



Department of Chemistry Maharaja Institute of Technology Mysore



OVERVIEW OF ENGINEERING CHEMISTRY

The basic sciences or natural sciences or natural sciences (Physics, chemistry and Mathematics) are a group of subjects which play vital role in undergraduate engineering programs. Chemistry is a part of basic sciences and it is known as central science, because it is important to so many other fields of scientific study. Changes in the engineering education are necessary to address the rapidly changing needs of our society. 'An engineering graduate is expected to apply the knowledge of science and mathematics to solve problems of the society.

Chemistry and basic sciences in general are not cultural complements but form a truly important basis in order to produce a work force of versatile and open minded engineering professionals, able to adapt to scientific and technological innovations. It is important to design the programs with relevant chemistry subjects for the integral education of the students, with a real link to the engineering subjects. An undergraduate course in engineering involves a chemistry subject, which gives knowledge in chemistry. This knowledge in chemistry is help for solving engineering problems. Which focus on learning and applying the advanced engineering, science or mathematical principles and concepts.

Mechanical engineering course involves the design, production, analysis and maintenance of mechanical systems. Except design, chemistry plays a very important role in all other mechanical engineering fields, ex; Energy science and engineering, Nanotechnology, Material science and engineering, tribology etc., require in depth knowledge of chemistry which are parts of mechanical engineering. Structural engineering depends on the knowledge of materials and their properties, in order to understand how different material support and resist loads. Common structural materials are; iron, concrete, aluminum, composite materials, clay, alloys, fiber, reinforced plastics etc. Life of any buildings or construction depends on the quality of these materials. Rate of corrosion of metals also play a very important role in determining the life of any building. Environmental engineering rests heavily on the application chemistry to the environment. The purpose of environmental engineering is to create systems and strategies to treat waste streams; produce same drinking water; control storm water; manage solid waste, hazardous waste and radioactive waste; clean up environmental contamination. Hence, chemistry such as "water and waste water treatment", "environment chemistry" and "environmental pollution" will enhance the knowledge of civil engineering students in this field.

Electrical engineering is the branch of engineering science that studies the uses of electricity and equipment for power generation and distribution and the control of machines and communication. Computer science and electronics and communication are also considered as a part of electrical engineering science. Semiconductors is extensively used in electronic and computer science engineering. Microelectronic components are created by chemically fabricating Wafers of semiconductors such as silicon, germanium, metal oxides (CMOS) etc. chemical image processing (hyper spectral and multi spectral) is a part of electronic and computer science engineering needs the knowledge of molecular spectroscopy. Electrochemistry forms the basis for batteries and fuel cells, liquid crystals and organic light emitting diodes (OLEDs) are very useful in electronic display technology. The electrical engineering involves a significant amount of chemistry and hence study of "chemistry of electrical engineering material", "Electrochemistry and "Liquid crystals & OLEDs" will be beneficial to the knowledge of students.



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OVERVIEW OF ENGINEERING CHEMISTRY LABORATORY

Laboratories used for scientific research take many forms because of the differing requirements of specialists in the various fields of science and engineering. Laboratory science experiences are critical to the learning process across all areas of study, the students who engage in well-designed laboratory experiences develop problem-solving and critical-thinking skills, as well as gain exposure to reactions, materials and equipment in a lab setting. Chemistry is the study of matter and the chemical reactions between substances. Chemistry is also the matter's composition, structure and properties. Matter is essentially anything in the world that takes up space and has mass. Chemistry is sometimes called “the central science”, because it bridges physics with other natural sciences, such as geology and biology.

The scientific method is a process by which observations are questioned; hypotheses are created and tested; and the results are analyzed and hence one should gain practical knowledge. Laboratories used for scientific research take many forms because of the differing requirements of specialists in the various fields of science and engineering. Chemistry laboratory provide students how to handle chemicals and instruments. It imparts practical knowledge for students in volumetric analysis of hard water, amount of calcium oxide and chemical oxygen demand. One should learn about safety of handling chemicals and instruments.

During hands-on chemistry activities, students directly and safely investigate chemical properties and reactions, utilizing laboratory apparatus and instruments. These activities are essential for learning chemistry and improving science literacy. Web-based and computer-simulated activities may help increase student exposure to chemistry, reduce costs, and eliminate hazardous waste and safety concerns; however these tools cannot be considered as equivalent replacements for hands-on laboratory experiences.