RAMAIAH
College of Arts, Science & Commerce

Department of chemistry and Biochemistry.

The college has well equipped labs in order to provide the study centered environment and to emphasize the fundamental understanding in chemical, physical and biological principles, effective application of scientific method, critical thinking, quantitative analysis and intensive experimental learning activities.

The goal is nurturing the young brain with in-depth and advanced scientific knowledge and capable of rational thinking. Chemistry department has five well equipped labs among which three are utilized for Undergraduate course (B.Sc.) and two are utilized for Post graduate course (M.Sc.), for both chemistry and biochemistry streams. The labs are having all the chemicals, glassware and instruments required for the experiments and their dissertation work. The entire lab in charge and lab attender will be trained always regarding how to handle hazardous chemicals. Stock of chemicals and glass wares is well maintained and audited from time to time.

When one chooses to study chemistry, it is not just important by necessary to attain the practical skills also. We make our students to do practical regularly through proper guidance and follow systematic protocols. The practical classes in our college is meant to teach you not only the practical skills that you may need to be a scientist but also other skills such as problem-solving, time management, organization. We believe that the practical knowledge gained during undergraduate level should also teach them how to work safely in a chemistry laboratory and with

chemicals as they will learn how to assess the potential dangers associated with every chemical they use.

We keep doing to give instructions to the students before starting the experiments for the particular semester curriculum. The students are not permitted in lab without wearing the safety measures especially the lab coat. Three of our chemistry labs are exclusively given for carrying out the undergraduate practical under both Chemistry and Biochemistry streams. The teachers always put interest to monitor students' progress in handing their lab from first to last year.

By the end of third year of their degree, the students are expected to have learned;

- Basic experimental skills such as titrations, synthesis and purification of organic and inorganic compounds.
- The safe and confident use of chemical apparatus and chemicals.
- How to obtain accurate results.
- To make careful observation of chemical reactions and correlate the experiments they do in labs with the theory classes.
- To analyze and interpret the experimental data.

These skills thus acquired by the students make them to work confidently in industries and other laboratories after their degree.

Lab-01:

This lab is allotted for Organic chemistry experiments. 3rd semester B.Sc. students carry out the experiments like preparation of organic compounds, determination of Physical constants like Melting point for different organic solids and Boiling point of different organic liquids. This lab is equipped with electric water bath (thermostat), Boiling point apparatus (condensation unit) and melting point apparatus (Thiel's tube) and other apparatus required to conduct organic chemistry experiments. This lab includes instrumentation room for the storage of instruments, store room for the storage of chemicals and apparatus issue room, from where the

instruments will be issued to the students whenever they require apparatus and to collect it back. Each practical is of 3 hours duration. In the end of each semester students must undergo practical model exams before they go for final university exam.

Lab-02:

This lab is allotted for Inorganic as well as Physical chemistry experiments. 1st semester B.Sc. students learn Inorganic chemistry experiments like titrations and estimations of inorganic compounds, in 2nd semester they learn the Physical chemistry experiments like determination of physical constants like Viscosity, Surface tension, Distribution Coefficient of binary liquids, Molar Mass of electrolytes and non-electrolytes, transition temperature of a salt hydrate and degree of dissociation of electrolytes, etc. In 6th semester they perform the physical chemistry experiments including Potentiometric, Colorimetric and Conductometric titrations for the estimation of compounds.

This lab is equipped with electric water bath (thermostat), hot air oven, Distillation unit, fume exhaust hood's, Viscometer, stalagmometer, Colorimeter, PH meter, potentiometer, electrodes, Cooling Centrifuges, Electrophoretic units, reflex condenser, magnetic stirrer, etc. This lab also has an apparatus issue room, from where the instruments are issued to the students.

Lab-03:

This lab is allotted for inorganic chemistry experiments like systematic semi-micro qualitative analysis of inorganic salt mixture and estimation of inorganic compounds.

It is equipped with Muffle furnace, centrifuge machines, electric water bath and instruments required for inorganic chemistry experiments. This lab also includes Instrumentation room and Apparatus issue room.

Lab 4 (Biochemistry PG)

We have Biochemistry Lab is well equipped with Basic instruments, Chemicals, Glassware, Immunological kits and Molecular Biology Kits. Our Biochemistry lab met the required facilities, instruments for M.Sc experiments and project work as per University designed experiments.

Biochemistry lab is equipped with Colorimeter, PH meter, Cooling Centrifuges, Refrigerator with Freezer, Incubator, Hot Plates, Water bath, Burette stands, Electronic weigh balance, Bunsen burner, Micropipette (0.5 µl – 10 µl, 2 – 20µl, 20 – 200µl and 200 – 1000µl), Trans Illuminator (UV), Basic Microscope, Electrophoretic units both horizontal and vertical, etc.

Clearly, we have displayed an information about laboratory Do's and Don'ts in entry of our lab.

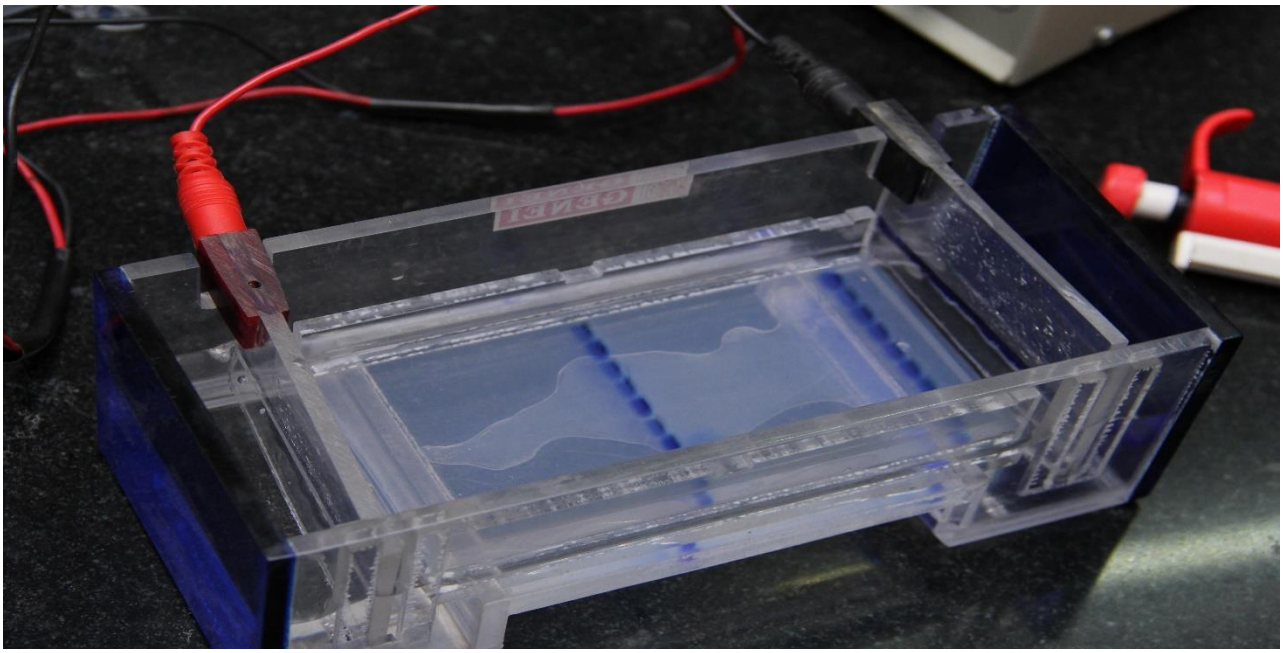
Stock will be taken care every year. Lab–in charge and Attenders are trained with basics of chemistry. Lab-in charge is taught to take care of hazardous chemicals. Laboratory is always maintained. It is pre-prepared before starting any lab class or practical.

The first semester of the new curriculum is dedicated to instruction in modern biochemical concepts and methods, including amino acid, protein and nucleic acid estimations. Estimations of Vitamin, Hydrolysis and Chromatography (Thin layer, Paper, Ion Exchange), while the second semester focuses on. Double immune diffusion and radial immune diffusion ELISA, immune-blotting techniques, Rocket electrophoresis. Basic python programming, ANOWA using R and Data mining using R Students also taught through computational biology. Biochemical enzyme kinetics Km, Vmax, Inhibition studies, PH and temperature optimization also learned from second semester.

Third semester mainly focused on clinical Biochemistry and molecular biology. Estimations of glucose, urea, Hb, Cholesterol, calcium, Creatinine, Bilirubin, SGOT and SGPT. Isolation, quantification and characterization of genomic and plasmid DNA, from plant and Bacteria. Concepts of PCR, RT-PCR, South blotting also learned through demonstration program through external laboratory experts in our lab.

Fourth semester focus on genetic engineering and protein chemistry. Extraction and isolation of enzymes (phosphatases / esterases / amylases) from Insect / Microbial / Plant sources. Preparation of Competent cells and Synthesis of cDNA. Isolation and characterization of gene fragments for cloning and Restriction digestion of isolated plasmid DNA are done in our lab.

Students have to do project for final semester as per their curriculum. They have to submit their dissertation record in university. Students generally do their project work in our Biochemistry lab under the guidance of some teacher. We have equipment for phytochemical extraction units like Soxhlet extractor apparatus. Students apply the methods and concepts from the first, second and third semester knowledge to design and execute a project work in their fourth semester. The year-long course concludes with groups of students preparing a manuscript (scientific paper) through lab PC and orally presenting a scientific poster that details their findings.



RAMAIAH
College of Arts, Science & Commerce

DEPARTMENT OF CHEMISTRY & BIOCHEMISTRY
LAB SAFETY Do's & Don'ts

Do's

- Wear a chemical resistant apron.
- Use the chemicals, water and gas very economically to avoid pollution.
- Read the procedure from the manual and listen carefully the instructions given by the teacher before starting any experiment.
- Keep your work area clean and clutter free.
- Handle organic chemicals very carefully while heating as they are highly inflammable and wear goggles during qualitative analysis.
- Know the location of all safety and emergency equipments used in the lab including, First-aid kit, Fire extinguisher, fire alarm and the emergency exits.
- Dispose all chemicals, broken glass pieces, used filter papers and other lab materials into the proper containers as directed by the instructor.
- Before leaving the laboratory, gas and water taps must be closed tightly and replace lids or caps on reagent bottles.
- Report ALL accidents, hazards or chemical spills to the instructor (no matter how small). Do not panic.
- If your lab Partner is hurt, immediately and loudly call to get the teacher`s attention. DO NOT PANIC.
- When heating liquids in a test tube, always point the test tube away from other student.
- Any breakage of glass/failure of equipment must be reported to the teacher.

Don'ts

- Do not wear bulky or dangling clothing.
- NEVER experiment on your own.
- NEVER add water to an acid.
- NEVER attempt to taste, smelling of gases, or touch chemicals without instructions.
- NEVER use electrical equipment around water.
- NEVER mix chemicals before asking the instructor.
- NEVER return unused chemicals to the original container.
- NEVER leave the lab without washing your hands.
- Do not spoil or erase the labels pasted on the reagent bottles.
- Students are not allowed to work in Laboratory alone or without presence of the teacher.
- Absolutely no running, practical jokes, or horseplay is allowed in the laboratory.
- Do not use mobile phone in laboratory area.
- NEVER place chemicals directly on the balance pan during weighing. Never weigh a hot object.

Lab 4 (Chemistry. PG).

Laboratory work is an established part of courses in chemistry in higher education. The original reasons for its development lay in the need to produce skilled technicians for industry and highly competent workers for research laboratories and ‘hands-on’ laboratory time is part of wider process of learning. In consideration of this, our college provides separate well-equipped laboratory for post graduate students.

The practical experimentation reinforces the material which have learned in class and it gives students a chance to apply their knowledge. As per the curriculum Inorganic/ Physical chemistry experiments and Organic chemistry experiments were carried out by I year and II year M.Sc., students respectively. The lab equipped with chemicals, glassware’s, instruments, working tables, and can accommodate 25 students per session. To perform the experiments lab equipped with instruments like PH meter, calorimeter, conductometer, potentiometer, magnetic stirrer etc. It also has fume hood, fire extinguisher, waste disposal unit and exhaust fans. The lab in-charge and lab attenders trained regarding handling and storage of chemicals, reagent preparation, glassware cleaning, instruments calibration and stock maintenance.

In Inorganic practical’s students learn inorganic salt analysis, Inorganic complex preparations, gravimetric and volumetric analysis of salts. In Physical chemistry, they always learn chemical kinetic studies, thermodynamic related experiment, colorimetric, potentiometric, conductometric experiments. In organic chemistry students learn about analysis of organic compounds and synthesis of various organic compounds via single or multi step reactions, separation and analysis of binary mixture of organic compound. Along with it they also perform isolation and estimation experiments.