

## **CHEMISTRY EDUCATION IN INDIA**

**Purpose and objectives.** The purpose of this conference paper is to present some of the fundamentals of the Indian educational plan from elementary school through the doctorate. It gives a brief introduction to the structure of higher education programmes in chemical science in India.

**Methods of research.** Searching different Internet sources about chemistry education in India, analyzing.

India is a vast country with about 1 billion people. 20 different languages are spoken by people of 31 states. As a result the system of education could not be brought to uniformity throughout the country. The Government of India had set up an autonomous commission, the University Grants Commission (U.G.C.) to look after the higher education and research. Although education policy is largely decided by the states, they follow the norms set up by the U.G.C. in matters related to higher education.

### **1. SYSTEM OF CHEMISTRY TEACHING**

Pattern of school education is more or less similar in various states.

Secondary and Higher Secondary Boards set up by the State Governments govern the respective courses in respect to bringing out the syllabi, conducting the final examinations and issuing certificates to the successful candidates. The National Council of Educational Research and Training (NCERT) play a very vital role in promoting and improving the secondary and higher secondary level of teaching throughout the country.

In Indian colleges and university departments, there have been efforts directed towards updating curricula and syllabi, and modernising teaching strategies and educational delivery systems. Such efforts need to be backed by discipline-based research in chemistry (that is, Chemistry Education Research (CER)) so as to make Chemistry education meaningful. Thus, getting engaged with CER is an important fertile research area at undergraduate level.

The structure of chemical education, as followed in colleges and universities, is represented in Table 1.

Table 1. The Structure of Chemistry Education in Colleges and Universities

Course and Name of the Examinations	Duration of the Course
1. Bachelor of Science (Pass)	Three years course (In some Universities two years course). Equal weights for three combination subjects are given, e.g., physics, chemistry, mathematics. Various combinations amongst subjects are available. Chemistry is taught and practical training is provided for three years
2. Bachelor of Science (Honours)	Three years course. Students majoring in chemistry, study the subject in detail for three years. They are to take two more subsidiary subjects (pass subjects) as in 1 above. Rigorous practical training is also given.
3. Master of Science	Two years course. First year gives emphasis to all main branches of chemistry. The second year is devoted for specialisation in any one of the

	<p>major branches e.g., organic, inorganic, physical chemistry and in some universities, analytical chemistry. Rigorous practical training is given.</p> <p>Master degree in subjects based on chemistry, eg. bio-chemistry, agricultural chemistry, etc. is also offered in many universities.</p>
4. Bachelor of Technology and Master of Technology	<p>In some universities, there are 3 year B. Tech. course and after successful completion of the course 2 years M.Tech. course in chemical technology or chemical engineering or allied topics are provided. Chemistry is taught in these courses giving emphasis on industrial aspect of the subject.</p>

During the last few decades, chemistry has made advancements both in basic front as well as in application front. New theories have emerged and many sophisticated instruments have been developed, which is mainly responsible for the development of basic chemistry. The far-reaching applications of the basic principles and the structural concept have got tremendous implications in, biology, medicine, geology nutrition and food sciences, engineering sciences and almost in every area of technology.

The NCERT has recommended a chemistry course which is being followed by most of the Secondary and Higher Secondary Schools in the Country. The course content for the Secondary (Class IX and X) are designed to provide a base for learning chemistry for pupils who wish to take up the subject at the plus two stage and also to benefit those who are not going to continue to study the subject further. The course will help in forming some idea about matters related to economic development, environmental problems and national growth.

In the 10+2 curriculum the course contents are so designed that the students can pursue their higher education in academic line or they can switch over to professional or vocational stream.

## **2. SCHEME OF ACADEMIC PROGRAMME**

On the basis of the recommendations of the Curriculum Development Centre (CDC) in Chemistry, set up by the University Grants Commission (U.G.C.), the following curriculum in chemistry is being followed or will be followed by most of the universities and colleges.

According to U.G.C. guidelines, the expected working days for effective teaching are per year = 30 weeks; per semester (or term) = 15 weeks;

### **2.1. Undergraduate Programme**

B.Sc. Pass

Usually, at the B.Sc. Pass level, three compulsory subjects are being taught with an equal credit. In most universities, 12 periods (of 45 minutes duration) are allotted to each subject. The committee has suggested that each period should be of 1 hour duration.

B.Sc, (Honours)

The C.D.C. in Chemistry has recommended the following pattern for Hons. teaching.

1. At the 1 year level, the Curriculum in Chemistry should preferably be same for Pass and Hons. Course.

2. Therefore, the students are expected to study two more subsidiary subjects and the marks/credits awarded to these should be taken into consideration for over-all assessment.

3. At the II Year and III Year level, the work-load in Chemistry is doubled and therefore only one subsidiary will have to be studied.

### **2.2. Graduate Programme**

M.Sc. Programme

The 2 year course has been divided into 4 Semesters and common programme has been envisaged for the first-three semesters. Each semester will have 4 Theory Papers in addition to Lab Courses.

### **2.3. Doctoral Programme**

Some students, after passing the M.Sc. Examination, carry out their research work under the guidance of a supervisor and submit thesis for the award of the Ph.D. Degree of a University. For submission of thesis, he is to work for at least a period of two years. D.Sc. Degree, a higher Degree, is also awarded by some Universities for independent research work. The candidates from Institutes other than Universities are got to be registered with a University for the doctorate degree. These Institutes have also got integrated Ph.D. programme where students, after passing B.Sc. Examination, are admitted. In some Institutes, emphasis is also given on course work and the dissertation work are considered as partial requirement for the Ph.D. Degree.

Funding for research is usually made by various Central Government Agencies, like Department of Science and Technology (DST), Council of Scientific and Industrial Research (CSIR), University Grants Commission (UGC), Department of Atomic Energy (DAE), Indian Council of Medical Research (ICMR), Department of Biotechnology (DOT) etc. The Research Fellowship in most cases are given on the basis of the results of some competitive examination, for example the National Eligibility Test (NET), Graduate Aptitude Test in Engineering (GATE) etc.

### **REFERENCES**

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