



Karmaveer Bhaurao Patil University, Satara

Syllabus for

Diploma I

Processing and Packaging of Household Chemicals

Under

Faculty of Science and Technology

With effect from Academic Year 2024-2025

Department of Chemistry

Revised Syllabus of Diploma Programme (UG)

Preamble

This Syllabus is prepared for first year undergraduate students. At this level, to develop their interest towards household chemistry and also to prepare them for the industrial exposure. The interdisciplinary approach with vigour and depth is compatible to the syllabi of other universities. The units in the syllabus are well defined with scope and the number of lectures. The references are mentioned with relevance.

Program

1. The students are expected to understand the fundamentals, basic principles, concepts and recent developments in the subject area.
2. The practical course is in relevance to the theory courses to improve the understanding of the concepts.

Program

After successful completion of diploma course student will be able to:

1. Synthesize various household chemicals.
2. Get the information about the ingredients involved in the synthesis of household products.
3. Know about the marketing of the products.

I Year Diploma Program

1. Title: Processing and Packaging of Household Products
2. Year of Implementation: 2024-25
3. Duration: One Year
4. Pattern: Semester
5. Medium of Instruction: English
6. Contact hours: 7 hours/week
8. Structure of Course:

Syllabus Structure (UG)

Year	Semester	Course No.	Course Code	Contact Hours	Credits (1Credit=15 H)	Total Marks
1	I	CT I	DCT 101	30	2	75
		CL I	DC L101	60	2	75
	II	CT II	DCT 202	30	2	75

		CL II	DC L202	60	2	75
	Annual	CP I	DCP101	30	1	50
		Total		210	9	350
2	III	CT III	DCT 303	30	2	75
		CL III	DC L303	60	2	75
	IV	CT IV	DCT 404	30	2	75
		CL IV	DC L404	60	2	75
	Annual	CP II	DCP202	30	1	50
		Industrial and or Incubation and or Research and or Field Training		30	1	-
		Total		240	10	350
	V	CT V	DCT 505	30	2	75
		CLV	DCL505	60	2	75
	VI	CT VI	DCT 606	30	2	75
		CL VI	DCL606	60	2	75
	Annual	CP III	DCP303	60	2	100
		Industrial and or Incubation and or Research and or Field Training		30	1	-
		Total		270	11	400
Total				720	30	1100

D: Diploma, *: Departmental Code

C: Course, T: Theory, L: Lab (Practical), P: Project

Total No. of Courses: 10 (Theory: 06, Practical: 06, Project: 03) Theory and Practical:

Semester, Project: Annual

Semester I

DCT 101: Introduction of Household chemicals

(Contact Hrs: 30 Credits: 2)

Course Objectives:

Students will be able to

1. Know different household chemicals and their manufacturing processes.
2. Know the soap technology and the manufacturing process for both chemical and herbal soap.

Unit I: Household chemicals

(15)

- 1.1 Introduction of household chemicals.
- 1.2 Examples of household chemicals, Air freshener, toilet rim block, insect repellent, Body wash, Mouth wash.
- 1.3 Introduction & synthesis of cleaning agents.
- 1.4 Application of natural cleaning agents, cleaning action, floor cleaner, toilet cleaner, bathroom cleaner, Kitchen cleaner.

Unit II: Technology of soap (15)

- 2.1 Chemistry of soap, raw materials for soap industry and their selection;
- 2.2 Natural ingredients of soap, common oil fats and butters used in soap making
- 2.3 Chemical reactions of soap; hard and soft soaps;

2.4 Plant and process employed in soap manufacture; process of natural soap making, liquid hand wash and liquid dish wash.

Course Outcomes:

After completion of the unit, Student is able to

1. learn fundamentals of household chemicals, various cleaning agents
2. Students is able to learn the technology of soap and preparation of soap

Reference Books:

1. Shetty, M.C. *Small Scale Industries and Household Industries in Developing Economy.*
2. Prasad, Giriraj. *Manufacture of Perfumes, Cosmetics, and Detergents.*
3. Sharma, B.K. *Industrial Chemistry.*

DCL101: (Practical):
(Contact Hrs: 60 Credits: 02)

Course Objectives:

Students will be able to

1. Know the preparation of household products
2. Use the herbal ingredients for the use of household products.
3. Know manufacturing process of soap
4. Know the basic ingredients used in different household chemicals

List of Practical's

1. Preparation of Sanitary acid (Three types)
2. Preparation of liquid soap (Three fragrances)
3. Preparation of Herbal Soap (Three fragrances)
4. Preparation of white phenyl (Three types)
5. Preparation of Solid soap (Three types)

Any other suitable practical can be added

Course Outcomes:

After completion of the unit, Student is able to

1. Define process of soap and sanitary acids preparation
2. Know different reactions for preparation of liquid soap.

Reference Books:

1. Vogel's text book of qualitative chemical analysis (Longman ELBS Edition)
2. Vogel's text book of Quantitative analysis (Longman ELBS Edition)
3. Practical Organic Chemistry by A. I. Vogel
4. Practical Organic Chemistry by O. P. Agrawal.

Semester II

DCT202: Introduction of Detergents, Surfactants, Packaging of products and extraction Techniques

(Contact Hrs: 30 Credits: 2)

Course Objectives:

Students will be able to

1. Know about the detergents, surfactants, various extraction techniques
2. Know about the packaging process of products.

Unit I: Detergents and Herbal extraction techniques (15)

- 1.1 Introduction, different terms used in detergents; raw materials for detergents;
- 1.2 Washing action of detergents; types of detergents;
- 1.3 Introduction of surfactants; types of surfactants, bleach and its mechanism of action, antimicrobial efficiency
- 1.4 Extraction techniques: Introduction, steam distillation,
- 1.5 Ether extraction, Soxhlet extraction, Digestion, Decoction, ultrasound extraction.

Unit II: Packaging introduction (15)

- 2.1 Packaging-History, need and evaluation; packaging function-contain, preserve, protect, inform, identify, sell; packaging Hazards.
- 2.2 Transportation, chemical, climatic, biological; packaging classification-primary/secondary/tertiary, unit/intermediate, bulk, flexible and rigid.

Course Outcomes:

After completion of the unit, Student is able to

1. Get the knowledge about types and uses of detergents and surfactants.
2. Get the knowledge of extraction techniques such as steam distillation, soxhlet extraction.

Reference Books:

1. SBP Board. *Flavours and Essential Oils Industries*.
2. Poucher, W. *Perfumes, Soaps, and Cosmetics*.
3. Prasad, Giriraj. *Manufacture of Perfumes, Cosmetics, and Detergents*.
4. Yam, K.L. *The Wiley Encyclopaedia of Packaging Technology*. 3rd ed. Wiley, 2009.

DCL202: (Practical):

(Contact Hrs: 60 Credits: 02)

Course Objectives:

Students will be able to

1. Know different herbal extraction process.
2. Know the active ingredients in herbal products.
3. Know the manufacturing process of detergents.
4. Know different preparation methods for mouthwash.

List of Practical's

1. Extraction of active ingredients of Babul Herbal product
2. Extraction of active ingredients of Chandan Herbal product
3. Extraction of active principles of haldi Herbal product-,Reetha
4. Extraction of active ingredients of Reetha Herbal product
5. Extraction of active ingredients of jasmine Herbal product
6. Extraction of active ingredients of Neem Herbal product
7. Practical based on preparation of various cosmetic's products by using herbal principle: Shampoo (2)
8. Preparation of various cosmetic's products by using herbal principle mouth wash (3)
9. Preparation of Detergents (2)
10. Preparation of Liquid Pitambari

Course Outcomes:

After completion of the unit, Student is able to

1. Prepare various extracts of babul, haldi, jasmine, reetha, neem.
2. Prepare Shampoo and mouth wash

Reference Books:

1. Vogel, Arthur Israel. *Vogel's Textbook of Qualitative Chemical Analysis*. Longman ELBS Edition.
2. Agrawal, O.P. *Practical Organic Chemistry*.
3. Mann, F., & Saunders, B.C. *Practical Organic Chemistry*.
4. Ahluwalia, V.K. *Comprehensive Practical Organic Chemistry: Qualitative Analysis*.
5. Vogel, A.I. *A Textbook of Quantitative Inorganic Analysis Including Elemental Instrumental Analysis*. 3rd ed.

DCP101 (Project):

(Contact Hrs.30, Credits: 1)

BOS subcommittee-

1. Mr. D. N. Gaikwad (Chairman)
2. Dr. R. V. Hangarge (Member)

Experts –

1. Mrs. N. S. Jadhav, Assistant Professor, L.B.S. College, Satara
2. Mr. Sandip Pawar, Manager, BPCL, Mumbai