

VSC2: Mastering the Calibration of Glassware and Instruments

Course Code:

Credits: 4

This course focuses on the calibration of glassware and instruments used in scientific measurements. Students will learn the principles, methods, and techniques involved in calibrating various types of glassware and instruments. The course emphasizes both theoretical knowledge and practical skills through hands-on calibration exercises. Students will gain proficiency in ensuring accurate and reliable measurements by calibrating and verifying the performance of laboratory equipment.

Course Objectives:

Understand the importance of calibration in scientific measurements.

Learn the principles and techniques of glassware calibration.

Gain knowledge of the calibration process for different types of laboratory instruments.

Develop practical skills in calibrating glassware and instruments.

Apply quality control measures in laboratory settings.

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Programme Outcomes (POs 1-8)

Course Outcomes (COs) / Programme Outcomes (POs)	1	2	3	4	5	6	7	8
Understand the importance of calibration in scientific measurements.	√	√						
Learn the principles and techniques of glassware calibration.	√	√		√				
Gain knowledge of the calibration process for different types of laboratory instruments.	√					√		
Develop practical skills in calibrating glassware and instruments.	√	√		√				
Apply quality control measures in laboratory settings.	√	√		√				√

Course Articulation Matrix relates course outcomes of course with the corresponding programme outcomes whose attainment is attempted in this course. Mark '√' in the intersection cell if a course

Unit I: Introduction to Calibration 6

Importance of calibration in scientific measurements Concepts of accuracy, precision, and traceability

Regulatory standards and guidelines for calibration Calibration traceability and documentation

Unit II: Glassware Calibration 6

Introduction to volumetric glassware (e.g., pipettes, burettes, volumetric flasks)

Techniques for calibrating volumetric glassware. Determination of accuracy and precision in volume measurements

Calibrating graduated cylinders and beakers

Evaluation of accuracy and uncertainty in graduated glassware measurements

Correction factors and error estimation in graduated glassware calibration

Unit 3: Instrument Calibration

Principles of pH measurement and calibration

Calibration of pH meters using buffer solutions

Module 4: Calibration Techniques for Specific Instruments (6)

Calibration of Flame photometer, doublebeam spectrophotometer and FT-IR. Verification of linearity and stray light.

Practicals:

Experiment 1: Calibration of Volumetric Glassware

Experiment 2: Calibration of Graduated Glassware

Experiment 4: Calibration of pH Meters

Experiment 5: Calibration of Spectrophotometers

Skill Enhancement Course (SEC)

Course Title : : Food Packaging

Course Credits: 1, Total Contact Hours: 30

Course Outcomes:

1. Define fundamental terms in Food Packaging.
2. Apply different method to food Packaging.
3. Understand practical knowledge for food Packaging.
4. Understand traditional Indian food packaging materials and their applications

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Programme Outcomes (POs 1-8)

Course Outcomes (COs) / Programme Outcomes (POs)	1	2	3	4	5	6	7	8
1. Define fundamental terms in Food Packaging.	√							
2. Apply different method to food Packaging.		√		√				
3. Understand practical knowledge for food Packaging.	√			√				
4. Understand traditional Indian food packaging materials and their applications.								

Course Title : : Food Packaging

Course Credits: 1, Total Contact Hours: 30

Practicals

1. Packaging of snacks-3 practicals
2. Packaging of milk-1 practicals
3. Packaging of carbonated drinks-2 practicals
4. Packaging of bread and biscuits-2 practicals
5. Packaging of coffee and tea -2 practicals.
- 6.

References:

1. Gordon, L. Robertson, 2006, Food Packaging: Principles and Practices, 2nd edition.
2. Painy, F. A., Painy, H. Y., Handbook of Food Packaging, Leonard Hill, Glasgow, UK, (1983)

Skill Enhancement Course (SEC)

Course Title : : Food Packaging

Course Credits: 1, Total Contact Hours: 15

Course Outcomes:

1. Define fundamental terms in Food Packaging.
2. Apply different method to food Packaging.
3. List different food samples and identify the correct method for labeling.
4. Understand traditional Indian food packaging materials and their applications

Course Articulation Matrix: Mapping of Course Outcomes (COs) with Programme Outcomes (POs 1-8)

Course Outcomes (COs) / Programme Outcomes (POs)	1	2	3	4	5	6	7	8
1. Define fundamental terms in Food Packaging	√							
2. Apply different method to food Packaging.		√	√	√				
3. List different food samples and identify the correct method for labeling.	√	√	√					
4. Understand traditional Indian food packaging materials and their applications.	√		√					

Course Title : : Food Packaging

Course Credits: 1, Total Contact Hours: 15

Unit-I: Introduction to food packaging

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Definition, Functions, Packaging situations in India and World, Packaging requirements, labeling laws.

Unit-II: Food packaging materials

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Wood and clay-Properties, Applications, Advantages and Disadvantages. Glass-Properties, Applications, Advantages and Disadvantages. Metal- Properties, Applications, Advantages and Disadvantages. Paper- Types, Properties, Applications, Advantages and Disadvantages. Plastic and laminates- Types, Properties, Applications, Advantages and Disadvantages.

References:

1. Gordon, L. Robertson, 2006, Food Packaging: Principles and Practices, 2nd edition.
2. Painy, F. A., Painy, H. Y., Handbook of Food Packaging, Leonard Hill, Glasgow, UK, (1983)