

# Programme Overview Chemistry

## JLN Govt. College Haripur (Manali)

<b>Name of the Department</b>	<b>Chemistry</b>
Year of Establishment	2014
Names of Programmes /Courses	UG
No. Of Teaching Posts Sanctioned	01
No. Of Teaching Posts Filled	01

### Faculty:

S.No.	Names	Qualification	Designation	Experience
1	Dr. Ram Singh	M.Phil, Ph.D	Assistant Professor	11 years

### Course Structure: B.Sc with Chemistry

(UG yearly programme w.e.f 2018)

Year	Course Type	Course Code	Course Title	Credit
I	CORE COURSE-II	CHEM101TH CHEM101IA CHEM101PR	ATOMIC STRUCTURE, BONDING, GENERAL ORGANIC CHEMISTRY & ALIPHATIC HYDROCARBONS	6
	CORE COURSE-V	CHEM102TH CHEM102IA CHEM102PR	STATES OF MATTER, CHEMICAL KINETICS & FUNCTIONAL ORGANIC CHEMISTRY	6
II	CORE COURSE-VIII	CHEM201TH CHEM201IA CHEM201PR	SOLUTIONS, PHASE EQUILIBRIUM, CONDUCTANCE, ELECTROCHEMISTRY & ORGANIC CHEMISTRY	6
	CORE COURSE-XI	CHEM202TH CHEM202IA CHEM202PR	CHEMISTRY OF MAIN GROUP ELEMENTS, CHEMICAL ENERGETICS AND EQUILIBRIA	6
		CHEM204TH CHEM204IA	FUEL CHEMISTRY & CHEMISTRY OF COSMETICS & PERFUMES	4
III	DISCIPLINE SPECIFIC ELECTIVES DSE:2A (CHOOSE ANY ONE FROM	CHEM301TH CHEM301IA CHEM301PR	POLYNUCLEAR HYDROCARBONS, DYES, HETEROCYCLIC COMPOUNDS AND SPECTROSCOPY (UV, IR ,NMR)	

	GIVEN THREE)			6
		CHEM302TH CHEM302IA CHEM302PR	INDUSTRIAL CHEMICALS AND ENVIRONMENT	
		CHEM303TH CHEM303IA CHEM303PR	QUANTUM CHEMISTRY, SPECTROSCOPY & PHOTOCHEMISTRY	
	DISCIPLINE SPECIFIC ELECTIVES DSE:2B (CHOOSE ANY ONE FROM GIVEN THREE)	CHEM304TH CHEM304IA CHEM304PR	CHEMISTRY OF TRANSITION AND INNER TRANSITION ELEMENTS, COORDINATION CHEMISTRY, ORGANOMETTALICS, ACIDS & BASES	6
		CHEM305TH CHEM305IA CHEM305PR	POLYMER CHEMISTRY	
		CHEM306TH CHEM306IA CHEM306PR	MOLECULES OF LIFE	
	SEC 3	CHEM307	CHEMICAL TECHNOLOGY & SOCIETY AND BUSINESS SKILLS FOR CHEMISTRY	4
	SEC 4	CHEM308	PESTICIDE CHEMISTRY & PHARMACEUTICAL CHEMISTRY	4

### Chemistry Program

Studying chemistry is lucrative from many prospective and there are numerous benefits of studying it. Being a central science, chemistry is used in every aspect of person's life from the food consumed to the products used. The learning outcome based curriculum in chemistry in particular will definitely help the teachers of the discipline to visualize the curriculum more specifically in terms of the learning outcomes expected from the students at the end of the instructional process. The learning outcome-based curriculum framework for B.Sc. degree in chemistry is intended to provide a broad framework and hence designed to address the needs of the students with chemistry as the core subject of study. The curriculum framework for the bachelor-level program in chemistry is developed keeping in view of the student centric learning pedagogy, which is entirely outcome-oriented and curiosity-driven. To avoid rote-learning approach and foster imagination, the curriculum is more leaned towards self-discovery of concepts. The curriculum framework focuses on pragmatist approach whereby practical

application of theoretical concepts is taught with substantial coverage of practical and field works. The platform aims at equipping the graduates with necessary skills for chemistry-related careers, careers with general graduate-level aptitude and for higher education in chemistry and allied subjects.

### **Scope of Chemistry:**

Chemistry is referred to as the science that systematically studies the composition, properties, and reactivity of matter at atomic and molecular level. The scope of chemistry is very broad. The key areas of study of chemistry comprise Organic chemistry, Inorganic Chemistry, Physical Chemistry and Analytical Chemistry. Organic chemistry deals with study of substances

containing carbon mostly; inorganic chemistry deals with study of all other elements/compounds/substances and their chemical properties. Physical chemistry deals with

applications of concepts, laws to chemical phenomena. Analytical chemistry, in general, deals

with identification and quantification of materials. Development of new interdisciplinary

subjects like nano-materials, biomaterials, etc. and their applications from chemistry point of

view added new dimension to materials chemistry. Thus, the degree programme in chemistry

also intended to cover overlapping areas of chemistry with physics, biology, environmental sciences. Further, a broad range of subjects such as materials chemistry, biomaterials, environmental chemistry, etc., has also been introduced which can be helpful for students/faculty members to broaden the scope of their studies and hence applications from job prospective point of view. In addition, industrial visits are encouraged and added to the curriculum in order to enhance better exposure to jobs/employment opportunities in industries, scientific projects and allied sectors. In addition, employability of B.Sc. Chemistry graduate is given due importance such that their core competency in the subject matter, both theoretical and practical, is ensured. To expand the employability of graduates, a number of skill development courses are also introduced in this framework.

### **Program Objectives:**

The aim of bachelor's degree programme in chemistry is intended to provide:

(i). Broad and balance knowledge in chemistry in addition to understanding of key chemical concepts, principles and theories.

(ii). To develops students' ability and skill to acquire expertise over solving both theoretical and applied chemistry problems.

(iii). To provide knowledge and skill to the students' thus enabling them to undertake further studies in chemistry in related areas or multidisciplinary areas that can be helpful for self employment/ entrepreneurship.

(iv) To provides an environment that ensures cognitive development of students in a holistic manner. A complete dialogue about chemistry, chemical equations and its significance is more important rather than mere theoretical aspects.

(v).To provides the latest subject matter, both theoretical as well as practical, such a way to foster their core competency and discovery learning.

(vi).To enable the graduate prepare for national as well as international competitive examinations, especially UGC-CSIR NET and UPSC Civil Services Examination.

### **Program and learning Outcomes:**

The program and learning outcomes based course curriculum framework of Chemistry is designed to persuade the subject specific knowledge as well as relevant understanding of the course. The academic and professional skills required for Chemistry-based professions and jobs are also offered by same course in an extraordinary way. In addition, the learning experiences gained from this course should be designed and implemented for cognitive development in every student. The practical associated with this course helps to develop an important aspect of the teaching-learning process.

### **Program Outcomes, program specific outcomes and course outcomes of Chemistry Department**

- **Core competency:** The chemistry graduates are expected to know the fundamental concepts of chemistry and applied chemistry. These fundamental concepts would reflect the latest understanding of the field, and therefore, are dynamic in nature and require frequent and time-bound revisions.
- **Communication skills:** Chemistry graduates are expected to possess minimum standards of communication skills expected of a science graduate in the country. Graduates are expected to be well-versed in speaking and communicating their idea/finding/concepts to wider audience
- **Critical thinking:** Chemistry graduates are expected to know basics of cognitive biases, mental models, logical fallacies, scientific methodology and constructing cogent scientific arguments.
- **Problem-solving:** Graduates are expected to be equipped with problem-solving philosophical approaches that are pertinent across the disciplines;
- **Analytical reasoning:** Graduates are expected to acquire formulate cogent arguments and spot logical flaws, inconsistencies, circular reasoning etc.
- **Research-skills:** Graduates are expected to be keenly observant about what is going on in the natural surroundings to awake their curiosity.
- **Teamwork:** Graduates are expected to be team players, with productive cooperations involving members from diverse socio-cultural backgrounds.

**Program specific outcomes:**

The core courses would fortify the students with in-depth subject knowledge concurrently; the discipline specific electives will add additional knowledge about applied aspects of the program as well as its applicability in both academia and industry. The skill enhancement courses would further add additional skills related to the subject as well as other than subject. In brief the student graduated with this type of curriculum would be able to disseminate subject knowledge along with necessary skills to suffice their capabilities for academia, entrepreneurship and Industry. Depending upon interest, students can work in polymers, water detoxification, organometallics, and electrochemistry, green chemistry, pharmaceutical industries and R&D sectors etc. or carry out analysis in laboratories under the guidance of expert faculties.

**Practical Outcomes:** Students learn practical skills and are able to:

1. Follow practical instructions safely and accurately
2. Carry out variety of experimental procedures
3. Measure and interpret various analytical techniques.
4. Interpret quantitatively the results of their experiments
5. Understand the specific requirements of teaching laboratory based subjects.
6. Formulate Safety protocols and demonstrate a thorough understanding of health and safety requirements.
7. Assist others in safe and efficient laboratory work.

**Student Progression:**

Institution facilitates student progression to higher level of education and towards employment. Every year the majority of students graduates with first division. Many students qualify in PG entrance tests. BSc in Chemistry graduates are able to take whole range of careers either within chemical community or outside. Past and present students feedback are analyzed and suggestions were implemented.

**Activities:**

To boost up the academic interest among the students, department of chemistry periodically organizes functions /activities/ Seminars for B.Sc. students. A large number of students actively participates in various completions like poster making, seminars, debates and declamations, Quiz, working models etc. conducted on different occasions like to celebrate 'National Science day', Students actively participated in various activities like declamation, power point presentations and poster presentation on the assigned topics. All the functions and activities give students and faculty exposure to contemporary areas of scientific research in addition to the basic concepts associated with interdisciplinary topics.