# SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

## M.Sc. (Home Science) – Foods and Nutrition

Semester-II

| Course Type | Course Code | Course Title | Teaching-Learning Scheme L-P-T | Total Notional Hours | Course credits |
|---|---|---|---|---|---|
| DSC | P2H02NCFDN01 | Nutritional Biochemistry | 4-0-1 | **120** | 04 |

- **Course Learning Outcomes (CLOs)**

On completion of this course, students will be able to:

**CLO1.** Analyse the metabolism of amino acids.

**CLO2.** Examine the chemistry, biosynthesis, structure and organization of nucleic acids (DNA and RNA).

**CLO3.** Evaluate the processes of DNA replication, transcription and translation.

**CLO4.** Analyse the metabolic functions of hormones and biosignaling mechanisms.

**CLO5.** Differentiate detoxification and biotransformation of xenobiotics in the body.

| Unit | Course Content | Learning Pedagogies* | CLO(s) |
|---|---|---|---|
| I | Metabolism of amino acids | Classroom lecture, ICT based learning, Seminar | CLO1 |
| II | Nucleic acids: Chemistry, biosynthesis, DNA structure and organization, RNA | Classroom lecture, ICT based learning, Seminar | CLO2 |
| III | DNA replication, transcription and translation | Classroom lecture, ICT based learning, Seminar Research oriented learning | CLO3 |
| IV | Hormones and biosignaling; Detoxification and biotransformation of xenobiotics | Classroom lecture, ICT based learning, Seminar Group discussion | CLO4, CLO5 |

- **Assessment Methodologies**

**(A) Internal Assessment**

**a. Internal Formative assessment**

(a) Assignment, Self-learning and Terms work
(b) Seminar/Presentation
(c) Quiz

**b. Internal Summative Assessment**

(a) Mid-term tests

# SARDAR PATEL UNIVERSITY

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NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

## M.Sc. (Home Science) – Foods and Nutrition

Semester-II

### (B) Weightage of Learning Efforts for External Assessment

| Unit | Aligned CLOs | Total Learning Hours | Approximate weightage (Marks) to Learning levels (BT) | | | Total Marks |
|---|---|---|---|---|---|---|
| | | | Remember (R) | Understanding (U) | Application/ Analyse & above (A) | |
| I | CLO1 | 30 | 1 | 1 | 11 | 13 |
| II | CLO2 | 32 | 1 | 1 | 10 | 12 |
| III | CLO3 | 30 | 1 | 1 | 11 | 13 |
| IV | CLO4, CLO5 | 28 | 1 | 1 | 10 | 12 |
| | | **120** | **04** | **04** | **42** | **50** |

- **Assessment and Evaluation**

| Sr. No. | Assessment/Evaluation | Component | Weightage (%) |
|---|---|---|---|
| 1 | Continuous Internal Evaluation | Seminars, Assignments, Quiz, Class Regularity, Internal exam | 50% |
| 2 | End-Semester Examination | Written Exam | 50% |

### (C) CLOs – PLOs Matrix

| CLO \ PLO | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 | PLO9 | PLO10 | PLO11 | PLO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLO1 | 3 | 3 | 2 | - | 1 | - | - | 1 | - | - | - | 1 |
| CLO2 | 3 | 3 | 2 | - | 1 | - | - | 1 | - | - | - | 1 |
| CLO3 | 2 | 3 | 3 | 2 | 1 | 2 | - | 1 | - | - | - | 1 |
| CLO4 | 2 | 2 | 3 | 2 | - | 2 | - | 1 | 1 | 1 | - | 1 |
| CLO5 | 2 | 2 | 3 | 2 | - | 2 | 1 | 1 | 1 | 1 | - | 1 |

Values to **CLO-PLO** matrix are assigned **by judging the importance of the particular CLO** in relation to the **PLOs**.

| CLO – PLO correlation | Value |
|---|---|
| Strong | 3 |
| Moderate | 2 |
| Low | 1 |
| No correlation | - |

- **Suggested Learning Materials Books:**

| Sr.No. | Title | Author(s) | Edition/Year | Publisher |
|---|---|---|---|---|
| 1 | Amino Acids: Biochemistry and Nutrition | Guoyao Wu | 2019 | CRC Press |
| 2 | Lippincott Illustrated Reviews: Biochemistry | Denise R. Ferrier | 7th Edition, 2019 | Wolters Kluwer |

| | | | | |
|---|---|---|---|---|
| 3 | Textbook of Biochemistry for Medical Students | D.M. Vasudevan, S. Sreekumari, K. Vaidyanathan | 8th Edition, 2016 | Jaypee |
| 4 | Essentials of Biochemistry | P. Naik | 2nd Edition, 2017 | Jaypee |
| 5 | Biochemistry | T.A. Brown, S.N. Mukhopadhyay | 2018 | Viva Books |
| 6 | Lehninger Principles of Biochemistry | David L. Nelson, Michael M. Cox | 6th Edition | W.H. Freeman |

- **Online Resources (Open Source)**

| Sr. No. | Description of Resource(s) | Weblink |
|---|---|---|
| 1 | e-PG Pathshala – Biochemistry modules | https://epgp.inflibnet.ac.in |
| 2 | NPTEL – Biochemistry and Molecular Biology lectures | https://nptel.ac.in |
| 3 | PubMed – Research articles on biochemistry and molecular biology | https://pubmed.ncbi.nlm.nih.gov |

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NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

## M.Sc. (Home Science) – Foods and Nutrition

Semester-II

| Course Type | Course Code | Course Title | Teaching-Learning Scheme | Total Notional Hours | Course credits |
|---|---|---|---|---|---|
| | | | L-P-T | | |
| DSC | P2H02NCFDN02 | Foods and Nutraceutical Chemistry | 4-0-1 | **120** | 04 |

- **Course Learning Outcomes (CLOs)**

On completion of this course, students will be able to:

**CLO1.** Evaluate the role of nutraceuticals and lipid changes in disease prevention, and correlate them with traditional Indian dietary practices and concepts (*Rasayana*).

**CLO2.** Discuss the basis of health claims for nutraceutical compounds, protein functionality such as gelation, emulsification, foaming, and texturization, pigment changes, enzymatic browning, and cooking-related chemical changes in fruits and vegetables.

**CLO3.** Apply principles of food chemistry to explain changes during processing and cooking of cereals, pulses, meat, eggs, fruits, and vegetables. Demonstrate the application of leavening agents, dough and batter preparation, and egg functionality in bakery products.

**CLO4.** Analyze and evaluate the relationship between nutraceutical compounds and their physiological functions, food browning reactions, and the effects of processing, storage, and heat on lipids and bioactive compounds.

**CLO5.** Examine and formulate nutraceuticals and functional foods with appropriate regulatory, labelling, and safety considerations, and integrate traditional Indian dietary practices and concepts (*Aahar*, *Rasayana*) for health claims

| Unit | Course Content | Learning Pedagogies* | CO(s) |
|---|---|---|---|
| I | a) Introduction to Nutraceuticals: Definitions, basis of claims for a compound as a nutraceutical, Traditional nutraceutical-rich foods (turmeric, amla, tulsi, millets), role of rasayana therapy in disease prevention and longevityregulatory issues for nutraceuticals including CODEX, functional foods<br>b) Nutraceuticals and Diseases: Cardiovascular diseases, cancer, diabetes, hypercholesteremia, obesity, joint pain, immune enhancement, age-related macular degeneration, endurance performance and mood disorders<br>c) Health aspects of selected nutraceuticals: Polyphenols, lycopene, isoflavonoids, ω-fatty acids, prebiotics and probiotics, glucosamine, phytosterols etc.. | Classroom lectures, ICT enabled learning, Seminar, Case based learning | CLO1, CLO2 |

| | | | |
|---|---|---|---|
| | d) Health aspects of selected nutraceuticals: Polyphenols, lycopene, isoflavonoids, ω-fatty acids, prebiotics and probiotics, glucosamine, phytosterols etc..<br>e) Functional foods: Formulation of functional foods containing nutraceuticals, stability and analytica l issues, and labelling issues | | |
| II | a) Basic aspects of Carbohydrate chemistry in brief.<br>b) Starch: Structure, gelatinization, enzymic conversion<br>c) Sugar: Sources, concepts of sweetness, solubility and crystallization phenomenon related to texture, sources of sugar- cane sugar, milk sugars etc<br>d) Other polysaccharides: Cellulose, pectins, other gums, cellulose derivatives, starch derivatives, fibers etc., details of structural configuration<br>e) Non-enzymatic browning reactions: Mechanism, advantages.<br>f) Prebiotics: Fibre, oligosaccharides, resistant starch etc. and their chemistry and health benefits<br>g) Nutraceutical properties of food Carbohydrates | Classroom lectures, ICT enabled learning, Seminar | CLO1, CLO4 |
| III | a) Basic aspects of Protein chemistry: Amide linkages, structure, essential and non-essential amino acids etc. Type of Proteins, iso- electric point, hydration, solubility, viscosity, gelation, texturization, emulsification and foaming<br>b) Cereals and pulses: Types of flour, baking qualities, batters, doughs, leavening agents, pulses - Protein composition, soaking changes etc<br>c) Meat: Structure, post mortem changes, changes during cooking (in detail), tenderness etc<br>d) Egg: Colloids, emulsions, functions of eggs in cookery, changes during cooking, role in cake preparations, preparation of angel and sponge cakes<br>e) Nutraceutical properties of food Proteins and their health benefits. | Classroom lectures, ICT enabled learning, Seminar Collaborative Learning | CLO1, CLO2, CLO3 |
| IV | a) Basic aspects of lipid chemistry, type of Lipid.<br>b) Physical properties: Melting, crystallization, fractionation of fat, hydrogenation, inter-esterification, reversion and rancidity, fat sources, their characteristics<br>c) Chemistry of fat during heat treatment, degradation, darkening etc., cooking changes<br>d) Chemistry of fruits and vegetables: Pigments, changes in pigments during cooking and processing, enzymatic browning reactions, volatile acids in vegetables and effect during cooking | Classroom lectures, ICT enabled learning, Seminar, Research-Oriented Learning | CLO1, CLO4 |

| | | | |
|---|---|---|---|
| | e) Food additives: Different types of food additives in detail, Use of natural additives (spices, herbs) instead of synthetic additives<br>f) Nutraceutical properties of food Lipid and their health Benefits | | |

- **Assessment Methodologies**

**(A) Internal Assessment**

**a. Internal Formative assessment**

(a) Assignment, Self-learning and Terms work

(b) Seminar/Presentation

(c) Quiz

**b. Internal Summative Assessment**

(a) Mid-term tests

**(B) Weightage of Learning Efforts for External Assessment**

| Unit | Aligned CLOs | Total Learning Hours | Approximate weightage (Marks) to Learning levels (BT) | | | Total Marks |
|---|---|---|---|---|---|---|
| | | | Remember (R) | Understanding (U) | Analyse & above (A) | |
| I | CLO1, CLO2 | **30** | 1 | 1 | 11 | 13 |
| II | CLO1, CLO4 | **30** | 1 | 1 | 11 | 13 |
| III | CLO1, CLO2 CLO3 | **30** | 1 | 1 | 10 | 12 |
| IV | CLO1, CLO4 | **30** | 1 | 1 | 10 | 12 |
| | | **120** | **04** | **04** | **42** | **50** |

**(C) CLOs – PLOs Matrix**

| CLO | PLO | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 | PLO9 | PLO10 | PLO11 | PLO12 |
| CLO1 | 3 | 3 | 2 | 1 | - | - | 2 | - | 1 | 1 | 2 | 1 |
| CLO2 | 3 | 3 | 2 | 3 | - | - | 2 | 2 | 1 | 1 | 1 | 1 |
| CLO3 | 3 | 3 | 3 | 3 | 1 | 1 | - | 1 | 2 | 1 | 1 | 1 |
| CLO4 | 3 | 3 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 |
| CLO5 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 1 |

- **Assessment and Evaluation**

| Sr.No. | Assessment/Evaluation | Component | Weightage (%) |
|---|---|---|---|
| 1 | Continuous Internal Evaluation | Seminars, Assignments, Quizzes, Class Regularity, Internal exam | 50% |
| 2 | End-Semester Examination | Written Exam | 50% |

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NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

## M.Sc. (Home Science) – Foods and Nutrition

Semester-II

- **Suggested Learning Materials Books:**

| Sr. No. | Title | Author(s) | Edition/Year | Publisher |
|---|---|---|---|---|
| 1 | Food Chemistry | Fennema, O. R. | 5th Edition, 2017 | Marcel Dekker Inc. |
| 2 | Food Chemistry | Meyer, L. M. | 1st Indian Edition,1987 | CBS Publishers & Distributors Pvt. Ltd., India |
| 3 | Food Science | Potter, N. N., & Hotchkiss, J. H. | 5thEdition, 1995 | Springer |

- **Online Resources (Open Source)**

| Sr. No. | Description of Resource(s) | Weblink |
|---|---|---|
| 1 | NPTEL Online Course: *Food Chemistry* – Video lectures, assignments, and study materials for undergraduate/postgraduate students. | https://swayam.gov.in |
| 2 | Springer Open / SpringerLink – Open-access chapters and academic resources related to food chemistry. | https://link.springer.com |
| 3 | Open Library – Free access to academic books, research papers, and food science materials. | https://openlibrary.org |
| 4 | Elsevier Journal: *Food Chemistry* – A peer-reviewed international journal publishing research on the chemistry and biochemistry of foods, food components, and food systems. | https://www.sciencedirect.com/journal/food-chemistry |

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## M.Sc. (Home Science) – Foods and Nutrition

Semester-II

| Course Type | Course Code | Course Title | Teaching-Learning Scheme L-P-T | Total Notional Hours | Course credits |
|---|---|---|---|---|---|
| DSC | P2H02NCFDN03 | Food Processing Technology | 4-0-1 | **120** | 04 |

- **Course Learning Outcomes (CLOs)**

On completion of this course, students will be able to:

CLO1. Explain the principles and status of the food processing industry, and relate them to traditional Indian food processing practices and government initiatives promoting indigenous technologies.

CLO2. Demonstrate comprehensive understanding of traditional and modern processing techniques across major food groups (flesh foods, cereals, legumes, oilseeds, milk, fruits, and vegetables).

CLO3. Analyse the role of traditional and modern processing methods and equipment in enhancing food quality, safety, shelf life, and value addition.

CLO4. Evaluate the impact of traditional and modern food processing on nutritional quality, including nutrient losses and fortification strategies.

CLO5. Apply knowledge of modern food processing and packaging technologies to address industry challenges and improve food preservation and distribution.

| Unit | Course Content | Learning Pedagogies* | CO(s) |
|---|---|---|---|
| I | a) Basic issues of the food processing industry, Basic problems of the food processing industry, present status, status of food processing technology, growth trend and growth strategy, Govt. policies and programmes for food processing industry<br>b) Traditional Indian food processing and preservation methods (sun-drying, smoking, salting)<br>c) Flesh foods: Meat processing, processed meat products, poultry processing, dried egg powder, fish processing, fish meal | Classroom lectures, ICT enabled learning, seminar, Case based learning | CLO1, CLO2 |
| II | a) Processing of cereal grains: Milling process of rice, milling process of wheat, milling of cereals and legumes, breakfast cereals, pasta products, rice flakes, puffed rice, bakery product processing, maize processing- starch preparation, puffed maize; fermentation of cereals, nutrient loss during processing, fortification etc .<br>b) Legume, oil seed processing: Processing steps, equipments, soya flour processing texturized soya protein foods, legume flour preparation, other legume based products | Classroom lectures, ICT enabled learning, seminar, Case based learning Industrial visit | CLO2, CLO3 |

| | | | |
|---|---|---|---|
| | c) Traditional Indian cereal and pulse processing methods (hand pounding, traditional milling, germination, fermentation, earthen pot cookery, cooking on chula, coal, etc.) and its role in enhancing nutritional quality | | |
| III | Processing of milk and milk products:<br>a) Pasteurization and sterilization of milk, different types of milk and its processing, milk powder, processing steps and machinery, cheese processing steps and machinery, butter processing steps and machinery,<br>b) Use of *bilona* method for ghee preparation and its nutritional significance<br>c) Nutrient loss during processing, fortification of processed milk for infant food | Classroom lectures, ICT enabled learning, seminar, Case based learning Industrial visit, Collaborative Learning | CLO2, CLO3, CLO4 |
| IV | a) Processing of fruits and vegetables: Dehydration of fruits and vegetables, different methods of dehydration, canning, processing steps, equipment, nutrient losses during processing.<br>b) Packaging: New trends in of packaging, packaging for specific foods in detail | Classroom lectures, ICT enabled learning, seminar, Case based learning, Industrial visit | CLO2, CLO4, CLO5 |

. **Assessment Methodologies**

**(A) Internal Assessment**

**a. Internal Formative assessment**

(a) Assignment, Self-learning and Terms work
(b) Seminar/Presentation
(c) Quiz

**b. Internal Summative Assessment**

(a) End of Term Examination

**(B) Weightage of Learning Efforts for External Assessment**

| **Unit** | **Aligned CLOs** | **Total Learning Hours** | **Approximate weightage (Marks) to Learning levels (BT)** | | | **Total Marks** |
|---|---|---|---|---|---|---|
| | | | **Remember (R)** | **Understanding (U)** | **Analyse & above (A)** | |
| I | CLO1, CLO2 | 25 | 1 | 1 | 10 | **12** |
| II | CLO2, CLO3 | 35 | 1 | 1 | 11 | **13** |
| III | CLO2, CLO3, CLO4 | 30 | 1 | 1 | 11 | **13** |
| IV | CLO2, CLO4, CLO5 | 30 | 1 | 2 | 10 | **12** |
| | | **120** | **04** | **04** | **42** | **50** |

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## M.Sc. (Home Science) – Foods and Nutrition

Semester-II

- **Assessment and Evaluation**

| Sr.No. | Assessment/Evaluation | Component | Weightage (%) |
|---|---|---|---|
| 1 | Continuous Internal Evaluation | Seminars, Assignments, Quiz, Class Regularity, Internal exam | 50% |
| 2 | End-Semester Examination | Written Exam | 50% |

**(C) CLO – PLO Matrix**

| CLO \ PLO | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 | PLO9 | PLO10 | PLO11 | PLO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLO1 | 3 | 3 | 2 | - | - | - | - | - | - | 1 | 2 | 1 |
| CLO2 | 3 | 3 | 3 | 2 | - | - | - | - | 1 | 1 | 2 | 1 |
| CLO3 | 2 | 3 | 3 | 3 | 1 | 2 | 1 | - | 2 | 1 | 2 | 1 |
| CLO4 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 1 | 2 | 2 | 2 | 1 |
| CLO5 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 |

Values to **CLO-PLO** matrix are assigned **by judging the importance of the particular CLO** in relation to the **PLOs**.

| CLO – PLO correlation | Value |
|---|---|
| Strong | 3 |
| Moderate | 2 |
| Low | 1 |
| No correlation | - |

- **Suggested Learning Materials Books:**

| Sr.No. | Title | Author(s) | Edition/Year | Publisher |
|---|---|---|---|---|
| 1 | Food Processing Technology: Principles and Practices | P. J. Fellow | Second Edition 2005 | CRC Publishers |
| 2 | Outline of Dairy Technology | Sukumar, D. | 2019 | Oxford University Press |
| 3 | Cereal Processing & Nutritional Quality. | Sewa Ram & Mishra, B. | 2010 | New India Publishing Agency, New Delhi. |
| 4. | Food Packaging | Neelam Khetarpaul & Darshan Punia | 2008 | Daya Publishing House,New Delhi |
| 5 | Food Packaging | Neelam Khetarpaul & Darshan Punia | 2008 | Daya Publishing House, New Delhi |

- **Online Resources (Open Source)**

| Sr.No. | Description of Resource(s) | Weblink |
|---|---|---|
| 1 | Food Technology | https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=iWHzbXYGExXDS52DSnAzdQ== |
| 2 | Food standards and Regulation | https://www.fssai.gov.in/ |
| 3 | Springer Open / SpringerLink – Open-access chapters and academic resources related to food chemistry | https://link.springer.com |
| 4 | Open Library – Free access to academic books, research papers, and food science materials | https://openlibrary.org |

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## M.Sc. (Home Science) – Foods and Nutrition

Semester-II

| Course Type | Course Code | Course Title | Teaching-Learning Scheme | Total Notional Hours | Course credits |
|---|---|---|---|---|---|
| | | | L-P-T | | |
| DSC | P2H02NCFDN04 | Practical based on Nutritional Biochemistry and Food & Nutraceutical Chemistry | 0-8-1 | **120** | 04 |

- **Course Learning Outcomes (CLOs)**

On completion of this course, students will be able to:

**CLO1.** Estimate plasma amino acids and proteins using biochemical techniques. Determine A/G ratio and interpret biochemical results. Estimate

**CLO2.** Estimate DNA and RNA using spectrometric and spectrofluorometric methods. Isolate nucleic acids from biological samples and assess purity and quantity.

**CLO3.** Analyze health food products through market survey and apply laboratory techniques to estimate bioactive compounds and interpret findings.

**CLO4.** Evaluate the impact of food components and processing variables (amino acids, sugars, and ingredient proportions) through experimental studies.

| Unit | Course Content | Learning Pedagogies* | CLO(s) |
|---|---|---|---|
| I | a) Estimation of plasma total amino acids, total protein, A/G ratio | Laboratory Practicals | CLO1 |
| II | b) Estimation of DNA & RNA (spectrometric and spectrofluorometric methods); Isolation of DNA from bacteria and animal tissue | Laboratory Practicals | CLO2 |
| III | a) Market survey of existing health foods<br>b) Estimation of total phenolics and flavonoid content Estimation of total antioxidant capacity (DPPH-RSA and FRAP) | Laboratory Practicals, Market survey | CLO3 |
| IV | a) Estimation of total food pigments- lycopene, Anthocyanin<br>b) Effect of type of amino acid and sugar on Maillard reaction<br>c) Estimation of phytic acid<br>d) Effect of varying concentration of sugar, maida and baking powder on quality of cake | Laboratory Practicals | CLO3, CLO4 |

- **Assessment Methodologies**

**(A) Internal Assessment**

**a. Internal Formative assessment**

(a) Class Regularity

(b) Laboratory performance

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## M.Sc. (Home Science) – Foods and Nutrition

Semester-II

**b. Internal Summative Assessment**

(a) Internal practical exam

**(B) Weightage of Learning Efforts for External Assessment**

| Unit | Aligned CLOs | Total Learning Hours | Approximate weightage (Marks) to Learning levels (BT) | | | Total Marks |
|---|---|---|---|---|---|---|
| | | | Remember (R) | Understanding (U) | Application/ Analyse & above (A) | |
| I | CLO1, CLO2 | 30 | 1 | 1 | 11 | 13 |
| II | CLO1, CLO2 | 30 | 1 | 1 | 10 | 12 |
| III | CLO3 | 30 | 1 | 1 | 10 | 12 |
| IV | CLO4 | 30 | 1 | 1 | 11 | 13 |
| | | 120 | **04** | **04** | **42** | **50** |

**(C) CLOs – PLOs Matrix**

| CLO \ PLO | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 | PLO9 | PLO10 | PLO11 | PLO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CLO1** | 3 | 3 | 3 | 2 | 1 | 3 | - | - | 3 | 1 | - | - |
| **CLO2** | 3 | 3 | 3 | 2 | 2 | 3 | 1 | - | 3 | 1 | - | - |
| **CLO3** | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 |
| **CLO4** | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 1 | 3 | 2 | 1 | 2 |

Values to **CLO-PLO** matrix are assigned **by judging the importance of the particular CLO** in relation to the **PLOs**.

| CLO – PLO correlation | Value |
|---|---|
| Strong | 3 |
| Moderate | 2 |
| Low | 1 |
| No correlation | - |

- **Assessment and Evaluation**

| Sr.No. | Assessment/Evaluation | Component | Weightage (%) |
|---|---|---|---|
| 1 | Continuous Internal Evaluation | Class Regularity, Active participation in executing practicals, Internal practical exam | 50% |
| 2 | End-Semester Examination | Written and Practical Exam | 50% |

- **Suggested Learning Materials Books:**

| Sr. No. | Title | Author(s) | Edition/Year | Publisher |
|---|---|---|---|---|
| 1 | Food Analysis | S. Suzanne Nielsen | 5th Edition, 2017 | Springer |
| 2 | Biochemical Methods | S. Sadasivam & A. Manicka | 3rd Edition, 2008 | New Age International Publishers |
| 3 | A Manual of Laboratory Techniques | National Institute of Nutrition (NIN), Hyderabad | 2nd Edition, 2003 | ICMR–NIN |
| 4 | Practical Clinical Biochemistry | Harold Varley | 4th Edition, 2005 | CBS |

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## M.Sc. (Home Science) – Foods and Nutrition

Semester-II

| Course Type | Course Code | Course Title | Teaching-Learning Scheme | Total Notional Hours | Course credits |
|---|---|---|---|---|---|
| | | | L-P-T | | |
| DSC | P2H02NCFDN05 | Practical based on Food Processing Technology and Food Analysis | 0-8-1 | **120** | 04 |

- **Course Learning Outcomes (CLOs)**

On completion of this course, students will be able to:

**CLO1.** Evaluate quality parameters of dairy and plant-based food products (flavoured milk, groundnut milk, soybean milk, paneer, ghee, butter).

**CLO2.** Demonstrate the development of value-added food products such as paneer, cheese, khoa, bakery items (bread, cake, biscuits), and fruit products (jam, jelly, ketchup), and evaluate their quality parameters.

**CLO3.** Estimate proximate composition of foods including moisture, fat, carbohydrates, protein and fibre using standard analytical methods. Determine bioactive components such as pigments, vitamins, minerals and antioxidant compounds in food samples.

**CLO4.** Analyse functional properties of food powders including water holding capacity, oil absorption capacity and bulk density. Evaluate food additives and interpret analytical results in relation to food quality and safety.

| Unit | Course Content | Learning Pedagogies* | CLO(s) |
|---|---|---|---|
| I | a) Market survey of different processed foods available in the market<br>b) Preparation of flavoured milk, and analysis of pH, Titratable acidity, moisture, total solids, and lactose content<br>c) Preparation of groundnut milk and soyabean milk paneer and physicochemical analysis<br>d) Analysis of ghee and butter- moisture, Free fatty acid, pH, titratable acidity | Laboratory Practicals, Market survey | CLO1, CLO2 |
| II | a) Preparation of paneer, green cheese, khoa and evaluation of physicochemical parameters such as pH, Titrable acidity, and moisture<br>b) Preparation of bread, cake and biscuits<br>c) Preparation of jam, jelly and ketchup | Laboratory Practicals | CLO1, CLO2 |
| III | a) Estimation of moisture; fat constants (TBA, fat content); carbohydrates (lactose, reducing sugar, dietary fibre, crude fibre, total carbohydrate); protein (nitrogen analysis, methionine) | Laboratory Practical | CLO3, CLO4 |
| IV | a) Pigments (bixin, carotenoids, chlorophyll); vitamin C; mineral content; functional properties (WHC, OAC, bulk density, tapped density); antioxidant content (BHA, BHT) | Laboratory Practical | CLO3, CLO4 |

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NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

## M.Sc. (Home Science) – Foods and Nutrition

Semester-II

- **Assessment Methodologies**

**(A) Internal Assessment**

**a. Internal Formative assessment**

(a) Class Regularity

(b) Laboratory performance

**b. Internal Summative Assessment**

(a) Internal practical exam

**(B) Weightage of Learning Efforts for External Assessment**

| Unit | Aligned CLOs | Total Learning Hours | Approximate weightage (Marks) to Learning levels (BT) | | | Total Marks |
|---|---|---|---|---|---|---|
| | | | Remember (R) | Understanding (U) | Application/ Analyse & above (A) | |
| I | CLO1, CLO2 | 30 | 1 | 1 | 11 | 13 |
| II | CLO1, CLO2 | 30 | 1 | 1 | 10 | 12 |
| III | CLO3, CLO4 | 30 | 1 | 1 | 11 | 13 |
| IV | CLO3, CLO4 | 30 | 1 | 1 | 10 | 12 |
| | | **120** | **04** | **04** | **42** | **50** |

- **Assessment and Evaluation**

| Sr.No. | Assessment/Evaluation | Component | Weightage (%) |
|---|---|---|---|
| 1 | Continuous Internal Evaluation | Class Regularity, Active participation in executing practicals, Internal practical exam | 50% |
| 2 | End-Semester Examination | Written and Practical Exam | 50% |

**(C) CLO – PLO Matrix**

| CLO \ PLO | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 | PLO9 | PLO10 | PLO11 | PLO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CLO1** | 3 | 3 | 3 | 2 | - | 2 | - | - | 3 | 1 | 1 | 1 |
| **CLO2** | 3 | 3 | 3 | 3 | 1 | 2 | 1 | 1 | 3 | 1 | 1 | 1 |
| **CLO3** | 3 | 3 | 3 | 2 | 2 | 3 | 1 | - | 3 | 1 | - | - |
| **CLO4** | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 1 | 3 | 2 | 1 | 1 |

Values to **CLO-PLO** matrix are assigned **by judging the importance of the particular CLO** in relation to the **PLOs**.

| CLO – PLO correlation | Value |
|---|---|
| Strong | 3 |
| Moderate | 2 |
| Low | 1 |
| No correlation | - |

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## M.Sc. (Home Science) – Foods and Nutrition

Semester-II

- **Suggested Learning Materials Books:**

| Sr. No. | Title | Author(s) | Edition/Year | Publisher |
|---|---|---|---|---|
| 1 | Food Analysis | S. Suzanne Nielsen | 5th Edition, 2017 | Springer |
| 2 | Biochemical Methods | S. Sadasivam & A. Manicka n | 3rd Edition, 2008 | New Age International Publishers |
| 3 | A Manual of Laboratory Techniques | National Institute of Nutrition (NIN), Hyderabad | 2nd Edition, 2003 | ICMR–NIN |
| 4 | Official methods of analysis of AOAC International. | AOAC International | 2005 | AOAC International |

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## M.Sc. (Home Science) – Foods and Nutrition

Semester-II

| Course Type | Course Code | Course Title | Teaching-Learning Scheme | Total Notional Hours | Course credits |
|---|---|---|---|---|---|
| | | | L-P-T | | |
| DSC | P2H02NCFDN06 | Bhartiya Knowledge System in Home Science | 2-0-1 | **60** | 02 |

- **Course Learning Outcomes (CLOs)**

On completion of this course, students will be able to:

**CLO1.** Explain and interpret Bhartiya knowledge system in food, health, and family life, including Ahara, Ritucharya, and Pathya–Apathya.

**CLO2.** Analyze Bhartiya knowledge system–based indigenous foods and nutritional practices, including regional diets and millets for health and sustainability.

**CLO3.** Examine and evaluate Bhartiya knowledge system in indigenous clothing and traditional household management for sustainable living.

**CLO4.**Assess and apply Bhartiya knowledge system through folk media for community education, cultural preservation, and knowledge dissemination.

| Unit | Course Content | Learning Pedagogies* | CLO(s) |
|---|---|---|---|
| I | a) Traditional Knowledge Systems in Food, Health, and Family Life: Concept of Ahara (diet) in traditional Indian systems, Ritucharya and Dinacharya: Seasonal and daily dietary/lifestyle practices, Pathya–Apathya: Do's and don'ts in diet for health and disease<br>b) Indigenous Foods and Nutritional Practices of India: Diversity of regional and traditional Indian diet, Millets and underutilized grains (ragi, bajra, jowar) and their nutritional significance<br>c) Parenting and Family Life in Bhartiya Pranali: Concept of Brahmacharyashrama, Grihasthashrama, Vanaprasthashrama, Sannyasashrama and its role in family life, Samskaras (Garbhadhana to Annaprashana, Vidyarambha) and child developmentImportance of Indian storytelling (Panchatantra, Jataka tales) in value education, Role of grandparents in transmission of culture and knowledge | Classroom lecture, ICT-enabled learning, Case based learning, Experiential learning | CLO1, CLO2 |
| II | a) Indigenous Clothing Practices and Sustainability: Role of indigenous knowledge systems in Textile sustainability, Cultural preservation through traditional embroidery and designing practices<br>b) Traditional Household Management Practices in India: Traditional ways of managing household resources (food, water, energy), Role of family members, especially *Gruhini*, in managing the home sustainably, Traditional practices of reuse, recycling, and reducing | Classroom lecture, ICT-enabled learning, Case based learning, Expiriential learning | CLO3, CLO4 |

| | | | |
|---|---|---|---|
| | waste, Comparison between traditional and modern household management practices<br>c) Folk Media and Community Education in India: Concept, importance of traditional forms (songs, dance, theatre, puppetry, Bhavai, role play etc), Folk media as a tool for community education and awareness, Cultural values and knowledge transmission through folk media | | |

- **Assessment Methodologies**

**(A) Internal Assessment**

**a. Internal Formative assessment**

(a) Assignment, Self-learning and Terms work
(b) Seminar/Presentation
(c) Quiz

**b. Internal Summative Assessment**

(a) Mid-term tests

**(B) Weightage of Learning Efforts for External Assessment**

| Unit | Aligned CLOs | Total Learning Hours | Approximate weightage (Marks) to Learning levels (BT) | | | Total Marks |
|---|---|---|---|---|---|---|
| | | | Remember (R) | Understanding (U) | Application/ Analyse & above (A) | |
| I | CLO1, CLO2 | 30 | 1 | 1 | 11 | 13 |
| II | CLO3 CLO4 | 30 | 1 | 1 | 10 | 12 |
| | | **60** | **02** | **02** | **21** | **25** |

- Assessment and Evaluation

| Sr.No. | Assessment/Evaluation | Component | Weightage (%) |
|---|---|---|---|
| 1 | Continuous Internal Evaluation | Seminars, Assignments, Quiz, Class Regularity, Internal exam | 50% |
| 2 | End-Semester Examination | Written Exam | 50% |

**(C) CLOs – PLOs Matrix**

| CLO \ PLO | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 | PLO9 | PLO10 | PLO11 | PLO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CLO1** | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 3 | 2 |
| **CLO2** | 3 | 3 | 3 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 3 | 2 |
| **CLO3** | 3 | 3 | 3 | 3 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | 2 |
| **CLO4** | 2 | 3 | 3 | 3 | 1 | 1 | 2 | 3 | 3 | 2 | 3 | 2 |

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Semester-II

Values to **CLO-PLO** matrix are assigned **by judging the importance of the particular CLO** in relation to the **PLOs**.

| CLO – PLO correlation | Value |
|---|---|
| Strong | 3 |
| Moderate | 2 |
| Low | 1 |
| No correlation | - |

- **Suggested Learning Materials Books:**

| Sr. No. | Title | Author(s) | Edition/Year | Publisher |
|---|---|---|---|---|
| 1 | Handbook of Ayurveda and Nutrition | Priti Rishi Lal | Third edition, 2024 | Elite Publishing |
| 2 | Diet and Nutrition: An Ayurvedic Approach | Monika Luharia, Suraj Saries, Rashmi Barsagade, Anurag, Luharia | First edition | IP Innovative Publication Ltd., New Delhi |
| 3 | Handloom and Handicrafts of India | Jasleen Dhamija | 2004 | Abhinav Publications |
| 4 | Textiles of India | Herbert Ponder | 1990 | Taraporevala |
| 5 | Household Management | B. S. Khatkar | Latest edition | Daya Publishing |

- **Online Resources (Open Source)**

| Sr. No. | Description of Resource(s) | Weblink |
|---|---|---|
| 1 | Traditional Folk Media | https://www.igntu.ac.in/eContent/MJMC-4sem-Dr.Manisha%20Sharma.pdf |
| 2 | Traditional and Folk Media for Development | https://ebooks.inflibnet.ac.in/hsp13/chapter/traditional-and-folk-media-for-development/ |
| 3 | Folk And Traditional Media | https://egyankosh.ac.in/bitstream/123456789/78600/1/Unit-10.pdf |
| 4 | Ayurveda and food | https://ayush.gov.in/ |

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