

**GOVERNMENT DEGREE  
COLLEGE, KARVETINAGARAM**

**Chittoor Dt.-517582**



**CERTIFICATE COURSE**

**ON**

**Handling and Usage of Common  
Laboratory Glassware and  
Instruments**

**Organized by**

**Department of Chemistry**

**GOVT. DEGREE COLLEGE, KARVETINAGARAM**

**CHITTOOR DIST.-517582**

Date: 14-10-2024  
Karvetinagaram


**CIRCULAR**

All the First year B. Sc (Hon) students are hereby informed that the Department of Chemistry is going to commence a certificate course on “**Handling and Usage of Common Laboratory Glassware and Instruments**” from 21<sup>st</sup> October 2024 in the afternoon sessions

Duration of the Course: **30 Hours**

Course Fee: Free of cost

For further details contact: Dr. T. Hari Babu, Department of Chemistry

  
Principal  
**PRINCIPAL**  
**Govt. Degree College**  
**KARVETINAGARAM-517532**  
**Chittoor Dt., A.P.**

# GOVERNMENT DEGREE COLLEGE KARVETINAGARAM



NAAC 'B++' WITH CGPA 3.0

**CHITTOOR DIST. AP. 517582**  
**DEPARTMENT OF CHEMISTRY**

CERTIFICATE COURSE ON

## Handling and Usage of Common Laboratory Glassware and Instruments

**Eligibility** : All I B. Sc Hons Students


**Registration Fee** : Free of Cost

**Registration Start** : 15-10-2024

**Registration End** : 19-10-2024

**Duration of Course** : 40 Hrs

**Course Start** : 21-10-2024

  
Principal  
**PRINCIPAL**  
Govt. Degree College  
KARVETINAGARAM-517532  
Chittoor Dt., A.P.

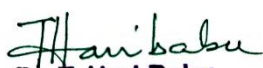
**GOVT. DEGREE COLLEGE, KARVETINAGARAM, CHITTOOR DIST.**


**DEPARTMENT OF CHEMISTRY – 2024-25**

**Certificate Course on “Handling and Usage of Common Laboratory Glassware and Instruments”**

***List of Students:***

<b>S.No</b>	<b>HALLTICKET</b>	<b>STUDENT NAME</b>
1	0325021036	ALAMBILLI CHARAN THEJA
2	0325021037	A LOKESH
3	0325021038	ARKAR THULASI
4	0325021039	D BALAJI
5	0325021040	DESURU BHANU PRAKASH
6	0325021041	D JYOTHSNA
7	0325021042	KOKKINTI AKASH
8	0325021043	KOLLAGUNTA MANOJ KUMAR
9	0325021044	KORAKUPPAM KUMARI
10	0325021045	MANGILI JYOTHISH
11	0325021046	MERAVA MANOJ
12	0325021047	MYLAM USHA
13	0325021048	NELLEPALLI STALIN
14	0325021049	PATTURI MOUNIKA
15	0325021050	P LATHISH
16	0325021051	SHAIK AFRINBHANU
17	0325021052	SOWDEPALLI UMA
18	0325021053	THOTI RAHUL
19	0325021054	T SHANTHI
20	0325021055	T VASU
21	0325021056	VADIMGADU HARIKRISHNA
22	0325021057	VANIMBEDU MOHANASINDHU
23	0325021059	KONETI JYOSHNA

  
**Dr. T. Hari Babu**  
Lecturer In Chemistry  
Govt. Degree College  
Karvetinagaram - 517582

  
Principal  
**PRINCIPAL**  
Govt. Degree College  
KARVETINAGARAM-517532  
Chittoor Dt., A.P.

## Brief Report on

# Certificate Course on *Handling and Usage of Common Laboratory Glassware and Instruments*

### Introduction

A certificate course on *Handling and Usage of Common Laboratory Glassware and Instruments* was inaugurated on 21<sup>st</sup> October 2024 in this college by the principal Dr. S. Vijuyulu Reddy. The course duration is 30 hours. This course was run free of cost to the student by the Department of Chemistry. The course was run by Dr. T. Hari Babu. The course was conducted one hour per day including Practical's. Twenty-Three students of I B.Sc Hons.(Chemistry) are enrolled in this course.

The certificate course on the *Handling and Usage of Common Laboratory Glassware and Instruments* is designed to provide students, laboratory technicians, and professionals with essential skills and knowledge for safely and effectively using laboratory glassware and instruments. The course aims to improve understanding of the importance of proper techniques, safety measures, and maintenance of laboratory tools to enhance the quality of experimental work and ensure a safe working environment.

### Course Objectives:

1. To familiarize participants with the different types of laboratory glassware and instruments.
2. To teach the proper methods of handling and cleaning laboratory equipment.
3. To emphasize safety procedures for using glassware and instruments in laboratory settings.
4. To introduce calibration and maintenance techniques for laboratory instruments.
5. To ensure awareness of best practices in storing and disposing of laboratory equipment.

**Course Content:** The course covers a variety of topics including but not limited to:

- **Overview of Laboratory Glassware:** Types of glassware such as beakers, flasks, test tubes, burettes, and pipettes, and their specific uses in different types of experiments.
- **Handling and Cleaning Techniques:** Correct procedures for handling delicate glassware, cleaning methods, and prevention of contamination or damage.
- **Usage of Laboratory Instruments:** Introduction to common instruments like microscopes, spectrophotometers, balances, centrifuges, and pH meters. Participants are taught to operate these tools and interpret their readings.
- **Safety Measures:** Guidelines for handling glassware and instruments safely to avoid accidents. This includes understanding the risks associated with breakage, chemical reactions, and proper storage of hazardous materials.
- **Instrument Calibration and Maintenance:** Regular procedures for calibrating instruments to ensure accurate readings and the importance of maintaining equipment in good working order.

- **Disposal and Storage:** Best practices for disposing of or storing glassware and instruments, including managing waste materials and ensuring that tools are stored in a way that prevents accidents.

**Teaching Methodology:** The course uses a combination of **theoretical lessons** and **practical demonstrations** to ensure a well-rounded learning experience. Participants engage in hands-on exercises to develop practical skills, including:

- Demonstrations on how to use and handle various instruments safely.
- Interactive discussions on the various types of glassware and their functions.
- Practical sessions for cleaning and maintaining glassware and instruments.
- Real-life case studies on laboratory accidents due to improper handling and how to prevent them.

Upon successful completion of the course, participants are awarded a **Certificate of Completion** recognizing their competence in using laboratory equipment and following safety protocols.

### **Conclusion**

This certificate course equips participants with the necessary skills and safety awareness for handling and using common laboratory glassware and instruments. It is a crucial step for those working in scientific research, healthcare, or educational institutions, ensuring that they can perform experiments efficiently and safely. By adhering to the best practices taught in the course, participants contribute to maintaining a safe and productive laboratory environment.

**GOVT. DEGREE COLLEGE, KARVETINAGARAM**

**Chittoor Dt.- 517582**

**DEPARTMENT OF CHEMISTRY**

**CERTIFICATE COURSE ON**

***HANDLING AND USAGE OF COMMON LABORATORY GLASSWARE AND  
INSTRUMENTS***

**SYLLABUS**

Total – 30 Hrs.

**Unit-1: Safe Handling of Laboratory Glassware**

Heating, stirring, washing, drying in oven, carriage & storage, tube insertion and removal from bungs, joining of glass components, vacuum applications, centrifugation

**Unit-2: Common Laboratory Glassware**

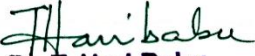
Measuring cylinder, Erlenmeyer flask, round bottom flask, Buchner flask, volumetric flask, beaker, reagent bottle, watch glass, pipette, burette, funnel, test tube, viscometer, stalagmometer, condenser, separating funnel, petri dish, mortar pestle


**Unit-3: Common Laboratory Apparatus & Instruments**

Test tube holder, tripod stand, spatula, wire mesh, Bunsen burner, spirit lamp, crucible tongs, Deionizer, Simple Balance, Hot air oven, Water Bath, Electronic Balance, Centrifuge Machine, Melting Point Apparatus, Digital Conductivity Meter, Digital Colorimeter, Digital Potentiometer, Stop Clock

## Day – Wise Certificate Course Lab

S.No	Date	Topic
1	21-10-2024	Handling of Measuring Cylinder and its usage
2	22-10-2024	Handling of Conical Flask and its usage
3	23-10-2024	Handling of Volumetric Flask and its usage
4	24-10-2024	Handling of Bunsen Burner and its usage
5	25-10-2024	Handling of Tripod stand and its usage
6	26-10-2024	Handling of Beakers and its usage
7	28-10-2024	Handling of Mortar Pestle and its usage
8	29-10-2024	Handling of Reagent Bottles and its usage
9	30-10-2024	Handling of Melting point capillaries and its usage
10	01-11-2024	Handling of Ignition tubes and its usage
11	02-11-2024	Handling of Watch Glasses and its usage
12	04-11-2024	Handling of Pipette and its usage
13	05-11-2024	Handling of Burette and its usage
14	06-11-2024	Handling of Viscometer and its usage
15	07-11-2024	Handling of Stalagmometer and its usage
16	08-11-2024	Operation of Spirit lamp and its usage
17	11-11-2024	Operation of Deionizer and its usage
18	12-11-2024	Operation of Simple Balance and its usage
19	13-11-2024	Operation of Hot air oven and its usage
20	14-11-2024	Operation of Water Bath and its usage
21	15-11-2024	Operation of Electronic Balance and its usage
22	16-11-2024	Operation of Centrifuge Machine and its usage
23	18-11-2024	Operation of Melting Point Apparatus and its usage
24	19-11-2024	Operation of Magnetic Stirrer and its usage
25	20-11-2024	Operation of Digital Conductivity Meter and its usage
26	21-11-2024	Operation of Digital Colorimeter and its usage
27	22-11-2024	Operation of Digital Potentiometer and its usage
28	23-11-2024	Operation of Stop Clock and its usage
29	25-11-2024	Drawing Test
30	26-11-2024	Certificate Distribution

  
**Dr. T. Hari Babu**  
Lecturer In Chemistry  
Govt. Degree College  
Karvetinagaram - 517582

  
Principal  
**PRINCIPAL**  
Govt. Degree College  
KARVETINAGARAM-517582  
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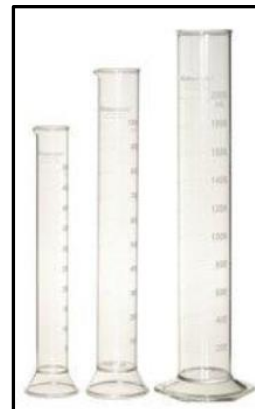
## SOME COMMON LABORATORY GLASSWARE

### 1. Measuring Cylinder

A Measuring Cylinders / graduated cylinder / cylinder measuring / mixing cylinder is a piece of laboratory apparatus used to measure the volume of a liquids, chemicals or solutions during the lab daily work.

Graduated cylinders are more precise and accurate than the common laboratory flasks and beakers.

Graduated cylinders are also used to determine displacement, which is a measurement of the change in a volume of water when additional materials are added to it, this means that the volume of solid objects and solutions can be determined using a graduated cylinder.

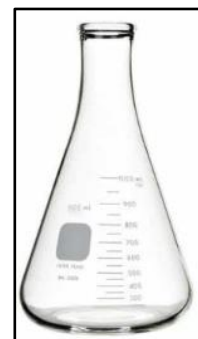


### 2. Conical Flask

This is a conical-shaped glass apparatus with a round bottom. The conical flask does not contain graduated readings in most cases. It is mostly available in 25-, 50-, 100-, and 250-ml sizes.

#### Uses:

Widely used in titrations like acid-base, redox, complexometry, etc. Since the mixture requires constant stirring, the sample is taken in a conical flask, and the reactive agent is added from the burette drop by drop with a constant swirling of the flask and its contents till the endpoint.



It can also be used for reactions involving heating. Since the mouth is narrow, the fumes of the reaction can be made to escape safely without exposing the lab interiors.

### 3. Volumetric Flask

A volumetric flask is a scientific instrument that is transparent and conical-shaped. In most cases, it is glass labware used specifically to hold liquid materials. Though one can find flasks made of plastic, the ones made of glass are preferred as they can hold harsh chemicals. It is a graduated flask with calibration to hold a fixed volume at the mark provided near the neck.

It finds its use mainly in chemical, biochemical, clinical, and research labs.  
Volumetric flask parts

The flask has two pieces, as seen in the picture below.

1. The flask
2. A small Cap or Lid (to close the flask mouth).

The flask is designed to accommodate the desired volume of the liquid up to the mark.



### 4. Bunsen Burner

A Bunsen burner, named after Robert Bunsen, is a kind of ambient air gas burner used as laboratory equipment; it produces a single open gas flame, and is used for heating, sterilization, and combustion



#### 4. Beakers

In laboratory equipment, a beaker is generally a cylindrical container with a flat bottom. Most also have a small spout (or "beak") to aid pouring, as shown in the picture. Beakers are available in a wide range of sizes, from one milliliter up to several liters. A beaker is distinguished from a flask by having straight rather than sloping sides.



#### 5. Tripod Stand

A laboratory tripod is a three-legged platform used to support flasks and beakers. Tripods are usually made of stainless steel or aluminium and made light-weight for efficient portability within the lab. Often a wire gauze is placed on top of the tripod to provide a flat base for glassware.



#### 6. Mortar and Pestle

A mortar and pestle is a set of two simple tools used to prepare ingredients or substances by crushing and grinding them into a fine paste or powder in the kitchen, laboratory, and pharmacy. The mortar is characteristically a bowl, typically made of hardwood, metal, ceramic, or hard stone such as granite. The pestle is a blunt, club-shaped object. The substance to be ground, which may be wet or dry, is placed in the mortar where the pestle is pounded, pressed, or rotated into the substance until the desired texture is achieved.



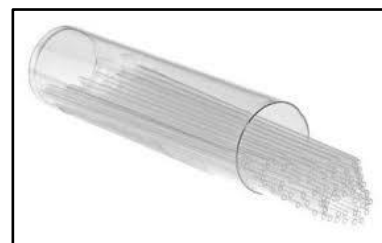
## 7. Reagent Bottles

Reagent bottles, also known as media bottles or graduated bottles, are containers made of glass, plastic, borosilicate or related substances, and topped by special caps or stoppers. They are intended to contain chemicals in liquid or powder form for laboratories and stored in cabinets or on shelves. Some reagent bottles are tinted amber (actinic), brown or red to protect light-sensitive chemical compounds from visible light, ultraviolet and infrared radiation which may alter them



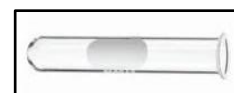
## 8. Melting Point Capillaries

A "melting point capillary" is a small, thin glass tube, usually sealed at one end, used to hold a tiny sample of a solid substance so that its melting point can be accurately determined by observing the temperature at which it melts when heated in a specialized apparatus called a "melting point apparatus"



## 9. Ignition Tube

An ignition tube is used in much the same way as a boiling tube, except it is not as large and thick-walled. It is primarily used to hold small quantities of substances which are undergoing direct heating by a Bunsen burner or other heat source. This type of tube is used in the sodium fusion test.



## 10. Watch Glass

Watch glasses are shallow, circular, and concave, and may be used as beaker or flask covers, weighing, crystallization, and drying. Watch glasses are available in a variety of sizes and materials compatible with virtually all



## 11. Pipette

A pipette is a laboratory instrument used to measure out or transfer small quantities of liquid, in volumes of milliliters (mL), microliters ( $\mu\text{L}$ )



## 12. Burette

A burette, also called a buret, is a long, graduated, glass tube marked with measurements and used in chemistry. A burette functions as a tool for measuring both liquids and gases. A volumetric burette is a long glass tube, while a piston burette is similar to a syringe



## 13. Viscometer

This device is also known as glass capillary viscometer or Ostwald viscometer, named after Wilhelm Ostwald. Another version is the Ubbelohde viscometer, which consists of a U-shaped glass tube held vertically in a controlled temperature bath. In one arm of the U is a vertical section of precise narrow bore (the capillary). Above there is a bulb, with it is another bulb lower down on the other arm. In use, liquid is drawn into the upper bulb by suction, then allowed to flow down through the capillary into the lower bulb. Two marks (one above and one below the upper bulb) indicate a known volume. The time taken for the level of the liquid to pass between these marks is proportional to the kinematic viscosity. The calibration can be done using a fluid of known properties. Most commercial units are provided with a conversion factor.



The time required for the test liquid to flow through a capillary of a known diameter of a certain factor between two marked points is measured. By multiplying the time taken by the factor of the viscometer, the kinematic viscosity is obtained.

## 14. Stalagmometer

An instrument for determining the number of drops, or the weight of each drop, in a given volume of liquid. A stalagmometer is a glass instrument that measures the surface tension of a liquid. It can also measure the interfacial tension between two liquids.

A stalagmometer is a capillary glass tube with a widened middle section and a narrowed lower end. The drops of liquid fall slowly from the tube in a vertical direction. The weight of the drops is in equilibrium with the surface tension when the drops start to fall. The surface tension can be calculated using Tate's law.

Stalagmometers are often used to calculate surface tension, such as that of blood or serum. They were also often used to determine alcoholic concentration



## 15. Spirit Lamp or Alcohol Burner

An alcohol burner or spirit lamp is a piece of laboratory equipment used to produce an open flame. It can be made from brass, glass, stainless steel or aluminium.

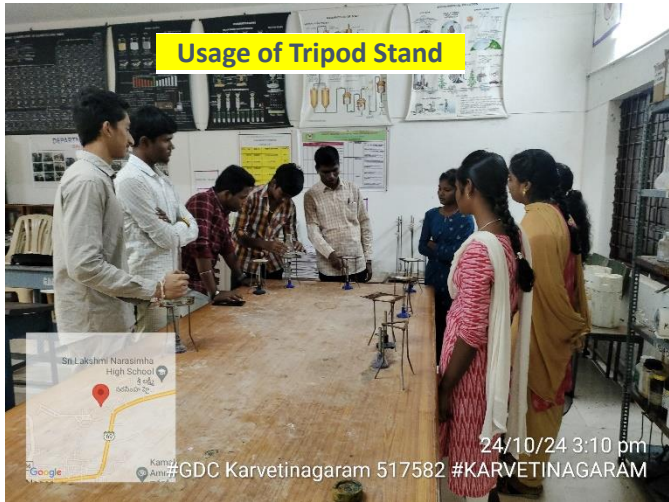
Alcohol burners are preferred for some uses over Bunsen burners for safety purposes, and in laboratories where natural gas is not available. Their flame is limited to approximately 5 centimeters (two inches) in height, with a comparatively lower temperature than the gas flame of the Bunsen burner.



## 16. De-ionizer

Water deionization systems remove ions and minerals by synthetic ion exchange resins. Cation resins remove positively charged ions; anion resins remove negatively charged ions. A water deionization system is ideal for laboratories, manufacturing, aquariums, and anywhere else high-purity water is required.





Usage of Tripod Stand



24/10/24 3:10 pm  
#GDC Karvetinagaram 517582 #KARVETINAGARAM



Handling of Beakers



26/10/24 3:27 pm  
#GDC Karvetinagaram 517582 #KARVETINAGARAM



Handling of Mortar and Pestle



28/10/24 3:22 pm  
#GDC Karvetinagaram 517582 #KARVETINAGARAM



Usage of Reagent Bottles



29/10/24 3:59 pm  
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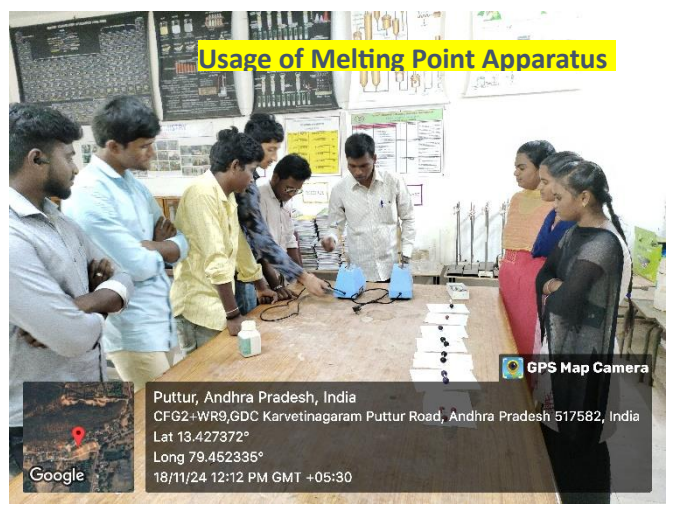
Puttur, Andhra Pradesh, India  
CFG2+WR9,GDC Karvetinagaram Puttur Road, Andhra Pradesh 517582, India  
Lat 13.427372°  
Long 79.452335°  
12/11/24 02:42 PM GMT +05:30

Usage of Analytical Balance



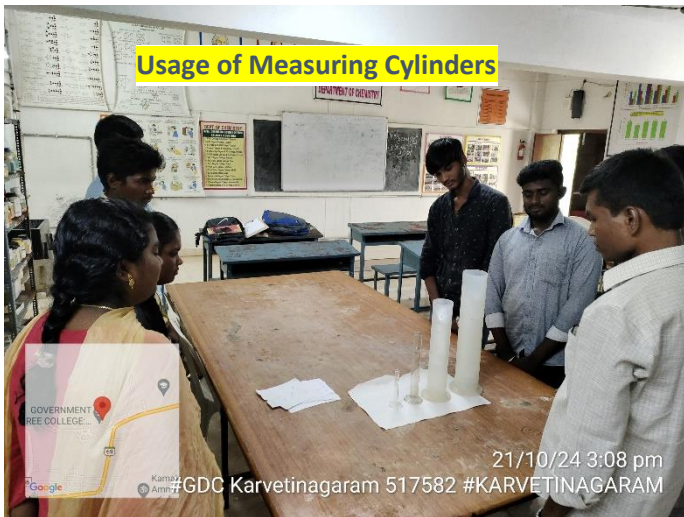
Puttur, Andhra Pradesh, India  
CFG2+WR9,GDC Karvetinagaram Puttur Road, Andhra Pradesh 517582, India  
Lat 13.427372°  
Long 79.452335°  
13/11/24 12:45 PM GMT +05:30

Usage of Hot Air Oven



**Usage of Magnetic Stirrer**

**Usage of Digital Conductivity Meter**



### Usage of Measuring Cylinders

21/10/24 3:08 pm

#GDC Karvetinagaram 517582 #KARVETINAGARAM



### Handling of Burette

22/10/24 1:02 pm

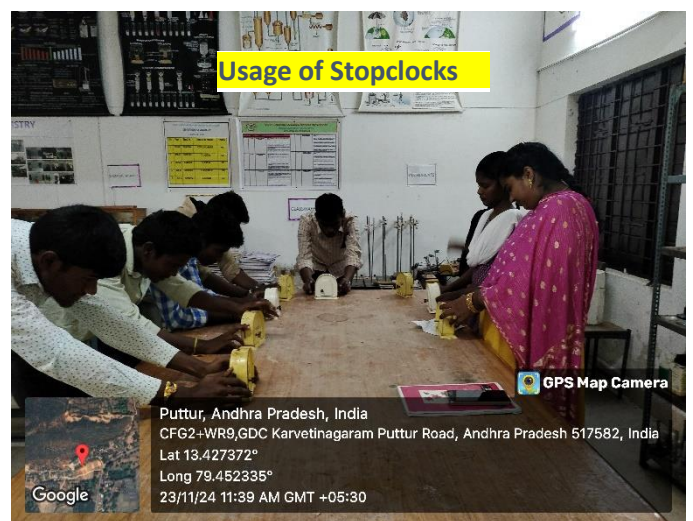
#GDC Karvetinagaram 517582 #KARVETINAGARAM



### Handling of Volumetric Flask

23/10/24 3:51 pm

#GDC Karvetinagaram 517582 #KARVETINAGARAM



### Usage of Stopclocks

Puttur, Andhra Pradesh, India  
CFG2+WR9,GDC Karvetinagaram Puttur Road, Andhra Pradesh 517582, India  
Lat 13.427372°  
Long 79.452335°  
23/11/24 11:39 AM GMT +05:30



### Usage of Digital Potentiometer

Puttur, Andhra Pradesh, India  
CFG2+WR9,GDC Karvetinagaram Puttur Road, Andhra Pradesh 517582, India  
Lat 13.427372°  
Long 79.452335°  
22/11/24 01:01 PM GMT +05:30

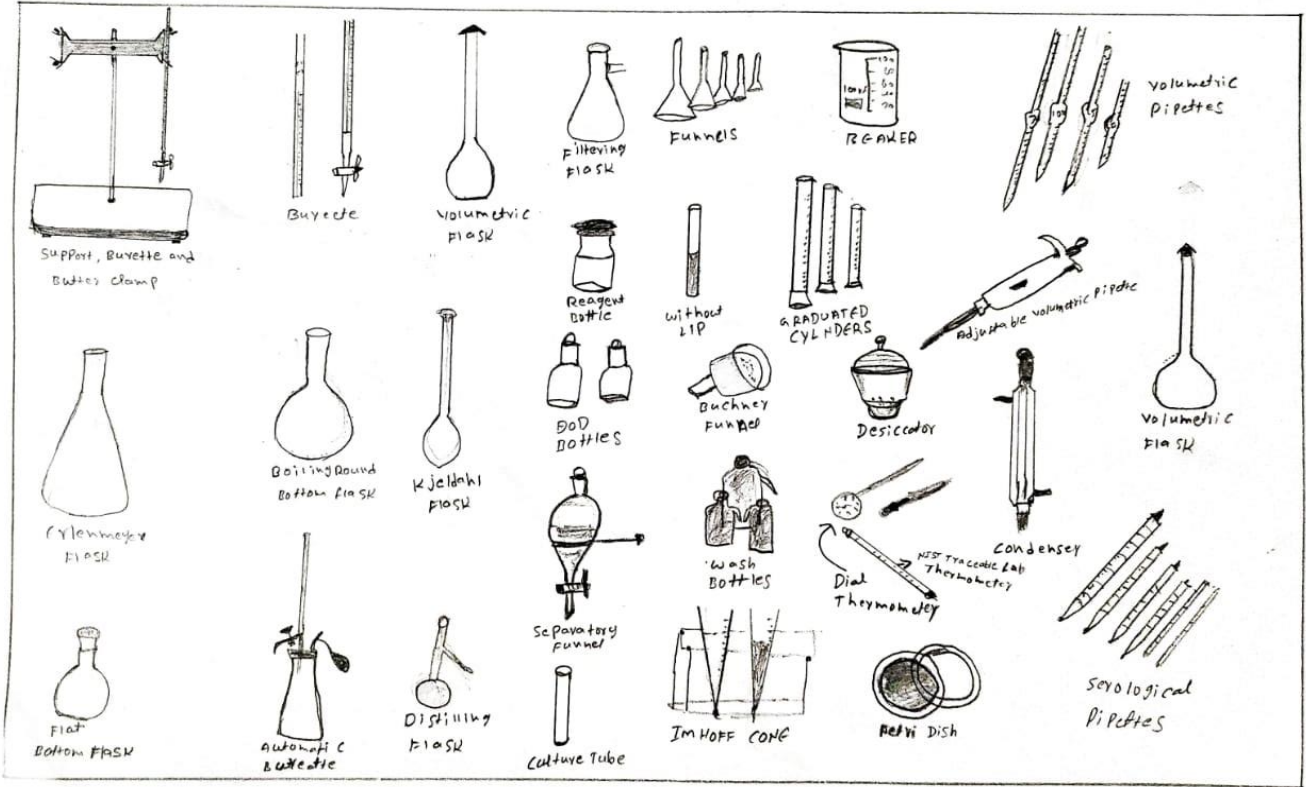


Puttur, Andhra Pradesh, India  
CFG2+WR9,GDC Karvetinagaram Puttur Road, Andhra Pradesh 517582, India  
Lat 13.427372°  
Long 79.452335°  
22/11/24 01:04 PM GMT +05:30

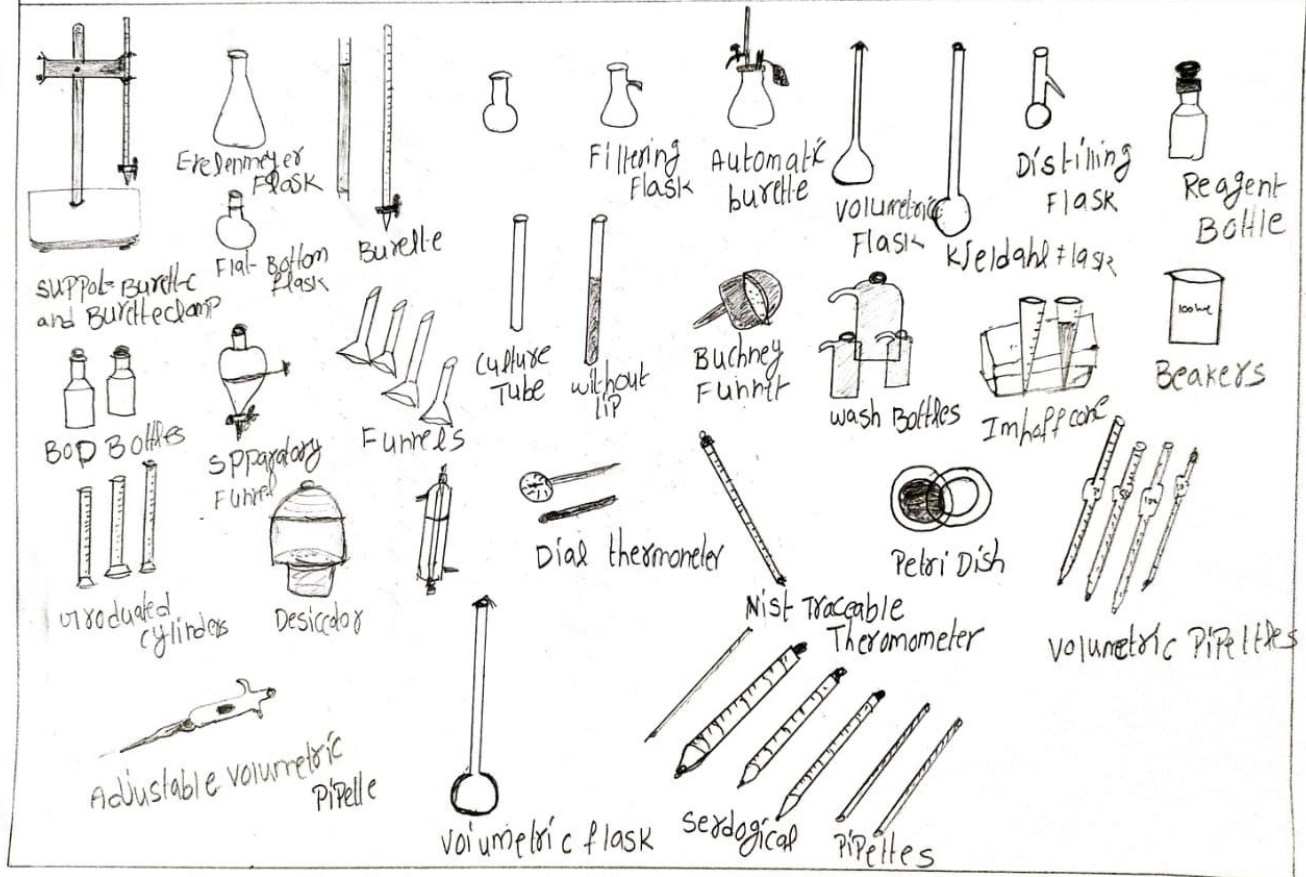
# DRAWINGS OF GLASSWARE BY THE STUDENTS

Name: D. Balaji  
 Group: 1<sup>st</sup> B.Sc Chemistry  
 Roll No: 3

## Common Laboratory Glassware



Name: S. Afrin bhanu Roll No: - 1 Department: - bsc - Chemistry





① Support, Burette and Burette clamp



② Automatic Burette



③ funnels



④ Beaker



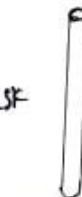
⑥ Volumetric flask



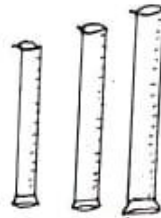
⑤ Erlenmeyer flask



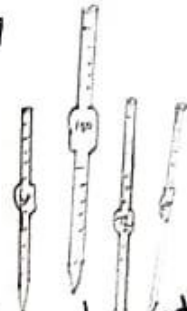
⑪ Kjeldahl flask



⑦ culture tube



⑧ Graduated cylinders



⑨ volumetric pipette



⑩ flat bottom flask



⑬ Distilling flask



⑭ without lip



⑫ Desiccator



⑮ Adjustable volumetric pipette



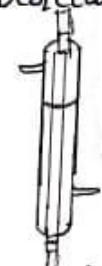
⑬ Burette



⑰ Reagent bottle



⑱ Buchner funnel



⑲ Condenser



⑲ Boiling Round Bottom flask



⑳ BOD bottles



㉑ Wash bottle



㉒ Dial thermometer



㉓ Volumetric flask



㉔ Filtering flask



㉕ separatory funnel



㉖ Gooch cone



㉗ NIST traceable lab thermometer



㉘ Petridish



㉙ Serological volumetric pipettes

㉚ Pipettes

## **Outcomes of the Certificate Course**

Typically designed to equip students with both theoretical knowledge and practical skills in the safe and efficient use of laboratory tools and equipment.

### **1. Familiarization with Common Laboratory Glassware and Instruments**

Identification and Function: Learn to identify and understand the purpose of various laboratory glassware (e.g., beakers, flasks, pipettes, burettes) and instruments (e.g., microscopes, centrifuges, balances).

### **2. Proper Handling and Maintenance**

- Correct Usage
- Cleaning and Maintenance
- Preventive Measures

### **3. Safety Protocols and Risk Management**


- Safety Standards
- Emergency Procedures

### **4. Practical Application of Techniques**

### **5. Application of Lab Equipment in Experiments**

### **6. Environmental Considerations and Waste Disposal**

In summary, this course empowers participants with essential laboratory skills and knowledge, ensuring that they are capable of working effectively and safely in scientific or industrial labs.

  
Principal  
**PRINCIPAL**  
**Govt. Degree College**  
**KARVETINAGARAM-517532**  
**Chittoor Dt., A.P.**

# VALEDICTORY FUNCTION



*Principal, Dr. S. Vijayulu Reddy addressing the students*



*Course Coordinator, Dr. T. Hari Babu addressing the students*



# CERTIFICATE DISTRIBUTION





# CERTIFICATES

 **GOVERNMENT DEGREE COLLEGE,  
KARVETINAGARAM, CHITTOOR (DT)** 

**CERTIFICATE**

*This is to certify that*

Mr/Ms. T. SHANTHI of Class I B.Sc Hons (Chemistry)  
has successfully completed "Handling and Usage of Common Laboratory  
Glassware and Instruments" certificate course offered by Department of  
Chemistry, Government Degree College, Karvetinagaram from 21-10-2024 to 26-11-  
2024

*Haribabu*  
Department In-Charge

*S. V. Murthy*  
Principal  
GOVT. DEGREE COLLEGE  
KARVETINAGAR - 517 582.  
Chittoor Dt. A.P.

 **GOVERNMENT DEGREE COLLEGE,  
KARVETINAGARAM, CHITTOOR (DT)** 

**CERTIFICATE**

*This is to certify that*

Mr/Ms. P. LATHISH of Class IB.Sc Hons (Chemistry)  
has successfully completed "Handling and Usage of Common Laboratory  
Glassware and Instruments" certificate course offered by Department of  
Chemistry, Government Degree College, Karvetinagaram from 21-10-2024 to 26-11-  
2024

*Haribabu*  
Department In-Charge

*S. V. Murthy*  
Principal  
GOVT. DEGREE COLLEGE  
KARVETINAGAR - 517 582.  
Chittoor Dt. A.P.