Department of chemistry and Biochemistry

Report on laboratory

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 nurture 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 choose 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

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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.

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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.

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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.

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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 a information about laboratory Do's and Don'ts in entry of the 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 RStudents also taught through computational biology. Biochemical enzyme kinetics Km, Vmax, Inhibition studies, PH and temperature optimization also learned from second semester.

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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.

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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.

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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.

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Department of Microbiology

Report on Microbiology Laboraory

The department of Microbiology has a practice of teaching the students through experiential learning which helps the students to develop the knowledge, skills, and values from direct experience outside the classes room and also in laboratories through various experiments prescribed in the syllabus.

There are two laboratories for UG and one laboratory for PG available. These laboratories are equipped with all the equipment required for conducting the experiments prescribed by Bangalore Central University. For each practical course, two faculties are assigned to conduct the experiments and the students are provided with hands-on training of each experiment. The experimental observations are monitored and verified by the faculty in charge. The objectives, protocols, observations, results, and discussions of each experiment conducted are systematically recorded and documented.

In addition to the regular practical courses of UG and PG programs, project work is also carried out for the IV semester M.Sc students as a part of their syllabus. The project work introduces the PG students to Research planning, execution, and documentation. The students are also trained to write the research paper on their project work and the same will be published in a research journal with the help of the project guide. The students of UG who are interested in research they were assigned with minor research which aims with the improvement of public health. Where a group of students of final year UG and PG had participated in testing the water quality in and around the college campus, also in analyzing the quality of water of Belandur lake and quality of groundwater 2km surrounding the Belandur lake, Bangalore, some of the students were also assigned with a project where they studied the effectiveness of different hand sanitizers on hand hygiene and also screened some of the fungal isolates from industrial effluents which could degrade the pigment malachite green which is one of the pigments extensively used in the textile industry and released into the water source which enter into bio magnification an affect the diversity of aquatic flora and fauna. These students also published their paper in a journal, such experiential learning

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helped the students to apply and share their knowledge which they had studied in their traditional classroom.Students were also taken for industrial visits where they could experience the process of manufacture or production of various products which they would have studied theoretically in a regular class. Apart from learning through experiments students of Microbiology are also involved in participating in conducting health awareness programs where students brought awareness and educated the public and school children through their oral presentations and also through posters on Tuberculosis, AIDS, etc., this helped the students to apply their knowledge, communication skill to speak with the public, teamwork, etc., Hence such experiential learning benefits the students as well as educating the community members on public health and Microbiology

Practical Classes in Microbiology lab

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Approved by Government of Karnataka, Approved by AICTE, New Delhi,
Recognized by UGC under 2F & 12B of UGC act 1956

Department of Computer Science

Report on Computer Lab

Computers have been used in education both as a subject of study and as a tool to assist in the learning process for technical and non-technical students. To fulfill this process we use the computer labs which serve as a centre for learning computer and its use. Computer labs have been configured to support teaching and learning by providing rows of computers. Lab computers and software allows students to complete course assignments or learn new programs.

The department of computer science engages themselves in sharing the knowledge in the field of computer science which includes implementation of classroom teaching practically in the lab. For technical students we teach them different programming languages, share visual information, show them the architecture of computer, give knowledge about the software and software engineering, how to develop software through the use of system development and application systems. For non-technical students also we use computer lab for giving the basic knowledge about the computer, teach them to access the computer, to browse different data on web browsers etc. We also train non technical students to learn simple software like tally, MS office etc. The lab is also been used to conduct the advance courses for technical as well as non technical students which helps them to compete with the industrial requirements.

Our staff along with their students uses the computer lab for research, or for creating technology-based projects. Which not only enhance the knowledge of the students but also helps them to implement that knowledge in their profession also.

Overall we can say that the computing labs are flexible which provides technology-enhanced learning spaces where students of different discipline can utilize the systems to gain knowledge and implement that knowledge in their personal and professional life and get benefits from it.

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Bangalore - 560 054

M S Ramaiah Nagar
MSRIT Post
Bangalore 560 054

T +91 80 2360 0966/8597
+91 80 2360 6905
F +91 80 2360 6213

E principal.msrcasc@gmail.com
W www.msrcasc.edu.in

Computer Lab- Practical classes in Computer lab

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Department of Humanities

Report on Psychology Laboratory

According to the American Psychological Association "Psychology is the scientific study of the mind and behaviour".Psychological laboratories are equipped for two purposes.

Wilhelm Wundt opens first experimental laboratory in psychology at the University of Leipzig, Germany in1879.

Firstly, for the recording of behaviour and for the monitoring of mental and emotional states. secondly, for the systematic control of environmental and individual factors which influence and determine human mental and emotional states.

A laboratory experiment is conducted under highly controlled conditions where students are supposed to collect data related to different human behavior.

Bangalore central University has framed the practical syllabus in such a way that the students learn and understand many psychological assessments and measures. Psychology Practical consists of different standardized verbal questionnaires related to cognition, emotion, behaviour, motor abilities, social well-being, aptitude tests etc.

Along with standardized questionnaire, students also understand the procedure to conduct Non-verbal tests by using apparatus which measure intelligence, perception, memory, learning, attention span, constancies, projective tests, personality test, mental ability test etc.

The students are grouped in batches which consists of 10-12 students according to the register numbers. Students have to attend the practical classes according to their respective batches.

Academically students can score well and easily understand as they can link with the theoretical concepts with practical experiments.

As students write the introspective report after learning every experiments, students will understand their own behavior which will help them to modify their behavior (if needed). Learning psychology will enhance their positivity, confidence and well-being.

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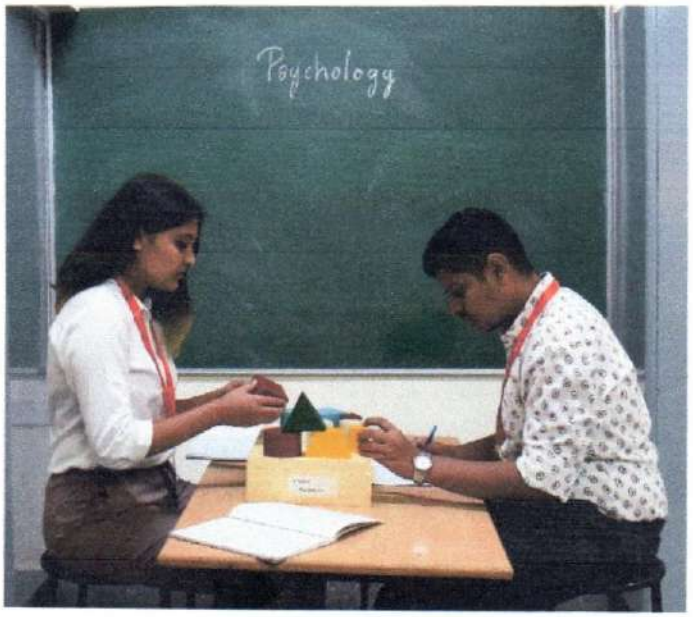
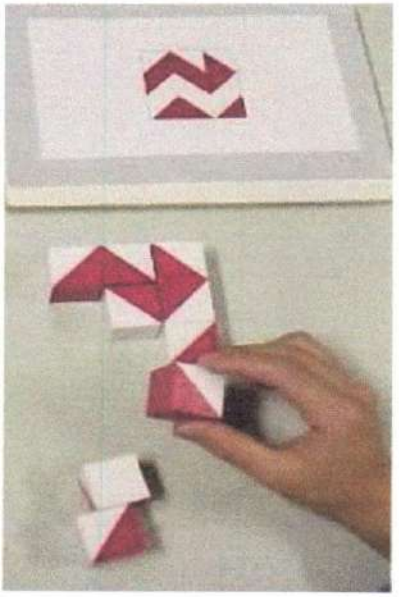
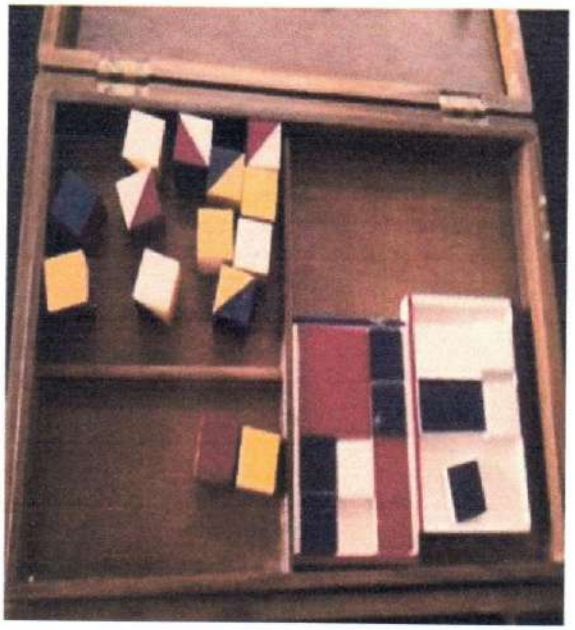
Photo Gallery







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Department of Biotechnology/Genetics

Report on Biotechnology/Genetics Laboratory

Experiential Learning, Participative Learning and Problem-solving methodologies are used for enhancing the learning experience. Bangalore Central University has made provision in the structure of all programmes to give students experiential and participative learning experience. While the teachers should adopt problem-solving Methodologies, the students are guided to join any industry/ advanced laboratory /MNC etc. or can design the experiments as per the norms of Bangalore Central University syllabus, either for internship/projects in 4th semester. Student-centric methods adopted by departments to provide project work, assignment, quiz, presentation etc. are an integral part of the CIA in all programmes.

Curriculum Planning is framed very semester in an inclusive manner, which includes both theory & practical's given equal importance. Departmental minutes of the meeting are held at regular intervals relevant to academic, for curriculum, co-curriculum & non-curriculum activities. Each independent faculty of particular specializations are allotted with time-table & workloads.

According to the syllabus, lesson plans prepared by each of the faculties with workloads for both theory & practical's. Apart from chalk-talk, PPT's; faculties use various teaching aids on on-like with different advanced technologies using different online programs. The institution has provisioned with ***"Campus Technology Platform"***, wherein teachers are actively interacting with students with advanced technological techniques aiding to teach the latest modernized aspects in science field & update day to day information. Faculty members are well acquainted with the use of ICT during classroom teaching through PowerPoint presentation & e-contents.

Arranging Lecture Series, Workshop, Seminar, Symposia, Conferences at national & internal levels helps students to participate in a myriad of academics and research activities. Learning to become independent, involving in activities: seminars on chosen/assigned topics, home assignments, PowerPoint presentations, improving in their vocabulary, develop creativity, originality of ideas, reasoning, increasing knowledge, improve in their analysis, report writing, editing etc., of papers/journals/Book chapters/Reviews. Also, they discover the ideas

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in research activity, inventing new things which can be patented both for entrepreneurship skills or beneficial for humankind.

Practical's are conducted & elaborated up to the level of research projects. Students are grouped into 2-5 batches depending of number of total students per section both in UG & PG Every student is guided to perform practical's individually as well as, in groups. The outcome of the practical's is consolidated to find the significances & impact of the experiments. At PG levels the projects are designed & performed as ***'in house project'***. Department is provided with seven laboratories, two for biotechnology UG-students, two for Genetics, one for PG students, the other two are for Plant Tissue Culture & Animal Tissue Culture. Experimental/Laboratory method is used are to acquaint the students with the facts through direct experience individually. Students verify the facts and protocols of the subject through conducting the experiments.

Activity centred method/Student Centric Method are more effective and durable in providing learning experiences. Students take interest and learn things via learning by doing, activities like preparing charts, designing experimental models which are similitude or working, using materials & instruments which are cost-effective, durable & economical providing learning experiences. Along with delivering lectures, teachers in laboratories use inductive-deductive method to experimental develop scientific attitude among students. Faculty members use ICT during Lab teaching through power point presentation & e-contents.

Faculties from the department are very active in motivating the students to involve in extension activities. Industrial visits/ Training at institutions like Biocon, Biozeen, IIHR, ICAR, CSIR institutes etc., extension activities is part of experimential learning & participative learning as it aids in training students in getting acquainted with the modern research techniques relatively early in their educational classes.

Extension activities viz., Field tours /Educational field trips/Study tours & organizing camps, conducted from ***Students for developments***, under ***"Campus to Community"*** programme. Visits to horticultural, floricultural, agricultural fields, helps students to work co-operatively, interact with each other, take responsibility and develop self-confidence. It stimulates students interest and provides opportunities for freedom of thought and free exchange of different views.

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All the above activities with teachers, students, along with the Institution programmes, encourage the students to take an active role in creating the learning process and ensures that the assessment of students reflects this approach.

These activities not only get them exposed but inculcate them in problem-solving skills, they receive a practical and direct experience of negotiating difficult situations and are trained as capable, competent and accomplished individuals.

An innovative method of theory & practical's teaching aims to promote learning in communication with teachers and other learners and which take students seriously to frame questionaries' & problems in reality. Also, student active participants in their own learning and foster transferable skills such as problem-solving, critical thinking, and reflective thinking.

Practical classes in Bio-technology lab

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