNDT 2.1	DSC - 4	Theory	3	Human Physiology	80	20
	CNDP 2.1		Practical	2	Human Physiology	40	10
	CNDT 2.2	DSC- 5	Theory	3	Essentials of Micronutrients	80	20
	CNDP 2.2		Practical	2	Essentials of Micronutrients	40	10
	CNDT 2.3	DSC- 6	Theory	3	Food Safety and Security	80	20
	CNDP2.3		Practical	2	Food Safety and Security	40	10
III	CNDT3.1	DSC - 7	Theory	3	Life Cycle Nutrition	80	20
	CNDP 3.1		Practical	2	Life Cycle Nutrition	40	10
	CNDT 3.2	DSC- 8	Theory	3	Dietetics I	80	20
	CNDT 3.2		Practical	2	Dietetics I	40	10
	CNDT 3.3	DSC- 9	Theory	3	Nutritional Biochemistry	80	20
	CNDP3.3		Practical	2	Nutritional Biochemistry	40	10
	CNDT- OE	OE-1	Theory	2	Traditional Foods in Health	80	20
IV	CNDT 4.1	DSC-10	Theory	3	Dietetics II	80	20
	CNDP 4.1		Practical	2	Dietetics II	40	10
	CNDT 4.2	DSC- 11	Theory	3	Community Nutrition	80	20
	CNDP 4.2		Practical	2	Community Nutrition	40	20
	CNDT 4.3	DSC- 12	Theory	3	Nutrition and Physical Fitness	80	20
	CNDP 4.3		Practical	2	Nutrition and Physical Fitness	40	10
	CNDT-OE	OE-2	Theory	2	Nutrition in Weight Management	80	20

V	CNDT 5.1	DSC- 13	Theory	3	Dietetics III	80	20
	CNDP 5.1		Practical	2	Dietetics III	40	10
	CNDT 5.2	DSC- 14	Theory	3	Food Science	80	20
	CNDP 5.2		Practical	2	Food Science	40	10
	CNDT 5.3	DSC- 15	Theory	3	Physiologic & Metabolic changes in Disease	80	20
	CNDP 5.3		Practical	2	Physiologic & Metabolic changes in Disease	40	10
	CNDT 5.4	DSE- 1	Theory	3	Nutrigenomics & Nutraceuticals/ Geriatric Nutrition	80	20
	CNDT 5.5	VOC - 1	Theory	3	Culinary Science	80	20
	CNDT 5.5		Practical	2	Culinary Science	40	10
VI	CNDT 6.1	DSC- 16	Theory	3	Dietetics IV	80	20
	CNDP 6.1		Practical	2	Dietetics IV	40	10
	CNDT 6.2	DSC- 17	Theory	3	Functional Foods	80	20
	CNDP 6.2		Practical	2	Functional Foods	40	10
	CNDT 6.3	DSC- 18	Theory	3	Food Service Management	80	20
	CNDP 6.3		Practical	2	Food Service Management	40	10
	CNDT 6.4	DSE- 2	Theory	3	Nutrition Counselling/ Diabetes Management	80	20
	CNDT 6.5	VOC - 2	Theory	3	Information and Communication Technology	80	20
	CNDP 6.5		Practical	2	Information and Communication Technology	40	10

B.SC CLINICAL NUTRITION AND DIETETICS SEMESTER 1
PRINCIPLES OF NUTRITION

Code: CNDT 1.1 **Total Marks: 100**
Hours:52 **Theory: 80**
Instruction hrs./week: 04 **Internal Assessment :20**

Programme Outcomes:

1. To understand the importance of nutrition.
2. To understand the nutrition facts and principles.

CONTENT	52 Hrs
Unit–1 INTRODUCTION	**18 Hrs**
Chapter 1: Understanding Technologies. Food, nutrition, health, nutrients, nutritional status, malnutrition-undernutrition, over nutrition, nutrition and optimum, diet, diet therapy, therapeutic nutrition.	
Chapter Kilo calorie, joule, diet diversity, body mass index, daily values, nutrition density	
Chapter: 3 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.	
Chapter 4 Recommended Dietary Allowance (RDA) General Principles of Deriving RDA, Use of Recommended Dietary Allowances (RDA's), Limitations of RDAs, Balanced diet, use of Food Exchange List. Food Pyramid, My Plate, Basic of menu planning for family.	
Unit – 2: ENERGY	**17 HRS**
Chapter: 1 Definition, units of energy, energy value of food. Components of energy requirement, factors affecting energy requirements, methods of measuring energy expenditure.	
Chapter:2 RMR, Physical Activity Level (PAL), BMR, factors affecting B.M.R, determination of BMR by calculation (Harris Benedict).	
Chapter:3 Energy needs of the body (reference man and reference woman), Energy requirement during work, thermic effect of food, SDA	

Chapter:4 Human body composition – Methods of assessment (direct and indirect), Changes in body composition during life cycle.	
Unit – 3 FOOD PREPARATION AND HEALTH	**17Hrs**
Chapter:1 Selection of foods, preliminary preparation of food, principles of cooking, methods of cooking - Boiling, Steaming, Pressure cooking, Microwave oven,	
Chapter:2 Frying (shallow, deep fat), Smoking point of oil, Combination method, methods of cooking: advantages and disadvantages.	
Chapter:3 Effect of cooking on nutritive value, methods of enhancing nutritive value, Nutrition and Health- Inter-relationship between food, nutrition, and health.	
Chapter:4 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
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

Practical

Credits: 02		**Total Marks: 50**
Course Code: CNDP 1.1	**Practical:40**	**Internal: 10**
Hours /week -02		**14 classes**

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

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.
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B.SC CLINICAL NUTRITION AND DIETETICS SEMESTER 1

ESSENTIALS OF MACRO NUTRIENTS

Code: CNDT 1.2 **Total Marks: 100**
HOURS: 56
Theory: 80
Instruction hrs. /week: 04 **Internal Assessment :20**

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

CONTENT	52Hrs
Unit–1 CARBOHYDRATES	**18Hrs**
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	**10Hrs**
Unit – 2 PROTEINS	**17Hrs**
Chapter No.3: Proteins: Composition, classification of proteins and amino- acids, functions, digestion, absorption and metabolism, Requirements and Sources, Effects of deficiency, Deficiency Diseases	
Unit–3 LIPIDS	**17 Hrs**
Chapter No.4: Lipids: Classification, functions, digestion, absorption and metabolism, Sources and Requirements - SFA, MUFA, PUFA: functions and deficiency, Role of fatty acids, Trans Fatty Acids, dietary guidelines	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICALS

Credits -02
14 CLASSES
Code: CNDP 1.2
Total Marks: 50
No of hours per week -03 **Practical: 40**
Internal Assessment: 10

1.	Planning and preparation of energy dense recipes
2.	Planning and preparation of low energy recipes
3.	Planning and Preparation of low Glycaemic index recipes. Calculation of Glycaemic index and Glycaemic load
4.	Planning and preparation of high & low fibre recipes
5.	Planning and preparation of protein dense recipes
6.	Planning and preparation of low protein recipes
	References:
1.	Shubhangaini A Joshi, (2010), Nutrition and Dietetics, with Indian case studies, Tata McGraw-Hill, NewDelhi
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5.	Longvah T Anathan R, Bhaskar chary K, and Venkaiah k (2017) Indian food composition table, NIN. ICMR Hyderabad
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SEMESTER 1

FOOD SANITATION AND HYGIENE

Course Code: CNDT 1.3 **Total Marks: 100**
Hours: 56 **Theory: 80**
Instruction hrs./week: 04 **Internal Assessment :20**

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

CONTENT	52 Hrs
Unit–1 INTRODUCTION	**17Hrs**
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.	**9 Hrs**
Unit–2 PURCHASE AND HYGIENE	**17Hrs**
Chapter No.3: Purchasing and Storage - Choosing a supplier, Inspection Procedures, Receiving and Inspecting Specific Food, Storage - General Storage	**7 Hrs**

Guidelines, Types of Storage, storing specific food, storage techniques - dry food storage, refrigerated storage, freezer storage. **Chapter No.4:** Hygiene in Service **-** Hygiene procedures in food preparation, holding and display food for service, serving food safely, off-site services, hot holding of foods, Safe use of left - over food, hygiene in food service, protective display of food. Storage and disposal of waste – Classification of waste, methods of disposal.	**10 Hrs**
Unit – 3 CLEANING AND SANITATION	**18 Hrs**
Chapter No.5: Cleaning and Sanitation - Sanitation Standards for Equipment, installing and maintaining kitchen equipment, Cleaning and Sanitizing - Cleaning vs. Sanitizing, **Chapter No: 6** 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.	**18 Hrs**

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL

Course Code: CNDTP 1.3

Credits: 02 Total Marks: 50 Practical's: 40
Internal: 10

Hours per week: 2 14 classes

- Market survey of cleaning and sanitizing agents (2classes)
- Hand washing technique e(2classes)
- Visit to food catering unit to study hygiene and sanitary practices (2classes
- Use of food sanitation checklist-food preparation and handling practices, personal practices, service. (4classes)
- Preparation of module and training of Group D staff in hygiene and sanitation (4classes)

References

1. De Vries. (1997) Food Safety and Toxicity, CRC, NewYork.
2. Lawley, R., Curtis L. and Davis, J. (2004) The Food Safety Hazard Guidebook, RS Cpublishing.
3. Mario Stanga, Sanitation: Cleaning and Disinfection in the Food Industry, Wiley, 2010.
4. Marriott, Norman G. (1985). Principles of Food Sanitation, AVI, New YorkUSA.
5. Norman G. Marriott, Principles of sanitation, Van Nostrand Reinhold Company, New York.1985.
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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.

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SEMESTER 2

HUMAN PHYSIOLOGY

Course Code: CNDT 2.1 **Total Marks: 100 Hours: 56**

Theory: 80
Instruction hrs. /Week: 04 **Internal Assessment :20**

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

SEMESTER 2

CONTENT	52 HRS
UNIT 1- Basic Cells and Tissues	16 Hrs
Chapter:1	8
Structure and Function of Cell, Physiological properties of protoplasm. Levels of cellular organization and function – cell organelles.	
Chapter: 2	8
Tissues - Structure and functions and types of epithelial, connective, muscular and nervous tissue	

Unit – 2 - Organ system Chapter:3 **Digestive System -** Digestive system: Review of structure (Physiology) and function - Secretory, Digestive and Absorptive functions. Functions and structure of mouth pharynx, oesophagus, stomach, intestine and intestinal villi. Liver, pancreas and gall bladder and their dysfunction Digestive glands	20 Hrs 4
Chapter: 4 **Circulatory System –** Blood: Properties, formation, composition and functions. Formation and function of plasma proteins, erythropoiesis. Blood groups. Composition & functions of CSF and Lymph structure & functions of heart, blood vessels – Physiological aspects, Blood pressure.	5
Chapter: 5	5
Respiratory system - Outlined structure of respiratory system, Primary function of respiratory system, Mechanism of respiration, Transport of gases. Role of lungs in the exchange of gases, Transport of oxygen and CO2.	
Chapter:6	5
Excretory System - Structure and functions of nephron, glomerular filtration, tubular absorption and secretion. Urine formation - Role of kidney in maintaining pH of blood	
Chapter: 7	5
Nervous System: structure and function of neuron - conduction of nerve impulse, synapses, and role of neurotransmitters Central and Peripheral nervous system,	

Unit – 3	16 Hrs
Chapter: 8	4
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.	
Chapter: 9	4
Reproductive System and Endocrine System -Male reproductive system – Structure and functions. Spermatogenesis. Female reproductive system – Structure and functions. Oogenesis. Menstrual cycle, Puberty, Menopause.	
Chapter: 9	4
Endocrinology-Functions of hormones of the Endocrine Glands – Hypothalamus, Pituitary Gland, Thyroid, parathyroid, thymus, adrenal ovaries and testes.	
Chapter: 10	4
Immune System - Organs and cells of Immune system, Primary and secondary Lymphoid organs. Immunity– Definition, Types-immunity, cell mediated and humoral immunity.	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL: Human Physiology

Course Code: CNDP 2.1

Credit-02 **14 classes**

Total Marks: 50 **Practical: 40** **Internal: 10**

1. Microscopic study of tissues- Epithelial, connective, and muscle tissues
2. Demonstration of human blood for RBC and WBC count
3. Estimation of haemoglobin by Sahli's 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 meth
7. Pulse, B.P and respiratory rate at rest and after exercises

References

1. Human Physiology by CC. Chatterjee, 11th edition (1985)
2. Essentials of Medical physiology by K Samb lingam, 3rd edition,2005
3. The Cell, Copper, Geoffery, M., Oxford University Press (2001)
4. Textbook of Biochemistry with Clinical correlations; Thomas Devlin [Ed.] (1997), Wiley –Liss.
5. Lehninger- Principles of Biochemistry; DL Nelson and MM Cox [Eds), 6th Edn. Macmillan Publications(2012).
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8. Principles of Biochemistry: General Aspects, Smith et al., [Ed.] (1986) McGrawHill.
9. Human Biochemistry, Orten and Neuhans, 10th Edn. Mosbey International,(1983).
10. Review of Medical Physiology, Gannong, W.F.15th Edn., Maruzen Asial,(1991).

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SEMESTER 2

Essentials of Micronutrients

Course Code: CNDT 2.2 **Total Marks: 100 Hours: 56** **Theory: 80**
Instruction hrs. /Week: 04 **Internal Assessment :20**

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

CONTENT	**52 Hrs**
Unit –1 – Vitamins	**17 Hrs**
Chapter:1 Definition and classification Fat soluble vitamins - Physiological functions, Sources, Requirements, Deficiency and Hypervitaminosis of Vitamin A, D, E and K.	9
Chapter:2 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	8

Unit – 2 – Minerals	**18 Hrs**
Chapter: 3 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	9
Chapter: 4 Trace Elements - Distribution in the body, Functions, Sources and requirement and Effects of Deficiency of Vanadium, Silicon, Boron, Nickel, Lithium, Lead, Cadmium, Sulphur.	9
Unit – 3 – Water and Electrolytes	**17 Hrs**
Chapter: 5 Water – Importance, distribution in the body, functions of water and sources, water intake and loss. Dehydration, edema.	9
Chapter: 6 Electrolytes - Types, sources, composition of body fluids, maintenance of fluid and electrolyte balance and imbalance	8

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

Practical

Course Code: CNDP 2.2

Credits-2 **14 classes**

Total Marks: 50 **Practical: 40** **Internal: 10 No of hours/week -03**

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

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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.
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B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 2

Food Safety and Security

Course Code: CNDT 2.3 **Total Marks: 100 Hours: 56 Theory: 80**
Instruction hrs. /Week: 04 **Internal Assessment :20**

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 adulterants.
3. Awareness of Additives.

CONTENT	52 Hrs
Unit –1	**20 Hrs**
Chapter: 1 Food Safety - definition of food safety and food spoilage, factors affecting food safety and food spoilage: GMP, GAP, SSOP, GHP, food adulteration - definition, types of adulteration in various foods- intentional, incidental, and metallic contaminants	**5**
Chapter: 2 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.	**5**
Chapter: 3 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,	**5**
Chapter: 4 International Laws and Agreements - FAO, WHO, Codex Alimentarius, WTO, JECFA, APEDA, ISO 22000 series, Hazard Analysis Critical Control Point (HACCP): principles of HAACP, applications of HACCP 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,	**5**

Unit – 2	**16 Hrs**
Chapter: 5 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.	
Unit – 3	**16 Hrs**
Chapter: 6 Food Additives -meaning and types, Contamination of Food; Non nutritional Constituents and food safety-naturally occurring microbial, farm processing, radioactive fallout. Animal food additives, Additives and food safety	8
Chapter: 7 Food borne diseases and prevention -Food poisoning, Food infection, Food Toxins	8

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICALS

Course Code: CNDP 2.3

Credits -2 Total marks: 50

Practicals: 40 Internals: 10

Hours /week -02 1 4 Classes

1. Detection of adulterants of in common foods
   a) Physical methods b) chemical methods
2. Preparation of a resource file on food additives and food toxins.
3. Nutrition labelling: Collection and interpretation.
4. HACCP for the preparation of any food.
5. Visit to food quality control Laboratory.

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.
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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.
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SEMESTER 3

LIFE CYCLE NUTRITION

Course Code: CNDT 3.1 **Total Marks: 100 Hours: 56** **Theory: 80**
Instruction hrs. /Week: 04 **Internal Assessment :20**

Content	
Unit– I Nutrition in pregnancy and lactation	
Chapter: 1 Pregnancy: Physiologic changes during pregnancy, nutritional requirements and dietary guidelines, gestational weight gain, dietary problems, complications during pregnancy, adolescent pregnancy, pre - conceptional nutrition. **Chapter:2** Lactation: Physiology of lactation, composition of breast milk, importance of breast feeding, advantages and disadvantages of breast feeding, factors affecting breast feeding, lactogogues, nutritional requirement and dietary guidelines,	15Hrs 8 7
Unit-II-Nutrition- pediatrics	
Chapter: 3 Infancy: Nutritional requirements and dietary guidelines, Growth and development, Types of feeding– breast feeding, formula feeding, complementary feeding, failure to thrive in infants. **Chapter: 4** Pre-school and school age: Nutritional requirements and dietary guidelines, Importance of breakfast and packed lunch, factors influencing food intake, nutritional problems.	15Hrs 8 7
Unit-III Nutrition in adolescents, adult, and geriatrics	
Chapter: 5 Adolescents: Physiological changes during puberty, nutritional requirements, and dietary guidelines, eating disorders,	15Hrs 5

Chapter: 6 Adults: Nutritional requirements and dietary guidelines, importance of weight management. **Chapter: 9** Geriatrics: Physiological changes during old age, Nutritional requirements and dietary guidelines, nutritional problems.	5 5

Formative Assessment=20marks	
Assessment Occasion/type	**Weightage in Marks**
Test1	10
Assignment +Project	5+5
Total	80marks (SA)+20 marks=100 marks

Practical-2 Credits **No. of Classes- 12**

Course Code: CNDP 3.1

Total Marks: 50 **Practical: 40** **Internal: 10**

Plan, prepare and evaluate

1. A day's diet for Pregnant Women
2. A day's diet for Lactating Women
3. Complementary food suitable for Infants.
4. Packed Lunch for School Children.
5. Nutrient dense recipes for Adolescents.
6. A day's diet for Adult Women.
7. A day's diet for Adult Men.

References	
1	Chadha Rand Mathur P, Nutrition: A life cycle Approach. Orient Black swan New Delhi,2015.
2	Seth Vand Singh KN, Diet Planning through lifecycle: Part1 Normal Nutrition .A Practical Manual, Elite Publishing House Pvt .Ltd. New Delhi,2006.
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B.SC. CLINICAL NUTRITION AND DIETETICS SEMESTER 3

DIETETICS-I

Course Code: CNDT 3.2 **Total Marks: 100 Hours: 56** **Theory: 80**
Instruction hrs. /Week: 04 **Internal Assessment :20**

Course Outcomes (COs):

By the end of the course, students will be able to:

1. Understand the scope and principles of dietetics.
2. Assess the nutritional status of clients/ patients.
3. Identify different types of hospital diets and feeding methods.
4. Design dietary interventions for weight management and febrile conditions.

UNIT-I **15hrs**

Chapter No:1 **5hrs**

Introduction to Dietetics
The dietitian responsibilities, code of ethics, Definition and objectives of diet therapy.

Chapter No: 2 **4hrs**

Medical nutrition therapy. Factors to be considered in planning therapeutic diets**.**

Chapter No:3 **6hrs**

Routine hospital diets-NPO, Liquid diet-clear liquid diet, full liquid diet, soft diet. Special feeding methods (Enteral and Parenteral)

UNIT-II **15Hrs**

Chapter No: 4 **9hrs**

Nutrition in Febrile conditions: Infection-Host defence mechanisms, causes, types, metabolic changes during infection, nutritional management.

Chapter No: 5 **6hrs**

Fever-types of fevers-long term- typhoid, TB, malaria and short term- dengue, covid and chikungunya. Metabolic changes in diseases.

UNIT-III **22Hrs**

Chapter No: 6 **5hrs**

Nutrition in Weight Management: body components, assessment: BMI,

WHR, Energy imbalance: Underweight, over weight and obesity.

Chapter No:7 **5hrs**

Obesity-Classification, theories, aetiology, risk factors, nutritional management and dietary modifications.

Chapter No: 8 **6hrs**

Role of hormones in control of appetite and weight management-action of Leptin, Ghrelin,

Insulin, Estrogen, Neural and Hormonal count, other types of peptide hormones.

Chapter No: 9 **6hrs**

Underweight-Classification, aetiology, risk factors, nutritional management and dietary modifications.

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

Course Code: CNDP 3.2

Practical

Credits: 2 **Total Marks: 50** **Practical: 40** **Internal: 10**

Hours/ week- 03 **14 classes**

1. Planning and preparing of routine hospital diets- clear fluid, full-fluid, soft diet, bland diet and blenderized diet.
2. A day's diet for Typhoid.
3. A day's diet for Tuberculosis.
4. High calorie and high protein recipes for Febrile conditions.
5. Therapeutic recipes (micronutrient rich) for infections
6. A day's low-calorie diet for obese person.
7. A day's high calorie diet for underweight person.

Reference:

- B. Srilakshmi (2019). *Dietetics.* New Age International Publishers.
- Swaminathan, M. (2002) Food and Nutrition, Volume I& II, The Bangalore printing and Publishing Company Ltd.
- Bamji, M.S, Reddy, V. (1998), Textbook of Human Nutrition, Oxford & IBH Publishing Co, New Delhi. Gibney M.J, Elia M Ljingquist. O (2005), Clinical Nutrition, Blackwell Science Publishing Co.
- Shubhangini A Joshi, (2021), Nutrition and Dietetics, with Indian case studies, Tata McGraw- Hill, New Delhi.

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SEMESTER 3

NURITIONAL BIOCHEMISTRY

Course Code: CNDT 3.3 **Total Marks: 100 HOURS: 56**

Theory: 80

Instruction hrs. /Week: 04 **Internal Assessment:20**

Content	45 Hrs
Unit–I Macronutrients	
Chapters: 1 Carbohydrates: Classification, Caloric value, Recommended daily allowances, Dietary sources, Functions, Digestion, absorption and storage, metabolism of carbohydrates, Malnutrition: Deficiencies and Overconsumption. **Chapter: 2** Protein: Classification, Caloric value, Recommended daily allowances, Dietary sources, Functions, Digestion, absorption and storage, metabolism of carbohydrates, Malnutrition: Deficiencies and Overconsumption. **Chapter: 3** Fat: Classification, Caloric value, Recommended daily allowances, Dietary sources. Functions, Digestion, absorption and storage, metabolism, Malnutrition: Deficiencies and Overconsumption	15Hrs
Unit-II-Fat soluble vitamins and Water-soluble vitamins	

Chapter: 4 Classification, Recommended daily allowances, Dietary sources, Functions, Absorption, synthesis, metabolism storage & excretion, Deficiencies, Hypervitaminosis **Chapter:5** Water and electrolytes: Daily requirements, regulation of water metabolism, distribution of body water, Maintenance of fluid & electrolyte balance, Over hydration, dehydration and water intoxication, Electrolyte imbalances.	15Hrs
Chapter: 6 Macro and microminerals: Classification, Recommended daily allowances, Dietary sources Functions, Absorption, synthesis, metabolism storage & excretion, Deficiencies, Over Consumption and toxicity	
Unit-III Carbohydrates Metabolism	
Chapter: 7 Introduction to metabolism, Metabolism of glucose (glycolysis), fructose and galactose; Metabolism of pyruvate and lactate; Metabolism of acetyl CoA (TCA cycle **Chapter: 8** energetic of glucose metabolism, Synthesis of ribose (HMP Shunt); Synthesis of glucose from non carbohydrates (gluconeogenesis); Metabolism of Glycogen- Glycogenesis and Glycogenolysis	15Hrs

Formative Assessment=20marks	
Assessment Occasion/type	**Weightage in Marks**
Test1	10
Assignment+ Project	5+5
Total	**80marks (SA)+20marks=100 marks**

Course Code: CNDTP 3.3

Credits-2 **No. of Classes-12**

Total Marks: 50 **Practical: 40** **Internal: 10**

- Preparation of phosphate and citrate buffers. 2 Hours
- Qualitative tests for Carbohydrates. 2 Hours
- Qualitative tests for amino-acids-Calculation of chemical score 2 Hours
- Estimation of Blood Sugar levels: RBS, FBS, GTT 2 Hours
- Estimation of HB level. 2 Hours

References	
1	Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2000): 25th Ed. Harpers Biochemistry. Macmillan Worth Publishers.
2	Nelson, D.L. and Cox, M.M. (2000): 3rd Ed. Lehninger's Principles of Biochemistry, Macmillan Worth Publishers.
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8	King, E.J. and Wootton, I.D.P. (1956). 3rd ed. Micro-Analysis in Medical Biochemistry. J and A Churchill Ltd.
9	Plummer,D.T.(1987).3rded.AnIntroductiontoPracticalBiochemistry.McGraw-HillBookCo.

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SEMESTER 3

TRADITIONAL FOODS AND HEALTH

Course Code: CNDT-OE **Total Marks: 100 HOURS: 56**
Instruction hrs. /Week: 02 **Internal Assessment :20**

Content	24 HRS
Unit–I Introduction to Traditional foods	**17Hrs**
Chapter No: 1 Definition of Traditional foods, food as religious and cultural symbols; importance of food in understanding human culture - variability, diversity. **Chapter No:2** Indian traditional foods and cuisine: History and evolution. Specialty ingredients in regional cuisines – herbs, extract, spices, masala powders and cooking oils of different regions. **Chapter No: 3** Geographical Indication (GI) tag for traditional foods. **Chapter No: 4** **Health Aspects of Traditional Foods**: Comparison of traditional foods with typical fast foods / junk foods – cost, food safety, nutritional facts, and benefits; traditional foods used for specific ailments /illnesses, emotional benefits.	5Hrs 5hrs 3hrs 4hrs
Unit-II-Traditional Food Patterns	**17Hrs**
Chapter No: 5 Typical breakfast, meal, and snack foods of different regions of India. Regional foods that have gone Pan Indian / Global. **Chapter No: 6** Popular regional foods; Traditional fermented foods, pickles and preserves, beverages, snacks, desserts and sweets, street foods.	7Hrs 6hrs

Chapter No: 7 Regional cuisines of India- Traditional foods of south Indian, north Indian, west Indian and east Indian cuisine.	4hrs
Unit-III Commercial production of Traditional foods	**18hrs**
Chapter No: 8 Processing and manufacture of traditional foods-paneer, butter and ghee manufacture. **Chapter No: 9** Commercial production and packaging of traditional beverages such as tender coconut water, Neera, lassi, buttermilk, dahl. **Chapter No: 10** Commercial production of intermediate foods–ginger and garlic pastes, tamarind pastes, masalas (spice mixes), idli and dosa batters.	7Hrs 7hrs 4hrs

Formative Assessment:	
Assessment Occasion/type	**Weight age in Marks**
Assignment/Seminar	5+5
Project	10
Total	20Marks

References	
1	Sen, Colleen Taylor Food Culture in India Greenwood Press, 2005.
2	Davidar, Ruth N. Indian Food Science: A Health and Nutrition Guide to Traditional Recipes: East West Books, 2001
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7	Al-Khusaibi, M., Al-Habsi, N., & Rahman, M. S. (Eds.). (2019). Traditional Foods: History, Preparation, Processing and Safety. Springer Nature.
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9	Galanakis, C. M. (Ed.). (2019). Innovations in traditional foods. Woodhead Publishing.

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SEMESTER 4

DIETETICS-II

Course Code: CNDT 4.1 **Total Marks: 100 HOURS: 56**

Theory: 80

Instruction hrs./ Week: 03 **Internal Assessment:20**

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

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

UNIT-I	**10Hrs**
Chapter No:1	**5hrs**
Diet in Gastro Intestinal Disorders- Pathophysiology and MNT for indigestion.	
Chapter No: 2	**5hrs**
Peptic ulcer, constipation, diarrhoea, lactose intolerance, gluten enteropathy, irritable bowel syndrome	
UNIT-II	**20Hrs**
Chapter No: 3	**8hrs**
Diabetes Mellitus: Definition, types (IDDM, NIDDM, GDM, MODY) aetiological classification, aetiology, symptoms, tests (blood and urine)- GTT, RBS, FBS, PPBS, HbA1C (Normal and abnormal values)	
Chapter No: 4	**6hrs**
Nutritional dietary management of IDDM, NIDDM and GDM, use of food exchange list, glycaemic index, and glycaemic load of foods.	
Chapter No: 5	**6hrs**
Carbohydrate counting, carbohydrate load, Oral hypoglycaemic drugs. Insulin-long acting, short acting and Intermittent acting. Physical activity.	

UNIT-III	22Hrs
Chapter No: 6	**8hrs**
Hypertension-aetiology, risk factors, symptoms, types, nutritional and dietary management, role of physical activity.	
Chapter No: 7	**8hrs**
Cardiovascular disorders- aetiology, risk factors, nutritional and dietary management.	
Chapter No: 8	**6hrs**
Atherosclerosis-role of fat in the development of atherosclerosis, Congestive heart failure.	
Chapter No: 9	**6hrs**
Dyslipidaemia and importance of physical activity.	

Formative Assessment:	
Assessment Occasion/type	**Weightage in Marks**
Assignment/Seminar	5+5
Project	10
Total	20Marks

Practical

Course Code: CNDP 4.1

Credits: 2 **Total Marks: 50** **Practical: 40** **Internal: 10**

Hours/ week- 02 **14 classes**

1. A day's diet for Peptic Ulcer
2. A day's diet for Constipation
3. A day's diet Diarrhoeal condition
4. A day's diet for NIDDM
5. A day's diet for GDM
6. A day's diet for Hypertension
7. A day's diet for Atherosclerosis
8. A day's diet for Renal disorders

Reference:

- B. Srilakshmi (2019). *Dietetics.* New Age International Publishers.
- Swaminathan, M. (2002) Food and Nutrition, Volume I& II, The Bangalore printing and Publishing Company Ltd.
- Bamji, M.S, Reddy, V. (1998), Textbook of Human Nutrition, Oxford & IBH Publishing Co, New Delhi.
- Gibney M.J, Elia M Ljingquist. O (2005), Clinical Nutrition, Blackwell Science PublishingCo.
- Shubhangini A Joshi, (2021), Nutrition and Dietetics, with Indian case studies, Tata McGraw-Hill, New Delhi
- Mahan, L. K., & Raymond, J. L. (2017). *Krause's food & the nutrition care process* (Fourteenth edition). Elsevier.

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SEMESTER 4

COMMUNITY NUTRITION

Course Code: CNDT 4.2 Total Marks: 100 HOURS: 56 Theory: 80
Instruction hrs. / Week: 03 Internal Assessment :20

Content	
Unit–I Introduction	
Chapter No: 1	17Hrs
Meaning and scope of community nutrition; Multidisciplinary approach of public health nutrition	4
Chapter: 2	
Concept of food security, nutrition security, nutrition monitoring, nutrition surveillance health economics, epidemiological studies, nutritional epidemiology.	4
Chapter: 3	
Malnutrition: etiology, prevalence, vicious cycle of malnutrition, economics of malnutrition. Major Nutritional problems: Prevalence at national and international level; Prevention and control of: Vitamin A deficiency, IDD, Anaemia	5
Chapter: 4	4
Coronary heart disease, Hypertension, Diabetes Mellitus, Diarrhoea, low birth weight, Child, and maternal malnutrition; Prevalence of Zn and Cu deficiency.	
Unit-II-Nutrition policy and programs	
Chapter: 5	17Hrs
National nutrition policy: need for nutrition policy, policy strategies and their implementations.	5
Chapter: 6	
National Nutrition programs- Objectives and functions of National Anaemia prophylaxis programs; Vitamin A prophylaxis programs; Goiter control program; ICDS; SNP; ANP	6
Chapter: 7	
Sustainable development goals; National nutrition policy-Aims, Short term and long-term intervention, implementation, Vision for the 21st century.	

Unit-III Organizations to combat malnutrition	
Chapter:8 Objectives and functions, National organizations concerned with Food and Nutrition-ICMR, NIN, CFTRI, DFRL, NIPCCD	15Hrs 4
Chapter: 9	
International organizations concerned with Food and Nutrition-FAO, WHO, UNICEF, WORLD BANK	4
Chapter-10 Approaches and strategies for improving nutritional status and health: Health–based interventions, Food–based interventions including fortification and genetic improvement of foods, supplementary feeding, Nutrition education for behaviour change, e environmental sanitation.	7

Formative Assessment:	
Assessment Occasion/type	**Weightage in Marks**
Assignment/Seminar	5+5
Project	10
Total	20Marks

Course Code: CNDP 4.2

Credits-2 **No. of Classes-12**

Total Marks: 50 **Practical: 40** **Internal: 10**

Plan, prepare and evaluate

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

References	
1	Bamji SM, Rao NP and Reddy V, Textbook of human nutrition, oxford and IBH publishing co., NewDelhi.
2	Gopalan C, Combating undernutrition-basic issues and practical approaches, Nutrition Foundation of India,1987.
3	Gopalan C, Women and nutrition in India, NFI, NewDelhi,1992.
4	JelliffeD.D.1966.The assessment of Nutritional Status of the Community. WHO, monographseries.
5	Jelliffe D.D.1966.The assessment of Nutritional Status of the Community. WHO, monographseries.
6	Michael. J.G, Barrie. M.M: Public health nutrition, Black well publishing, 2005.
7	Nweze Eunice Nnakwe., Community Nutrition – planning health promotion and disease prevention., Jones and Bartlett publishers, 2009.
8	Park. K, Park's textbook of preventive and social medicine., 12th edition. M/S Banarsi das bhanot publishers,2009.
9	Reddy V, PrahladRaoN,SastryGandNathKK,NutritiontrendsinIndia,Hyderabad,NIN,1993

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SEMESTER 4

NUTRITION IN PHYSICAL FITNESS

Course Code: CNDT 4.3 **Total Marks: 100 HOURS: 56 Theory: 80**
Instruction hrs. / Week: 03 **Internal Assessment: 20**

Content	17 Hrs
Unit–I Introduction to body composition	
Chapter No: 1	4
Definition of physical fitness: Benefits of Fitness, Components of fitness, Conditioning by training -overload and principle.	
Chapter No: 2	
Body's response to physical activity-Weight training, cardiorespiratory conditioning, muscle conditioning, Physical activity pyramid Balanced fitness program.	4
Chapter No: 3	4
Human Body Composition: Significance of studying body composition, two compartment and multiple compartment models.	
Chapter No: 4	
Methods of Assessment: Nutritional Anthropometry, BOD, POD, Bioelectric impedance, DEXA, Whole body K counter. Factors affecting body composition: Age, Body Weight, physical activity.	5
Unit-II Macro Nutrients	18Hrs
Chapter No: 5	6
Carbohydrate as an energy source for sport and exercise, Carbohydrate store. Fuel for aerobic and anaerobic metabolism. Glycogen re-synthesis, CHO Loading, CHO composition for pre-exercise, during and recovery period.	
Chapter No.6	6
Role of fat as an energy source for sports and exercise. Fat stores, regulation of fat metabolism, factors affecting fat oxidation (intensity duration, training status, CHO feeding), effect of fasting and fat ingestion.	

Chapter No.7	
Protein and amino acid requirements. Factors affecting protein turn over, protein requirement and metabolism during endurance exercise, resistance and recovery process. Protein supplement**.**	8
Unit-III Important micronutrients for exercise	
Chapter No: 8 Role of Vitamins and specific minerals needs during exercise, Dehydration, Exercise induced oxidative stress and role of antioxidants**.** **Chapter No. 9** Female athletic triad, sports anaemia, dietary supplements and ergogenic Aids (nutritional, pharmacological and physiological). Popular and famous ergogenic aids-Anti doping agency-list of banned drugs/substances.	17Hrs 6 6
Chapter No: 10 Physical activity pyramid Yoga and meditation in health: Effect of Yoga and meditation on physical and mental health	5

Formative Assessment:	
Assessment Occasion/type	**Weightage in Marks**
Assignment/Seminar	5+5
Project	10
Total	20Marks

Course Code: CNDP 4.3

Credits-2 **No. of classes-12**

Total Marks: 50 **Practical: 40 Internals: 10**

1. A survey (online) on types of exercise including Aerobics, spinning, Tai Chi, Yoga, Power yoga, weight training, strength training, Circuit training, etc. 2 Classes
2. Determination of physiological age of a person 2 Classes
3. A study of equipment commonly used in Fitness Industry, their advantage and limitation (Visit to a fitness centre)
4. Plan and prepare a (day's diet, pre game and post-game) for

   a) Athlete b) Marathon runner 2 Classes
5. Plan energy bar/sports drink for a sports person to be consumed during the game.

   2 Classes
6. To study the body composition of obese and normal person 2 Classes
7. Plan a diet and exercise chart for a obese adolescent girl. 2 Classes.

References	
1	Melvin H Williams(2005) Nutrition for Health, Fitness and Sports 7th Edn
2	Mahan LK and Ecott-Stumps (2000) Krause's Food, Nutrition and Diet Therapy, 10th edn, WB Saunders Ltd
3	Whitney and Rolfers SR (1999) Understanding Nutrition, 8th Edn West / Wads worth, An International Thomson Publishing Company
4	Jayaprakash. C. S 2003 Sports Medicine, Jaypee brother's medical publishers (P) ltd New Delhi.

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SEMESTER -4

NUTRITION IN WEIGHT MANAGEMENT

Course Code: CNDT OE **Total Marks: 100**
HOURS:56 **Theory: 80**
Instruction hrs. / Week: 02 **Internal Assessment: 20**

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

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

UNIT-I **17Hrs**

Chapter No: 1 **5hrs**
Health Definition, Balanced diet-factors affecting food intake. Food groups and serving**.**

Chapter No:2 **5hrs**
My Plate, Classification of macro and micro nutrients.

Chapter No: 3 **4hrs**
Functions, food sources and deficiency of nutrients.

UNIT-II

17Hrs

Chapter No:4 **5hrs**
Weight management-over weight, underweight.

Chapter No: 5 **5hrs**
Ideal body weight. BMI, dietary guidelines and health hazards-overweight and underweight.

Chapter No:6 **5hrs**
Role of physical activity in weight management.

UNIT-III **18Hrs**

Chapter No: 7 **6hrs**
Important micronutrients for exercise, components of physical fitness, health benefits of fitness.

Chapter No: 8 **6hrs**
Types of physical activity- structured and unstructured, physical activity pyramid.

Chapter No:9 **6hrs**
Yoga and meditation in health: Effect of Yoga and meditation on physical and mental health.

Formative Assessment=20marks	
Assessment Occasion/type	**Weightage in Marks**
Test1	10
Assignment +Project	5+5
Total	80marks (SA)+20 marks=100 marks

REFERENCES:

1. Melvin. H. Williams(2005). Nutrition for health, fitness and sports 7th Edn
2. Mahan.L.K and Ecott-Stumps (2000) Krause's food, nutrition and diet therapy, 10thEdn. W.B. Saunders Ltd.
3. Whitney and Rolfers.S.R(1999) Understanding Nutrition, 8th Edn West/Wadsorth, An International Thomson Publishing Company.
4. Jayaprakash. C.S 2003, Sports Medicine, Jaypee brother's medical Publishers (P)Ltd New Delhi.

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SEMESTER 5

DIETETICS-III

Course Code: CNDT 5.1 **Total Marks: 100 HOURS: 56**

Theory: 80

Instruction hrs. / Week: 03 **Internal Assessment: 20**

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

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

Unit-I **12Hrs**

Chapter: 1 **3hrs**

Liver disorders, aetiology, types, symptoms, dietary management of non-alcoholic fatty liver disease.

Chapter No:2 **5hrs**

Jaundice, viral hepatitis, cirrhosis and gall bladder disorders-aetiology, types, symptoms, dietary management of cholecystitis, choledocholithiasis, and cholelithiasis,

Biliary dyskinesia, Sclerosing cholangitis.

Chapter No: 3 **4hrs**

Pancreatic disorders-aetiology, types, symptoms, dietary management of acute and chronic pancreatitis and cystic fibrosis.

UNIT-II **13Hrs**

Chapter No: 4 **6hrs**

Renal disorders, aetiology, symptoms, dietary management, acute and chronic renal failure. Glomerulonephritis, Nephrosis.

Chapter No: 5 **7hrs**

Renal Calculi, Chronic kidney diseases (CKD), End stage renal disease, Dialysis, Renal transplantation.

UNIT-III **12Hrs**

Chapter No: 6 **4hrs**

Genetic disorders: Introduction to inborn errors of metabolism, common disorders-phenyl ketonuria, galactosemia, fructosuria, and maple syrup urine disease.

Understanding metabolic pathways and their disruption, and dietary management.

Chapter No: 7 **2hrs**

Genetic disorders affecting nutrient digestion and absorption-cystic fibrosis and pancreatic insufficiency.

Chapter No:7 **4hrs**

Celiac diseases and gluten-related disorders, Lactose intolerance and other carbohydrate malabsorption disorders, dietary modification and enzyme replacement therapy.

Chapter No: 8 **2 hrs**

Rheumatic disease-Osteoarthritis, Rheumatoid arthritis, Gout-aetiology, symptoms, dietary management, lifestyle modification.

UNIT-IV **15Hrs**

Chapter No:9 **4hrs**

Food Allergy- Introduction to food allergy and food intolerance, Immunology and Pathophysiology of food allergy, common food allergens diagnosis of food allergies and intolerances, management and

treatment of food allergies.

Chapter No: 10 **5hrs**

Food sensitivity types of reactions, foods involved in sensitivity. Lactose intolerance, gluten sensitivity, and other common intolerances, mechanism and symptoms, diagnosis and management strategies, special considerations and dietary planning.

Chapter No: 11 **6hrs**

Nutrient and Drug Interactions: Effect of drug on food intake, digestion, absorption, transportation and excretion.

Course Code: CNDP 5.1

Practical topics – 2 credits **13-15 weeks**

Total Marks: 50 **Practical: 40** **Internal: 10**

Plan, prepare and evaluate:

1. A day's diet for Cirrhosis (case profile)
2. A day's diet for Hepatitis (case profile)
3. Recipes for cholelithiasis
4. Recipes for acute pancreatitis
5. A day's diet for Nephrotic syndrome (case profile)
6. Prepare a list of low, medium and high Potassium foods Recipes for PKU (adult)
7. Recipes for Osteoarthritis / Rheumatoid arthritis (case profile)
8. A day's diet for Gout and list of low-purine foods (case profile)

Formative Assessment=20marks	
Assessment Occasion/type	**Weightage in Marks**
Test1	10
Assignment +Project	5+5
Total	80marks (SA)+20 marks=100 marks

Reference:

- B. Srilakshmi (2019). *Dietetics.* New Age International Publishers.
- Swaminathan, M. (2002) Food and Nutrition, Volume I& II, The Bangalore printing and Publishing Company Ltd.
- Bamji, M.S, Reddy, V. (1998), Textbook of Human Nutrition, Oxford & IBH Publishing Co, New Delhi.
- Gibney M.J, Elia M Ljingquist. O (2005), Clinical Nutrition, Blackwell Science Publishing Co.
- Shubhangini A Joshi, (2021), Nutrition and Dietetics, with Indian case studies, Tata McGraw-Hill, New Delhi
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SEMESTER 5

FOOD SCIENCE

Course Code: CNDT 5.2 Total Marks: 100 HOURS: 56 Theory: 80
Instruction hrs. / Week: 03 Internal Assessment: 20

Unit-I	08 hours
Chapter No:1 **Introduction to food science** Food science: Definition, importance and scope of food science. **Chapter No:2** Sensory evaluation- Factors affecting the acceptability of food, Selection of taste panel, Subjective and objective tests **Chapter No: 3** Bound and free water, Colloids, Emulsions-Types and factors affecting stability, pH **Chapter No: 4** Osmosis, Freezing point.	
Unit- II	22 hours
Chapter No:5 Study of cereals and pulses • Structure and composition of cereals, processing of cereals and pulses • Gelatinization of starch and factors affecting • Role of ingredients in baking, dough formation, factors affecting dough formation and gluten formation **Chapter No: 6** • Toxic constituents • Fruits and Vegetables • Classification and composition	

Chapter No: 7 • Pigments-Classification, Changes during cooking and factors affecting it • Enzymatic browning and prevention Fats and Oils • Physical and chemical properties • Rancidity • Changes during frying • Factors affecting fat absorption **Chapter No: 8** Sugar cookery and leavening agents • Stages of sugar cookery • Crystallization and factors affecting it • Non-enzymatic browning	

Unit- III
Chapter No: 9 Milk and milk products: Composition and Nutritive value of milk, properties of milk, Milk cookery, effect of heat on milk, Nutritional importance of milk, milk products -Non fermented and fermented products- Role of milk in cookery. **Chapter No: 10** Meat, Fish, poultry and Eggs: Meat: Structure, composition and nutritive value, post-mortem changes in meat, tenderization, curing and sessions. Cooking of meat and changes during cooking, Grades of meat **Chapter No:11** Fish and Poultry: composition and nutritive value, Cooking, Fish products. Egg: Structure and composition, Changes during cooking, Storage, effect of heat on proteins, egg products.
Unit- IV

Sensory evaluation – selection of panel of judges, preparation of samples, types – f tests, judging and results- Objectives methods, subjective methods.

Food Preservation and Processing: Studying various food processing techniques and preservation methods to enhance food quality and extend shelf life to maintain nutritional content.

Food Packaging: Food packaging in preserving food quality, preventing spoilage, and maintaining product integrity during storage and transportation.

Shelf life studies: actors that affect the shelf life of different food products and techniques To prolong product freshness and quality.

Course Code: CNDP 5.2

Credits-2 **13-15 weeks**

Total Marks: 50 **Practical: 40** **Internal: 10**

1. Methods of Cooking-boiling, broiling, frying, Microwave cooking, Poaching
2. Starch Cookery-a) Gelatinization of starch, and Dextrinization of starch, Glutenisation, Effect of kneading
3. Pulse cookery
    a. Whole grams-effect of soaking and germination.
    b. Dhals-Effect of acid and alkali on cooking time.
4. Fats and Oils – Smoking point of different fats and oils.
    a. Effect of deep frying at smoking point, below smoking point, above smoking point.
    b. Shallow frying-vegetable cutlet
    c. Deep fat frying-pappads
5. Milk Cookery-Coagulation of milk
6. Egg Cookery-
    a. Assessing of Egg Quality
    b. Boiled eggs (soft and hard), effect of beating on egg preparation.
    c. Prevention of ferrous sulphide formation
7. Stages of Sugar Cookery
8. Vegetables and fruits-Enzymatic browning, preparation of jam, jelly and squash

Formative Assessment=20marks	
Assessment Occasion/type	**Weightage in Marks**
Test1	10
Assignment +Project	5+5
Total	80marks (SA)+20 marks=100 marks

References:	
1.	Srilakshmi, B.(2003). Food science. New Age International (P) Ltd, New Delhi,7th edition, Reprint 2022.
2.	Hardy, Ronald W., and Sadasivam J. Kaushik, eds. Fish nutrition. Academic press, 2021.
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8.	Feiner, Gerhard. Meat products handbook: Practical science and technology. Elsevier, 2006.
9.	Stone, Herbert, and Joel L. Sidel. "Introduction to sensory evaluation. "Sensory Evaluation Practices (Third Edition). Academic Press, San Diego (2004): 1-19.
10.	Aneja, R.P., B.N. Mathur, R.C. Chandan, and A.K. Banerjee. Technology of Indian milk products: hand book on process technology modernization for professionals, entrepreneurs and scientists. Dairy India Yearbook, 2002.
11.	Manay,N.ShakuntalaO.Food:factsandprinciples.NewAgeInternational,2001

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SEMESTER 5

PHYSIOLOGIC AND METABOLIC CHANGES IN DISEASE

Course Code: CNDT 5.3 **Total Marks: 100 HOURS: 56 Theory: 80**
Instruction hrs. /Week: 04 **Internal Assessment: 20**

Unit-I	12 hours
Chapter No: 1 Introduction–Objectives and Scope and importance. Pathophysiology Infection–Fever and metabolic changes. **Chapter No: 2** Common disorders of Digestive tract and associated glands Peptic and Duodenal Ulcers **Chapter No:3** Diverticulosis, Diarrhoea, Irritable bowel syndrome, Malabsorption **Chapter No:4** Hepatitis, Liver Cirrhosis Acute and Chronic Pancreatitis	
Unit-II Circulatory system	12 hours
Chapter No: 5 Pathophysiology of Hypertension, Arterio and Atherosclerosis, Variation of HDL&LDL in blood **Chapter No: 6** Angina pectoris and Myocardial Infarction. • Anaemia–Types and Remedial measures.	

Unit-III Excretory system	12 hours
Chapter No: 7 Pathophysiology of Acute and Chronic Nephritis, Nephrosclerosis, Renal calculi, Renal failure,	
Chapter No: 8 Chronic Kidney disease (CKD), 1-5 stages along with dialysis and transplantation	
Unit- IV	24 hours
Chapter No: 9 Pathophysiology of Diabetes Mellitus – Types, Causes, Symptoms, Remedial measures, Hypo and hyper Vitaminosis, Endocrine Disorders - Thyroid, Adrenal and Growth hormones, Stress – Physiological effects, Neuro-endocrine control of stress **Chapter No: 10** Malnutrition, under and over nutrition Obesity-Types, Causes and risks. **Chapter No:11** Cancer biology-Types, Properties of cancer cells, Prevention and Regulation Inborn errors of Metabolism-AKU, PKU, Cystic fibrosis, Galactosemia, Albinism	

Formative Assessment=20marks	
Assessment Occasion/type	**Weightage in Marks**
Test1	10
Assignment +Project	5+5
Total	80marks (SA)+20 marks=100 marks

Course Code: CNDP 5.3

Credits-2 **13-15 weeks**

Total Marks: 50 **Practical: 40** **Internal: 10**

- To study the composition of ORS preparations
- Preparation of ORS
- Urinalysis to detect the presence of protein using dipstick method
- Urinalysis to detect the presence of glucose using dipstick method
- Observation of slides of
    a. Peptic ulcer and duodenal ulcer
    b. Liver Cirrhosis
    c. Renal Calculi
- To study the elements of basic life support
- Assessment of stress.
- To study the normal and abnormal biochemical parameters in Diabetes, CVD and Hypertension.
- Visit to a diagnostic laboratory.

References:	
1.	Bansal,N.,Pasricha,C.,Kumari,P.,Jangra,S.,Kuar,R.,&Singh,R.(2023).Acomprehensive overview of juvenile idiopathic arthritis: From pathophysiology to management. *Autoimmunity Reviews*, 103337.
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4.	Abbott, M.B., & Vlasses, C.H. (2011).Nelson text book of pediatrics. *Jama*, *306* (21), 2387- 2388.
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11.	Del Chierico, F., Rapini, N., Deodati, A., Matteoli, M.C., Cianfarani,S., & Putignani,L.(2022). Pathophysiology of type 1 diabetes and gut microbiota role. *International Journal of Molecular Sciences*, *23*(23), 14650.
12.	Bezabeh, M., Tesfaye, A., Ergicho, B., Erke, M., Mengistu, S., Bedane, A., & Desta, A.(2004). General pathology.
13.	Bezabeh, M., Tesfaye, A., Ergicho, B., Erke, M., Mengistu, S., Bedane, A., & Desta, A. (2008). Genetics: Principles and Analysis.

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SEMESTER 5

NUTRIGENOMICS & NEUTRACEUTICALS

Course Code: CNDT 5.4 **Total Marks: 100 HOURS: 6Theory: 80**
Instruction hrs. /Week: 04 **Internal Assessment: 20**

Unit-I	13 hour s
Chapter No:1 Introduction to Nutrigenomics: Definition and scope of nutrigenomics, historical background and development of nutrigenomics, key principles, and concepts in nutrigenomics, significance of nutrigenomics in personalized nutrition. **Chapter No: 2** Genetic Variation and Nutrient Metabolism: basics of genetics and genetic variations, Single nucleotide polymorphisms (SNPs) and their relevance in Nutrigenomics **Chapter No: 3** Genes involved in nutrient metabolism and their variants, impact of genetic variations on nutrient requirements and metabolism	
Unit- II	17 hour s
Chapter No: 4 Nutrigenomics and Chronic Diseases: Role of genetics and environmental factors in chronic disease development. Obesity and Nutrigenomics: Genetic factors contributing to obesity and body weight regulation Gene nutrient interactions influencing energy balance and adipose tissue metabolism, **Chapter No:6** Nutrigenomic approaches for personalized weight management and obesity prevention Cardiovascular Diseases and Nutrigenomics: Genetic variants associated with cardiovascular diseases, Impact of dietary components on lipid metabolism and cardiovascular health, Nutrigenomic strategies for managing dyslipidemia and reducing cardiovascular risk.	

Chapter No:7

Diabetes and Nutrigenomics: Genetic predisposition to type 2 diabetes and insulin resistance, Genedietnteractions influencing glucose metabolism and pancreatic function, Nutrigenomic interventions for diabetes prevention and management Cancer and Nutrigenomics: Genetic factors contributing to cancer development and progression, Nutrigenomic approaches for cancer prevention and adjuvant therapy,

Chapter No: 8

Personalized nutrition strategies for reducing cancer risk based on genetic variations Gut Microbiota: Gut microbiota composition and its relationship with chronic diseases, Influence of dietary factors ongutmicrobiota - hostinteractions, Nutrigen omicmodulation of gut microbiota for improved health outcomes.

Unit-III Chapter

No: 9

Nutraceuticals and Health Promotion: Definition and classification of nutraceuticals. Dietary supplements: vitamins, minerals, botanicals, and other bioactive compounds, Fortified foods: enriched and fortified products with added nutrients.

Chapter No: 10

Introduction to phytochemicals and their role in human health. Exploration of various phytonutrients – curcumin, resveratrol, quercitin, green tea catechins, polyphenols, phytoestrogens

Chapter No: 11

Plant pigments, and their potential health benefits. Traditional herbs, spices, and plant- based remedies with nutraceutical properties

Chapter No: 12

Overview of the nutraceutical marketing India, Regulatory framework and challenges in the Indian context, Opportunities and future prospects for nutraceuticals in the Indian health care industry.

Formative Assessment=20marks	
Assessment Occasion/type	**Weightage in Marks**
Test1	10
Assignment +Project	5+5
Total	80marks (SA)+20 marks=100 marks

References:

1. Klaus Kraemer and Peter B. Meier. Nutraceuticals in Health and Disease Prevention, CRC Press, 2001
2. JimKaput and Raymond L.Rodriguez, Nutritional Genomics: Discovering the Pathto Personalized Nutrition, Wiley-Inter science, 1st edition, 2006
3. Ann L. Yaktine and Robert Pool, Institute of Medicine (IOM). 2007. Nutrigenomics and beyond: Informing the future. Washington, DC: The National Academies Press, 2007
4. Debasis Bagchi, Francis Lau, Manashi Bagchi, Genomics, Proteomics and Metabolomics in Nutraceuticals and Functional Foods, Wiley-Blackwell; 1st edition, 2010.
5. JournalNutrients2012,4,1898-1944;MolecularNutritionResearch—TheModernWayOf Performing Nutritional Science.
6. Journal Nutrients2013,5,32-57;Nutrigenetics and Metabolic Disease: Current Status and Implication for Personalized Nutrition
7. Lynnette R. Ferguson, Nutrigenomics and Nutrigenetics in Functional Foods and Personalized Nutrition, CRC Press, 1st edition, 2013.
8. Satinder KaurBrar, SurinderKaur, Gurpreet Singh Dhillon, Nutraceuticals and Functional Foods : Natural Remedy, Nova Science Publishers, 2014.
9. Raffaele De Caterina, J.Alfredo Martinez, Martin Kohlmeier, Principle sofnutrigenetics and nutrigenomics, Academic Press, 2020.
10. DebasisBagchi, Harry G.Preuss, An and Swaroop, Nutraceuticals and Functional FoodsinHum an Health and Disease Prevention, CRC Press, 1st edition, 2021.

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SEMESTER 5

GERIATRIC NUTRITION

Course Code: CNDT 5.4 Total Marks: 100 HOURS: 56 Theory:80
Instruction hrs. /Week: 04 Internal Assessment: 20

Unit-I
Chapter No: 1 Physiological Changes in Aging: Age-Related Physiological Changes and Metabolic alterations. Impact of aging on body composition, metabolic rate, and nutrient metabolism, Body composition change, changes in muscle mass, strength, and functional capacity.
Chapter No:2 Effects of increased body fat and visceral fat on health, Hormonal changes and their influence on metabolism. Effects of aging on basal metabolic rate (BMR) and energy expenditure.
Chapter No: 3 Changes in nutrient absorption and utilization, gastrointestinal changes and their impact on nutrient absorption, age-related alterations in gastric acid secretion, intestinal absorption, and gut microbiota. Consequences of impaired absorption on nutrient status and overall health
Unit- II
Chapter No: 4 Nutritional Assessment of Older Adults: Introduction to screening tools used in geriatric nutrition assessment (e.g., MNA, MUST, SGA),

Chapter No: 5

Application of screening tools in identifying malnutrition risk or existing malnutrition Interpretation of screening results and implications for further assessment and intervention. Methods for assessing dietary intake in older adults (e.g., food diaries, 24-hour recalls, FFQs), Analysis and interpretation of dietary intake data, identifying nutrient deficiencies or excesses in older individuals.

Chapter No: 6

Evaluating dietary intake and nutritional needs, Overview of dietary guidelines and recommendations specific to older adults. Understanding nutrient requirements and recommended intakes for optimal health. Factors influencing individual nutritional needs in elderly population

Chapter No: 7

Nutritional Considerations for Age-Related Conditions: Malnutrition and sarcopenia, Causes, consequences, and prevention strategies, Role of nutrition in managing malnutrition and sarcopenia

Chronic Diseases and Nutrition: Nutrition implications for cardiovascular disease, diabetes, osteoporosis, and other common conditions. Dietary modifications and therapeutic diets for disease management.

Unit -III

Chapter No: 8

Nutrition Interventions for Healthy Aging: Concept of Hydration and Fluid Balance in the Elderly, Importance of hydration in older adults, Strategies to maintain proper fluid balance.

Chapter No: 9 Meal Planning and Dietary Modifications: Practical considerations for meal planning and preparation, adapting diets for age-related changes, dietary restrictions, and taste preferences
Chapter No: 10 Using nutritional assessment results to develop personalized nutrition plans. Adapting diets to address nutrient deficiencies, preferences, and dietary restrictions.
Chapter No: 11 Promoting Optimal Aging through Nutrition: Nutritional strategies for healthy aging and disease prevention. Role of physical activity and overall lifestyle in promoting well-being

Formative Assessment = 20 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment +Project	5+5
Total	80marks (SA)+20 marks=100 marks

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

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SEMESTER 5

CULINARY SCIENCE

Course Code: CNDT 5.5 **Total Marks: 100**

HOURS: 56 Theory:80

Instruction hrs. /Week: 04 **Internal Assessment: 20**

UNIT-I	**10Hrs**
Chapter No: 1 Introduction Aims and Objectives of Cooking.	**3hrs**
Chapter No: 2 Methods of cooking food: Moist methods, Dry heat methods, combination methods, microwave cooking and solar cooking,	**4hrs**
Chapter No: 3 Loss of nutrients during cooking, Concept of molecular gastronomy.	**3hrs**
UNIT-II	**08Hrs**
Chapter No: 4 Food Evaluation: Sensory evaluation: Selection of Panel of judges,	**3 Hrs**
Chapter No: 5 Preparation of Samples, Types of tests. Objective methods of evaluation.	**5Hrs**

UNIT-III	**08Hrs**
Chapter No: 5 Food Presentation: Basic Elements-Colour, texture, shape, layout and simplicity.	**3hrs**
Chapter No:6 Presentation for food service: choice of plates, serving trays, chafing dishes, portions, sequence of service in buffet style,	**3hrs**
Chapter No:7 Garnishing and food decoration.	**2hrs**
UNIT-IV	**12Hrs**
Chapter No: 8 Quantity Food Production: Standardization of recipes: Benefits of standardized recipes, components, Phases:	**5 hrs**
Chapter No: 9 Recipe verification, product evaluation, quantity adjustment phase. Introduction to costing of recipes and presentation of foods	**7hrs**
UNIT-V	**10Hrs**
Chapter No:10 Food Preservation: Objectives of food preservation	**2hrs**
Chapter No: 11 Methods of food preservation: High temperature, Low temperature, Dehydration,	**3hrs**
Chapter: 12 Use of preservatives-Class I and II preservatives, preservation by irradiation, controlled atmosphere storage.	**5hrs**

Formative Assessment= 20marks	
Assessment Occasion/type	**Weightage in Marks**
Test1	10
Assignment +Project	5+5
Total	80marks (SA)+20 marks=100 marks

Course Code: CNDP 5.5

Credits-2 **13-15 weeks**

Total Marks: 50 **Practical: 40** **Internal: 10**

- Standard vegetable cuts: Julienne, Brunoise, Macedoine, Jardine, Paysanne
- Preparation of a dish using the following techniques
    a. Mixing, blending, binding, beating, whipping, folding
    b. Coating, blanching, Marinating
- Preparation of salads
- Constituents: Base, Body, Garnish and Dressing Preparation of mayonnaise
- Preparation of salads using foods from different food groups
- Food presentation
- Standardization, quality food production, marketing and costing of
    a. Beverages
    b. Snacks
    c. Salads
    d. Working lunch.

REFERENCES:

- Srilakshmi.B(2010), Fifth Edititon Food Science New Age International Publisher
- Mod, Zulfikar(1995) Food Production an analysis, United Publishers, Mangalore.
- Sethi Mohini(2005) Institution Food Managemetn New Age International Publishers.

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SEMESTER 6

DIETETICS-IV

Course Code: CNDT 6.1 **Total Marks: 100**
HOURS: 56 **Theory: 80**
Instruction hrs. /Week: 04 **Internal Assessment: 20**

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

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

Unit – 1 Nutrition and Cancer	**15Hrs**
Chapter No:1 Definition of cancer and its global health impact, Role of nutrition in cancer development and progression, Link between diet, lifestyle, and cancer risk. Etiology and causes of cancer development. Types of cancer and their risk factors. Role of genetics, environment, and lifestyle in cancer development. Common symptoms experienced by cancer patients.	**5hrs**
Chapter No: 2 Impact of cancer and treatment on appetite and dietary intake. Strategies to address complaints related to food intake in cancer patients, Dietary management for cancer patients.	**4hrs**
Chapter No: 3 Importance of a well-balanced diet in supporting treatment and recovery. Strategies to manage nutrition-related side effects of cancer treatment. Addressing malnutrition and weight loss in cancer patients.	**3hrs**
Chapter No: 4 Immuno nutrients and their role in cancer prevention and treatment. Impact of	**3hrs**

specific nutrients on the immune system and cancer outcomes. Benefits of immune nutrients in reducing treatment-related side effects. Current research and evidence on immune nutrients in cancer care.	
Unit – 2: HIV/AIDS: Introduction to HIV/AIDS	**12hrs**
Chapter No: 5 Definition of HIV/AIDS, Modes of transmission and risk factors stages of HIV infection: acute, chronic, and AIDS. Impact of HIV/AIDS on nutritional status and immune function.	**3 hrs**
Chapter No: 6 Specific nutritional requirements for individuals with HIV/AIDS. Effects of HIV on energy expenditure, nutrient absorption, and metabolism. Nutrient deficiencies commonly associated with HIV/AIDS.	**3hrs**
Chapter No: 7 Importance of adequate macro- and micronutrient intake for immune support. Dietary challenges and strategies for individuals with HIV/AIDS. Maintaining a balanced diet and managing nutrition-related side effects of antiretroviral therapy (ART).	**3hrs**
Chapter No: 8 Nutrition's role in managing opportunistic infections and supporting immune function. Dietary considerations for specific symptoms like diarrhoea, oral thrush, and weight loss.	**3hrs**
Unit -3: General nutrition care in Stress, Infection and Surgery	**10hrs**
Chapter No: 12 Types of diet orders/prescription-Adequate general (regular) diet; Modified diet Stress-Metabolic changes associated with stress, causative agents of stress, result of acute or prolonged stress, diet changes. Infection- nutritional needs and dietary requirements Surgery and nutritional status	**4hrs**
Chapter No: 13 pre-operative nutrition -objectives and dietary management Post-operative nutrition – points to be considered to promote food intake (spacing meals, creating a pleasant environment, conditions favouring a patient to eat and favouring digestion, promoting adequate fluid intake. Role of Progressive diet); Common complaints of patients associated with food intake and management.	**6hrs**

Unit - 4: Nutrition support in critically ill	15hrs
Chapter No: 14 Definition of critical illness and its impact on nutritional status**,** Understanding the importance of nutrition support in critically ill patients. Overview of the goals and benefits of providing adequate nutrition during critical illness. Introduction to the different methods of nutrition support.	3hrs
Chapter No: 15 Malnutrition in critically ill patients, assessing nutritional status in critically ill patients. Understanding the impact of critical illness on body composition and metabolic changes. Assessing energy requirements and determining the appropriate route of feeding.	4 hrs
Chapter No: 16 Exploring the role of laboratory values in assessing nutritional needs and monitoring nutritional interventions. Enteral nutrition - Definition, patient screening, Indications, and Tube feeding: Nasogastric, Nasoduodenal, Naso jejunal, Types of enteral feeds: natural liquid foods, blenderised diets and elemental diets.	4hrs
Chapter No: 17 Parenteral Nutrition: Definition, composition, Indications, Parenteral routes for nutrition and drug administration, Total Parenteral Nutrition (TPN). Refeeding syndrome- Definition, causes, symptoms. Home care for critically ill and requiring long-term nutrition support, palliative care, rehabilitation diets (stages).	4hrs

Formative Assessment=20marks	
Assessment Occasion/type	**Weightage in Marks**
Test1	10
Assignment +Project	5+5
Total	80marks (SA)+20 marks=100 marks

PRACTICALS

Course Code: CNDP 6.1

Credits-2 13-15weeks

Total Marks: 50 Practical: 40 Internal: 10 Plan, prepare and evaluate:

1. A day's diet for Cancer.
2. A day's diet for HIV/AIDS.
3. Recipes for elderly hospitalized patients (soft diet post-surgery)
4. Recipe for hospitalized sick children (soft diet post-surgery)
5. Market survey and listing of commercially available enteral and parenteral formulas.

Reference:

- B. Srilakshmi (2019). *Dietetics.* New Age International Publishers.
- Swaminathan, M. (2002) Food and Nutrition, Volume I& II, The Bangalore printing and Publishing CompanyLtd.
- Bamji, M.S, Reddy, V. (1998), Textbook of Human Nutrition, Oxford & IBH Publishing Co, NewDelhi.
- Gibney M.J, Elia M Ljingquist. O (2005), Clinical Nutrition, Blackwell Science PublishingCo.
- Shubhangini A Joshi, (2021), Nutrition and Dietetics, with Indian case studies, Tata McGraw-Hill, New Delhi

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SEMESTER 6

FUNCTIONAL FOODS

Course Code: CNDT 6.2 **Total Marks: 100 HOURS: 56**

Theory: 80

Instruction hrs. /Week: 04 **Internal Assessment: 20**

UNIT-I	**13 Hrs**
Introduction:	
Chapter No: 1 Definition of functional food and nutraceuticals, FOSHU (foods for specified health use) categories of functional ingredients.	**5 hrs**
Chapter No:2 Benefits and Active principles of common herbs/plants (containing beneficial ingredients) used in the field of nutraceuticals-Ginseng, Rosemary, Thyme, Organo, Sage, Basil, wheat grass.	**8 hrs**
UNIT-II	**13Hrs**
Chapter No:3 Prebiotics-Definition, sources, non-digestible /slow digestible carbohydrates: Dietary fibre, Oligosaccharides, sugar alcohols used in food products, resistant starch, Gums	**5 hrs**
Chapter No:4 Role of fiber in the diet: Diabetes and Obesity, Constipation and Diverticular diseases, Colon cancer, Breast cancer.	**3 hrs**
Chapter No:5 Health benefits of Oligosaccharides: Anti constipation, non-carcinogenic, Non-carcinogenic, Reduction of serum cholesterol, improved intestinal flora.	**5 hrs**

UNIT-III	**13 Hrs**
Chapter No: 6 Probiotics-Definition, sources, Health benefits of Lactic acid bacteria, Bifidobacterium, Saccharomyces Boulardii, Streptococcus, thermophiles	
UNIT-IV	**13 Hrs**
Chapter No: 7 Health benefits (in brief)-natural pigments (chlorophyll, chlorophyllin, carotenoids, anthocyanins), Polyunsaturated fatty acids (Omega 3 and Omega 6), peptides and proteins (Glutamine, L-Arginine),	**6 hrs**
Chapter No: 8 Glycolysis, Isoprenoids, Alcohols and Phenols, Lecithin and Choline, Isoflavonoids, Phytoestrogens, antioxidants, Phytosterols.	**5hrs**
Chapter No:9 Vitamins and mineral supplements in health.	**2 hrs**
UNIT-V	**13Hrs**
Chapter No: 10 Significance of functional foods and nutraceuticals in the food and pharma industry.	**7 hrs**
Chapter No:11 Food labels and regulations of nutraceuticals and functional foods	**6 hrs**

PRACTICALS

Course Code: CNDP 6.2

Credits-2 **13-15weeks**

Total Marks: 50 **Practical: 40** **Internal: 10**

- Planning of resource file on functional foods 3 Classes
- Market survey on dietary supplements, probiotics and prebiotics available in the market 4 Classes
- Study the types of labels and analyse 3 Classes
- Planning of a probiotic product 2 Classes
- Planning and preparation of recipes rich in Omega-3 and Omega-6 Fatty acids. 4 Classes

REFERENCES:

- Gibson GR & William C.M(2000). Functional Foods-Concept to Products.
- Goldberg. I (1994). Functional Foods: Designer Foods, Pharma Foods.
- Losso J.N. (2007). Angi-angiogenic Functional and Medicinal Foods. CRC Press.
- Neeser JR & German B.J(2004), Bioprocesses and Biotechnology for Nutraceuticals. Chapman & Hall.
- Robert E.C (2006). Handbook of Nutraceutical

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SEMESTER 6

FOOD SERVICE MANAGEMENT

Course Code: CNDT 6.3 **Total Marks: 100 HOURS: 56**

Theory: 80

Instruction hrs. /Week: 04 **Internal Assessment: 20**

Unit–1	**13Hrs**
Chapter No: 1 Evolution of the Food Service Industry: Historical overview of the food service industry.	**3hrs**

Factorsinfluencingthegrowthanddevelopmentoftheindustry.Evolutionoffoodservice establishments and concepts.	
Chapter No: 2 Types of Food Service: Commercial food service establishments: restaurants, cafes, fast food chains, etc. Non-commercial food service establishments: schools, hospitals, prisons, etc.	**3hrs**
Chapter No:3 Characteristics and unique considerations for each type of food service, Similarities and differences in operations, management, and customer expectations. Styles of Food Service:	**3 hrs**
Chapter No:4 Formal food service: fine dining, upscale establishments. Semi-formal foodservice: casual dining, family-style restaurants. Informal food service: fast casual, quick-service restaurants. Differentiating factors, ambiance, and customer experiences in each style.	**4hrs**
Unit–2	**13 hrs**
Chapter No:5 Management-Definition, principles, functions. Menu planning and design: considerations, strategies, and techniques, Equipment and technology: selection, maintenance, and utilization, Inventory management: procurement, storage, and stock control.	**3hrs**

Chapter No: 6 Facility layout and design: optimizing space utilization and Work flow Tangible and Intangible tools	**3hrs**
Chapter No: 7 Layout of kitchen space-Layout plan, hotel kitchen, college hostel, food service area of a canteen. Facility layout and design: optimizing space utilization and workflow.	**3 hrs**
Chapter No: 8 Methods of purchasing- open market buying, formal buying, wholesale buying, contract purchase, auction buying. Menu planning-Types of menus, factors affecting menu planning. Hygiene and sanitation: Environmental hygiene and sanitation, hygiene in food handling, personal hygiene, accidents and safety procedures, waste disposal	**4 hrs**
Unit-3	**14hrs**
Chapter No: 9 Costing in the Food Service Industry: Introduction to cost concepts and principles, Components of cost: material cost, employee cost, overhead cost. Understanding cost behaviour: fixed, semi-fixed, and variable	**3hrs**
Chapter No:10 Concept of break-even and cost benefit ratio; cost control-Food, labour, overhead and hidden cost; Pricing of dishes: Factors influencing menu pricing decisions, Cost-based pricing vs. value-based pricing	**3hrs**
Chapter No:11 Menu engineering and pricing strategies for maximizing profitability, Pricing considerations for different food service segments, Food laws and regulations: Overview of food laws and regulations in the food service industry.	**3hrs**
Chapter No:12 Understanding regulatory agencies and their roles (local, national, international). Food safety standards and requirements for food establishments. Compliance with labelling, packaging, and allergen regulations. Compulsory Indian food standards.	**4hrs**

Unit-4	13hrs
Chapter No: 13 Concept of Total Quality Management in the food service industry. Definition and principles of Total Quality Management, Understanding the importance of TQM in the food service industry, Key concepts of customer focus, continuous improvement, and employee involvement.	**3 hrs**
Chapter No:14 Benefits of implementing TQM in food service operations. Quality assurance principles and practices. Overview of quality assurance in the food service industry. Establishing quality standards and specifications for food and service. Implementing quality control measures to ensure adherence to standards.	**3hrs**
Chapter No:15 Monitoring and evaluating quality through inspections and audits. Quality Control Measures- Developing standard operating procedures (SOPs) for key processes. Implementing quality control checks at each stage of food production and service.	**3hrs**
Chapter No: 16 Corrective and preventive actions for non-conformities and deviations. Overview of quality certifications and accreditations in the food service industry (e.g., ISO 9001, HACCP). Understanding the requirements and benefits of certification. Implementing certification processes and documentation. Maintaining compliance and continuous improvement in relation to certifications.	**4hrs**

Formative Assessment=20marks	
Assessment Occasion/type	**Weightage in Marks**
Test1	10
Assignment +Project	5+5
Total	80marks (SA)+20 marks=100 marks

Course Code: CNDP 6.3

PRACTICALS

Credits-2 **13-15weeks**

Total Marks: 50 **Practical: 40** **Internal: 10**

- Visit to food service institution (Commercial and Non-Commercial)
- Survey on types of equipment used in food production and service.
- Plan a menu for
  a. Hospital food service for patients, (Waiter service)
  b. Industria canteen, (Table de hote Menu)
  c. Five-star hotel, (A la Carte Menu)
  d. College Hostel (A week's Cyclic Menu)
  e. Fast Food Outlet (Self-service-Tray)
  f. Preparation of market list, cost and selling price calculation of a given lunch
- Serviette folding
- Table setting and formal service for
  g. Indian lunch/dinner (North Indian and South Indian service)
  h. Continental breakfast**.**

References:	
1	Service management and marketing–C Gronroos, 2007
2	FoodserviceManualforHealthCareInstitutions"byRubyParkerPuckett(2012)
3	Food service Organizations: A Managerial and Systems Approach "by Mary B. Gregoire (2014)
4	Managing Quality Service In Hospitality: How Organizations Achieve Excellence In The Guest Experience "by Robert C. Ford and Michael C. Sturman (2014)
5	IntroductiontoFoodservice"byJunePayne-PalacioandMonicaTheis(2015)
6	Food service Management: Principles and Practices "by June Payne-Palacio and Monica Theis (2018)
7	Pricing and revenue optimization-RL Philips, 2021

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SEMESTER 6

NUTRITION COUNSELLING

Course Code: CNDT 6.4 Total Marks: 100 HOURS:56 Theory: 80
Instruction hrs. /Week: 04 Internal Assessment: 20

Unit–1 Components of nutrition counselling	**26 Hrs**
Chapter No: 1	**7 hrs**
Assessment component: Methods of review (verbal and non-verbal techniques). Dietary Data Analysis: Usage of standard cups and measurement, 24hour dietary recall method, 3 days dietary recall method, Food Frequency Questionnaire (FFQ), Food log.	
Chapter No:2	**6 hrs**
Counselling process: Techniques for obtaining relevant information – General profile, medical history, clinical information, lifestyles, physical activity, stress, nutritional status.	
Chapter No: 3	**6 hrs**
Planning component: Designing of counselling plans-goals and objectives, client care plan and designing evaluation instruments. Implementation component: counselling the patient.	
Chapter No: 4	**7 hrs**
Evaluation component: Measuring the success of performance of client and evaluating the Counselling process, counselling strategies for behaviour modification, the OARS technique.	
Unit–2	**26 hrs**
Chapter No: 5	**8 hrs**
Counselling spectrum: Individual and group counselling. Nutrition counselling for adolescent eating disorder- Anorexia nervosa, Bulimia nervosa, Binge eating disorder.	
Chapter No:6	**8 hrs**
Nutrition counselling for weight management during adulthood- Lifestyle modification strategies.	
Chapter No: 7	**10 hrs**
Nutrition Counselling for pregnant women with respect to pre pregnancy, prenatal and antenatal care. Nutrition counselling for mothers on weaning. Nutrition counselling for geriatrics- Definition of ageism, geriatrics.	

Formative Assessment=20marks	
Assessment Occasion/type	**Weightage in Marks**
Test1	10
Assignment +Project	5+5
Total	80marks (SA)+20 marks=100 marks

References:

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

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SEMESTER 6

DIABETES MANAGEMENT

Course Code: CNDT 6.4 **Total Marks: 100 HOURS: 56 Theory: 80**
Instruction hrs. /Week: 04 **Internal Assessment: 20**

Unit – 1	26 hrs
Chapter No: 1 Understanding Diabetes Mellitus (DM), glucose utilization in the body, Physiology of glucose absorption, insulin and pancreas, blood glucose homeostasis, glucose metabolism.	**6 Hrs**
Chapter No:2 Types of DM -Type I, Type II, Gestational DM. Modifiable and non- modifiable risk factors of Type II DM. Other types of DM. Impaired Glucose tolerance. Etiology of DM, Indian diabetes risk score, Symptoms of DM.	**7hrs**
Chapter No:3 Understanding diagnostic tests for DM: urine glucose testing, Commercially available HbA1c meter, urine ketone testing, blood ketone monitoring,	**6hrs**
Chapter No:4 Diabetes monitoring: self-monitoring of blood glucose using glucometer, continuous glucose monitoring system.	**7hrs**
Unit – 2 Management of DM	**26hrs**
Chapter No:5 Pharmacological-oral glucose lowering drugs, other agents, Insulin Therapy-Types Non pharmacological (lifestyle management)- MNT, Physical activity, weight management MNT -Objectives, principles, assessment prior to MNT.	**6hrs**

Chapter No: 6 Food and blood sugars-Macro and micronutrients, functional foods in DM. Menu planning, dietary exchanges, healthy eating plate carbohydrate counting, Glycaemic index, Glycaemic load, portion control.	**7hrs**
Chapter No:7 Role of Exercise in DM-importance of exercise, types of exercise (Aerobic, resistance, flexibility), blood sugars and exercise.	**7hrs**
Chapter No: 8 Complications of Diabetes: Acute -hypoglycaemia, diabetic ketoacidosis, hyperglycaemic syndrome. Chronic-Microvascular (Neuropathy, Nephropathy, Retinopathy) and Macro vascular (Cardiovascular, cerebrovascular, peripheral vascular disease). Diabetic Neuropathy and foot care guide for diabetic.	**6hrs**

Formative Assessment = 20 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment +Project	5+5
Total	80marks (SA)+20 marks=100 marks

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

B.Sc. Clinical Nutrition and Dietetics

SEMESTER 6

INFORMATION AND COMMUNICATION TECHNOLOGY

Course Code: CNDT 6.5 Total Marks: 100 HOURS: 56 Theory: 80
Instruction hrs. /Week: 04 Internal Assessment: 20

UNIT: I	**06Hrs**
Chapter No: 1 ICT, Meaning, Components of ICT, Applications of ICT, Common Technologies: Data, Information, Hardware, Software,	
Chapter No: 2 Introduction to Vital Information Resources Under Seize (VIRUS)	**02 Hrs**
Chapter No:3 ANTIVIRUS, Spam Components of a computer, Input, CPU and output devices, Memory-units of memory, primary and secondary memory and storage devices.	**04Hrs**
UNIT: II	**6Hrs**
Chapter No: 4 Introduction to MS word, Excel and Power point Data Communication: Meaning, Types and Components	
Chapter No: 5 Concept of computer networking: Types, Benefits, Teleconferencing Videoconferencing and Computer conferencing.	**6 Hrs**

UNIT: III	**04Hrs**
Chapter No: 6 Internet: Advantages and limitations, Internet services (in brief): social networking sites, Twitter and Microblogging,	
Chapter No:7 Internet forum, one drive, cloud computing, E-mail IOT (Internet of Things) and it Impact.	**04Hrs**
UNIT: IV	**2 Hrs**
ICT in Health Sector	
Chapter No: 8 E-health: Meaning, Benefits of E-health, ICT applications in public health care in India: E health projects: Birth and death registration, online maternal death review monitoring system, National Identification Number (NIN), Self- monitoring healthcare devices.	**6 Hrs**
Chapter No: 9 Mobile Health: meaning. Difference between E-health and M-health, health apps Health you card, I mg, m swasthya -CDAC, Cycle Tel, m diabetes, Evoz, MAMA My Fitness Pal, Zoojoo. be, Adverse health consequences of using mobile phones.	**6Hrs**
UNIT: IV	**02 Hrs**
Chapter No: 10 ICT in Food and Nutrition ICT and food security	
Chapter No: 11 Use of ICT for dietary assessment: 24 hr recall, use of personal digital Assistant, digital photography, smart cards ICT in counselling.	**4Hrs**

Formative Assessment=20marks	
Assessment Occasion/type	**Weightage in Marks**
Test1	10
Assignment +Project	5+5
Total	80marks (SA)+20 marks=100 marks

Course Code: CNDP 6.5

Credits-2 **13-15 weeks**

Total Marks: 50 **Practical: 40** **Internal: 10**

- Using MS word (basics)
- Excel: Building data base, Simple Calculations using Excel
- Power point presentation: Preparation of slides, presentation of slides, Simple animation techniques.
- Graphical representation of a given data (column, Bar, Line and Pie charts)
- Designing a digital poster.
- Create digital story on a given topic by combining text, image, audio and video and submit.
- Survey on self-monitoring health care devices.
- Visit to a hospital to learn use of computers in hospitals.

REFERENCES:

- B. Srilakshmi,2016, Nutrition Science, New age international publishers, New Delhi.
- Santhosh Kumar. M, Hiremath, 2015, Keonics computer literacy, course material for computer basics, A Government of Karnataka Enterprise, Kinnari Publications, Bengaluru.
- https://mohgw.gov.in/e-health(Ministry of Health and Family Welfare, Govt, of India Website.

**********END**********