# DEPARTMENT OF HOME SCIENCE

## SEMESTER-IV

## UG Programme for Bachelor in B.Sc. Home Science (Hons.) degree in three years

**Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.**

## DISCIPLINE SPECIFIC CORE COURSE

## DSC HH 410 : Textile Science

### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

| Course title & Code | Credits | Credit distribution of the course | | | Eligibility criteria | Pre-requisiteof the course (if any) |
|---|---|---|---|---|---|---|
| | | Lecture | Tutorial | Practical/ Practice | | |
| Textile Science | 4 | 3 | 0 | 1 | XII Pass | Appeared in Fashion Studies |

### Learning Objectives

- To impart knowledge regarding production, properties and usage of textile fibres and yarns
- To create awareness regarding various techniques of fabric production and their properties
- To give an overview of dyeing, printing and finishing of textiles

### Learning Outcomes

- Describe textile fibres in terms of their production and properties
- Understand production techniques and properties of yarns
- Explain various methods of fabric construction and relate them to specific uses keeping in mind fabric properties
- Recall various dyeing, printing and finishing techniques

### SYLLABUS OF DSC HH 410

**THEORY**

**(Credits 3; Hours 45)**

**UNIT I: Fundamentals of Textile Fibres 6 Hours**

Unit Description: This unit will deal with the key concepts of textile polymers, morphology of textile fibers, primary, secondary properties and classification of textile fibers.

- Morphology of textile fibers: Monomer, Polymer, Degree of Polymerisation, Crystalline and Amorphous Regions, Orientation
- Primary and secondary properties
- Fiber classification

**UNIT II: Production and Properties of Fibers 12 Hours**

Unit Description: This unit will introduce the student to selected commercially significant cellulosic, protein and man-made fibers, their production, chemistry, properties and usage.

**UNIT III: Production and Properties of Yarns 8 Hours**

Unit Description: This unit will discuss the techniques of yarn production, types of yarns and their properties.

- Yarn construction:
  - Mechanical spinning (Cotton system, Wool system, Worsted system)
  - Chemical spinning (Wet, Dry, Melt)
- Types of yarns: Staple and Filament yarns, Simple and Complex yarns, Textured Yarns
- Yarn Properties: Yarn Twist and Balance, Yarn Count

**UNIT IV: Fabric Construction 11 Hours**

Unit Description: This unit will apprise the students about different fabric construction techniques. Students will learn basic principles of weaving, knitting and non-woven fabrics.

- **Weaving**
  - Parts of a loom
  - Operations and motions of the loom
  - Classification of weaves- construction, characteristics, usage
- **Knitting**
  - Classification of knits
  - Construction and properties of warp and weft knits
- **Non-wovens**
  - Types
  - Construction
  - Properties and usage

**UNIT V: Basics of Textile Processing 8 Hours**

Unit Description: This unit help students gain insight to the fundamentals of textile processing, viz. dyeing, printing and finishing.

- **Dyeing**
  - Fundamentals of dyeing- Dyes and Pigments
  - Stages of dyeing- Advantages and Disadvantages
- **Printing**
  - Fundamentals of printing
  - Difference between dyeing and printing,

- Methods of printing: Block, Screen
- Styles of printing: Direct, Resist, Discharge

- **Finishes**
  - Classification of finishes
  - Routine finishes

**PRACTICAL**
**(Credits 1; Hours 30)**

| | | |
|---|---|---|
| 1. | Fibre Identification tests –Visual, burning, microscopic and chemical | 8 |
| 2. | Yarn Identification – Single, ply, cord, textured, elastic, monofilament, multifilament and spun yarn | 4 |
| 3. | Thread count and balance | 6 |
| 4. | Fabric identification (woven, knitted, non-woven) | 2 |
| 5. | Identification of basic weaves | 4 |
| 6. | Tie-Dye | 6 |

**Essential Readings:**


- Rastogi, D. & Chopra, S. (Eds.) (2017). *Textile Science*. New Delhi, India: Orient Black Swan Publishing Limited.
- Rastogi, D, Chopra, S., Arora, C. & Chanchal (Eds.). (2016). *Textile Science-A Practical Manual*. New Delhi, India: Elite Publishing House Private Limited.
- Sekhri S. (2022). *Textbook of Fabric Science: Fundamentals to Finishing*. Delhi, India: PHI Learning Pvt Ltd.
- Joseph, M. L. (1988). *Essentials of Textiles.* (6th Edition). Florida: Holt, Rinehart and Winston Inc.
- Corbman, P.B. (1983). *Textiles- Fiber to Fabric.* (6th Edition). USA: McGraw Hill.


**Suggested Readings:**


- Collier B. & Tortora G. Phyllis. (1997). *Understanding Textiles*. USA: Merrill.
- Hollen, N. and Saddler, J. (1979). *Textile*. New York: Mcmillan.
- Sekhri S. (2023) , वस्त्र विज्ञान (Vastra Vigyaan). Delhi: PHI Learning Private Ltd.


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## DISCIPLINE SPECIFIC CORE COURSE
## DSC HH 411 : Personal Finance and Consumer Studies

### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

| Course title& Code | Credits | Credit distribution of the course | | | Eligibility criteria | Pre-requisite of the course(if any) |
|---|---|---|---|---|---|---|
| | | Lecture | Tutorial | Practical/ Practice | | |
| Personal Finance and Consumer Studies | 4 | 3 | 0 | 1 | XII Pass | Appeared in Fundamentals of Resource Management |

### Learning Objectives

- To provide students an understanding of income, saving and investment management in the changing socio-economic environment
- To acquaint students with the concept of consumers' role in an economy, consumer problems, education, consumer aids and empowerment
- To comprehend issues related to consumer protection, legislative measures and redressal mechanisms

### Learning Outcomes

After completing the course, students will be able to:

- Acquire knowledge of income, saving and investment management in the changing socio-economic environment.
- Develop an understanding about the issues related to consumer protection, legislative measures and redressal mechanisms.
- Gain conceptual knowledge of critically evaluating and designing various consumer aids and about consumer education and protection.
- Learn to undertake food adulteration tests through lab analysis.
- Understand the schemes and services offered by banks and post offices.

### SYLLABUS OF DSC HH 411

**THEORY**
**(Credits 3; Hours 45)**

**UNIT I: Income and Expenditure** **14 Hours**

The unit focuses on developing the fundamental concepts of income, savings and investment management and its applicability in changing socio-economic environment.

- Household Income – Types, Sources, Supplementation of family income

- Income management – significance of budgeting, steps of making a budget, household accounts
- Factors influencing expenditure pattern
- Family savings and investments- need, principles, channels of investment, tax implications
- Consumer credit

**UNIT II: Consumer in India: Consumer problems and education 12 Hours**

This unit attempts to acquaint the students with an understanding of the consumer problems, role of consumer education and empowerment in today's context.

- Definition of a consumer
- Role of consumers in the economy
- Types of consumer problems – products and service related, causes and remedies
- Guidelines for wise buying practices
- Consumer education and empowerment, sustainable consumption
- Changing nature of the business world –e-commerce, e-business

**UNIT III: Consumer Protection 10 Hours**

This unit will orient the students to the need for consumer protection, and rights and responsibilities available for safeguarding consumers' interest.

- Consumer protection
- Consumer rights and responsibilities
- Consumer organizations and their role in consumer protection

**UNIT IV: Legislative framework for consumers protection**

This unit focuses on the legislative framework, acts and redressal mechanisms available for consumer protection.

- Basic legislative framework for consumer protection in India
- Consumer Protection Act (COPRA) and its amendment
- Alternative redressal mechanisms
- Standardization and quality control measures

**PRACTICAL**
**(Credits 1; Hours 30)**

1. Understanding and designing standardization marks.
2. Evaluation and designing of informative and attractive labels for different types of products.
3. Evaluation and designing of advertisements for print/digital media including products, services and social ads.
4. Case study of banks and post offices to understand their services and products.
5. Learning to fill different bank forms.
6. Analysis of consumer redressal through case study approach.
7. Food adulteration tests.

**Essential readings**


- Kotler, P.T., Armstrong, G., Agnihotri, P. (2018). *Principles of Marketing: Basic concepts of marketing*. Pearson Education. ISBN 13: 978-9352865611.

- Maheswaran, D. (2019). *Understanding Indian Consumers*. 1st Edition. Oxford University Press. ISBN 13: 978-0199479627.
- Mital M., Jain, S., & Mehta, C. (2015). *Family finance and Consumer Studies: A Practical Manual, Second Edition.* New Delhi: Elite Publishing House Pvt. Ltd.
- Mital, M., Sawhney, H. K. (2015). *Family Finance and Consumer Studies*. New Delhi: Elite Publishing House Pvt. Ltd.
- Rajni. (2020). *Personal Finance and Planning*. JSR Publishing House LLP.
- Seetharaman, P. and Sethi, M. (2001). *Consumerism: Strength and Tactics*. New Delhi: CBS Publishers.


**Suggested readings**


- Arora, R. (2005). *Consumer Grievances Redressal*. New Delhi: Manak Publications.
- Khanna, S. R., Hanspal S., Kapoor S. & Awasthi H.K. (2007). *Consumer Affairs*. Universities Press India Pvt. Ltd.


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## DISCIPLINE SPECIFIC CORE COURSE
## DSC HH 412: Physical Science for Home Science

### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

| Course title & Code | Credits | Credit distribution of the course | | | Eligibility criteria | Pre-requisite of the course(if any) |
|---|---|---|---|---|---|---|
| | | Lecture | Tutorial | Practical/ Practice | | |
| Physical Science for Home Science | 4 | 2 | 0 | 2 | XII Pass | Appeared in Communication Concepts and Theories |

### Learning Objectives

- To acquire knowledge of different compounds/substances and their importance
- To impart knowledge about various alternate energy sources
- To enhance their skills in handling different equipment

### Learning Outcomes

After completing the course, students would be able to:

- Acquire the ability to correlate structures of different compounds/substances like biomolecules, polymers, surfactants and metals with their properties and functions
- Understand the basic principles of different analytical techniques and the equipment used
- Develop understanding of the basics of different physical phenomenon and their applications in day-to-day life
- Understand the basic concept of nanotechnology and green chemistry
- Understand the various renewable energies and need of energy conversion

### SYLLABUS OF DSC HH 412

**THEORY**
**(Credits 2; Hours 30)**

## Section A-Chemistry

**UNIT I: Macromolecules, Dyes, surfactants and metals** **12 Hours**

This unit highlights biomolecules, synthetic polymers, dyes, cleaning agents and metals

- Carbohydrates - Classification, structures and properties.
- Proteins – Amino acids (structures, classification and properties), and basic concepts of proteins structure
- Lipids – Classification, structures and properties of fatty acids, triacylglycerol and structural lipids
- Synthetic polymers – Classification, polymerisation, polymer morphology, general properties of polymers, (Examples - PE, PP, PVC, PET, PS, PTFE, Nylons), biodegradable polymers, compounding, recyclable plastics (Impact on environment and human health)

- Dyes – Classification of dyes, chemistry of dyeing, food colours, natural dyes
- Surfactants – Soaps and synthetic detergents (structure, cleansing action and their applications)
- Metals- Characteristics of metals and their alloys (iron, aluminium, copper, silver, steel), types of corrosion, tarnishing, prevention of corrosion

**UNIT II: Introduction to Green chemistry 3 Hours**

This unit highlights the importance of Green chemistry

- Definition of green chemistry
- Need of green chemistry (Indiscriminate use of chemicals, fertilizers and pesticides)
- 12 principles of green Chemistry
- Important examples of green chemistry

## Section B-Physics

**UNIT III: Renewable Energy and Electronics 9 Hours**

This unit highlights the importance of Renewable energy and basics of electronics

- Basics of Semi-Conductors and their applications in simple electronic devices.
- Light sources-Incandescent lamp, fluorescent tube, CFL, LED
- Renewable sources of energy: Wind energy, ocean energy, hydro energy, geothermal energy
- Solar Energy- Importance, photoelectric effect, storage, solar cooker, solar green houses, solar desalination, solar cell, need and characteristics of photo-voltaic (PV) systems

**UNIT IV: Sound, Optics and Nanotechnology 6 Hours**

This unit highlights the introduction of nanotechnology, colour measurement, optics, sound and radio communication

- Spectrum of light, chromaticity and CIE chromaticity diagram, basics of spectrometry
- Basics of LASER and optical fibres
- Lenses-types of lenses, power measurement, defects and their remedies, applications in various instruments, photographic camera
- Introduction to nanotechnology, nano materials, properties and applications in different fields
- Basic knowledge of sound, echo, reverberations, acoustics of buildings
- Geostationary satellites, elementary knowledge of radio communication: AM and FM

**PRACTICAL**

**(Credits 2; Hours 60)**

1. **Section A- Chemistry**
   - Safe handling and disposal of chemicals generally used in chemical laboratories
   - Experiments using Analytical techniques:
     - Separation of mixture of amino acids using paper chromatography and determination of $R_f$ values
     - Estimation of proteins by Lowry's/ Biuret method
     - Determination of hardness of water by using complexometric titration
   - Qualitative tests for carbohydrates
     - Monosaccharides
     - Disaccharides and polysaccharides
   - Preparation of Osazones of monosaccharides and disaccharides
   - Saponification of the given oil
   - Preparation of biodiesel from vegetable oil preferably waste cooking oil.

- Preparation of nanoparticles of gold using tea leaves / silver nanoparticles using plant extracts

## 2. Section B- Physics

- Study of different types of experimental errors, their reporting and graphing techniques
- Determination of inner diameter, outer diameter and depth of beaker using Vernier Calliper
- Determination of area of cross section of glass rod and wire using Screw Gauge
- The use of Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, and (d) checking electrical fuses
- Study of the voltage and current of the solar cells in series and parallel combinations.
- Study of V-I & power curves of solar cells, and find maximum power point & efficiency of solar cell.
- Study of the application of solar cells to provide electrical energy to domestic appliances such as lamp, fan and radio.
- Electroplating of the given metal article with a superior metal and to determine the E.C.E.
- Determination of $\lambda_{max}$ using colorimeter.
- Verification of Beer- Lambert law.
- To study/observe the effect of size on colour of nanomaterials.
- Study of different types of lenses and determination of power of a convex lens.

**Essential Readings**


- Ahluwalia, V. K., Dhingra, S. and Gulati, A., 2005, College Practical Chemistry, University Press (India) Pvt. Ltd, India.
- Anastas, P.T. and Warner, J.C., 1998, Green Chemistry: Theory and Practice, Oxford University Press, U.S.A.
- Bahl, A. and Bahl, B.S., 2022, Advanced Organic Chemistry, (6th ed.), S. Chand and Sons, New Delhi.
- Beiser, A., Mahajan, S. and Choudhary, S.R., 2017, Concepts of Modern Physics, McGraw-Hill, India.
- Boyle, G., 2012, Renewable Energy, Power for a sustainable future (3rd ed.), Oxford University Press, U.S.A.
- Dua, A. and Manav, N., 2017, Practical Organic Chemistry, Manakin Press, New Delhi.
- Freedman, R.A., Young, H.D. and Ford, A.L., 2021, University Physics with modern physics (15th ed.), Pearson Education, India.
- Kulkarni, S. K., 2014, Nanotechnology: Principles & Practices (3rd ed.), Capital Publishing Company, New Delhi.
- Lancaster, M., 2016, Green Chemistry: An Introductory Text (2nd ed.), RSC Publishing, U.K.
- Poole, C.P., Frank, Jr. and Owens, J., 2003, Introduction to Nanotechnology (1st ed.), Wiley India Pvt. Ltd, India.
- Sharma, R.K., Sidhwani, I.T. and Chaudhari, M.K., 2013, Green Chemistry Experiments: A monograph, I.K. International Publishing House Pvt Ltd, New Delhi.
- Sukhatame, S.P. and Nayak, J. K., 2017, Solar energy, Tata McGraw - Hill Publishing Company Ltd., India.


**Suggested Readings:**


- Chattopadhyay, K.K. and Banerjee, A. N., 2009, Introduction to Nanoscience and Technology, PHI Learning Private Limited, New Delhi.
- Flint, B.L. and Worsnop, H.T., 1971, Advanced Practical Physics for students, Asia Publishing House, India.
- Jacob, T., 1979, Textbook of Applied Chemistry, McMillan India Ltd., Noida.

- Khandelwal, D. P., 1985, A Laboratory Manual of Physics for Undergraduate Classes, Vani Publication, New Delhi.
- Morrison, R.T., Boyd, R. N. and Bhattacharjee, S.K., 2021, Organic Chemistry (7th ed.), Pearson Education, New Delhi.
- Sharma, S.P., 2003, Basic Radio and Television (2nd ed.), Tata McGraw Hill, India.
- Singh, H., 2001, B.Sc. Practical Physics, S. Chand and Co., New Delhi.
- Solomon, T.W., 2017, Organic Chemistry (12th ed.), John Wiley & Sons, U.S.A.
- Vogel, 2009, Quantitative Chemical analysis, Pearson Education, New Delhi.
- Walker, J., Resnick, R., and Halliday, D., 2013, Fundamentals of Physics, Wiley, U.S.A.


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