COURSE OUTCOME

DEPARTMENT OF SCIENCE, SERAMPORE GIRLS COLLEGE

By Course outcomes(CO) we mean the brief statement describing significance and learning that students will achieve and can reliably demonstrate at the end of a course i.e. after completing a paper (whether it is CC/GE). These relate to the skills, knowledge, and behavior that students acquire in their curriculum through the course. The knowledge they will gain should be related to skill development, i.e., writing skill, skill of analytical thinking, critical thinking, problem solving. And then how these skills may be used to get different kind of jobs.

Serampore Girls' College is affiliated to University of Calcutta. It follows the curriculum and syllabus framed by the University of Calcutta. Each departmental head will frame appropriate course outcomes of their Honours and General Programme in consultation with members of the department in this lockdown time and submit it to

Dr. Uttam Haldar: (email: haldaru@ymail.com) For Arts stream

Dr. Sandip Majumdar: (email: sandipiitkgp13@gmail.com) For Science (Including Geography)

The CO statements are defined by considering the syllabus covered in each module of a course. By using the action verbs of learning levels, COs will be designed. Generally, four to five course outcomes may be specified for each course base on its weights. It is a very important parameter for NAAC.

The final version of Course Outcomes will be communicated to students, guardians and alumni for their awareness in four ways. It will be uploaded in departmental page of college website. COs are available online in each departmental page in college website (www.seramporegirlscollege.org), which will help the students to compare different COs before admission. Side by side COs will be also available in departmental notice board. Dept. teachers will also demonstrate students during the progression of course.

Table 1: Methods of communication of Course outcome to students, parents and alumni

How Published?	**Where Published?**	**How Disseminated**
Print in paper	Department Notice boards	Self-reading by students, parents and alumni
Online	Under Department tab of college Website	Available for Self-reading in public domain

Table 2: Course Outcomes, **Program:** B. Sc Chemistry (General)**, Program code: CEM-G**

S.l. No	Course	Semester	Course Code	Credit	Marks					Course outcome	Skill Development related to employability and Entrepreneurship development
					Theory	Practical	Internal Assessment	Attendenc	Total		
1	Introductory Physical and Organic Chemistry (Theory)	1	CC1/ GE 1	4	50		10	10	100	The motto of this course is- 1. To study the various atom models 2. To understand the important features of quantum mechanical model of atom 3. To study the periodic properties of elements 4. To understand the core concepts of organic chemistry i.e. resonance, hyperconjugation, inductive effect etc. and their application. 5. To understand optical isomerism, geometric isomerism and conformational isomerism. 6. To describe a reaction rate in terms of a change in concentration divided by a change in time (at constant volume) and a general form of a (differential) rate law. To write a general form of the rate law for any chemical reaction and define the order of a chemical reaction. To determine integrated rate expression for zero order, first order, second and third order reaction and their respective half-life period expressions. To study the various factors which affect the rate of a chemical reaction such as concentration,	The important development obtained from this course is- 1. Students are able to write electronic configuration of given atomic number. 2. Students are able to tell the name of orbitals by recognizing shapes of orbitals. 3. Students should be able to describe the characteristic of the three states of matter. 4. Students should recognize and draw constitutional isomers, stereoisomers, including enantiomers and diasteromers, racemic mixture and meso compounds. 5. Students should understand rate of reaction and factors affecting it. Derive integrated rate expressions for zero order, first order, second order and third order reaction. Understand theories of reaction kinetics and differentiate them.

										temperature, solvent, catalyst etc. And theories of chemical kinetics.	
2	**Quantitative Inorganic Analysis (Practical)**	1	CC1/ GE 1	2		30				The motto of this course is- To develop skills for quantitative estimation using the different branches of volumetric Analysis	The important development obtained from this course is- The students will get skill in the quantitative analysis by doing titrations in the different branches of volumetric analysis.

3	Synthetic organics and Thermodynamics and its Applications(Theory)	2	CC2/GE 2	4	50		10	10	100	The motto of this course is- 1. To understand the concepts of thermodynamics and its laws 2. To understand the entropy change in reversible and irreversible reactions. 3. To understand the physical significance of third law of thermodynamics. 4. To understand the concepts of electrochemistry. 5. To understand the working and reaction of electrochemical cells 6. To understand thermodynamic terms: system, surrounding etc. Types of systems, intensive and extensive properties. State and path functions and their differentials. 7. To understand Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law 8. To understand the concept of equilibrium constant, free energy, chemical potential 9. To understand the Nernst distribution law – its thermodynamic derivation, modification of distribution law when solute undergoes dissociation, association and chemical combination. Applications of distribution law	The important development obtained from this course is- 1. Students should recognize the basic terms of thermodynamic. 2. Students should able to predict the energy change in heat capacities at constant volume and pressure and their relationship. 3. Students should able to drive Joule's law and its application. 4. Students should able to derive relationship between modification of distribution law when solute undergoes dissociation 5. Students should identify different methodologies for the synthesis of alkane, alkene and alkynes. 6. Students should able to identify products of specific reactant and specific conditions.
4	Physical Chemistry Experiments (Practical)	2	CC2/GE 2	2		30				The motto of this course is- To demonstrate procedures and instrumental methods applied in analytical and practical tasks of physical chemistry	Students can independently integrate qualitative and quantitative concepts of physical chemistry.

5	**Basics of bonding and different types of elements and their properties and advance electrochemistry and introductory coordination chemistry**	3	CC3/GE 3	4	50		10	10	100	The motto of this course is- 1. To explain the formation of different types of bonds. 2. To predict the geometry of simple molecules 3. To explain the different types of hybridization and draw shapes of simple covalent molecules. 4. To understand the molecular orbital theory of diatomic molecules 5. To understand how to calculate bond order. 6. To understand how to calculate lattice energy through Born Haber Cycle. 7. To study transition metals to understand the trends in properties and reactivity of the d-block elements. 8. To study the Werner's theory of coordination compounds. 9. To be able to outline the completed electrophilic aromatic substitution reactions of the following types: halogenation, nitration, sulfonation, and Friedel-Crafts acylation & alkylation	The important development obtained from this course is- 1. The students will able to calculate bond order of different molecules. 2. The students will able to draw MO diagrams of different molecules. 3. The students will able to calculate effective nuclear charge using Slaters Rule. 4. The students will be able to describe the periodic table as a list of elements arranged so as 5. The students will able to demonstrate trends in their physical and chemical properties. 6. The students will able to state the principle resemblances of elements within each main 7. The students will able to state the principle resemblances of elements within each main group in particular alkali metals, alkaline earth metals, halogens and noble gases.

6	**Qualitative Inorganic Analysis (Practical)**	3	CC3/GE 3	2		30				The motto is to understand basic principles of qualitative analysis and learn how to determine which groups are present by analysis.	Student will learn to analyze mixtures even in real samples.
7	**Organic Functional Groups, Advanced Coordination Chemistry, Quantum and Spectra**	4	CC4/GE 4	4	50		10	10	100	The motto of this course is- 1. To understand the methods for preparation of alcohols. 2. To understand the different classes of alcohols. 3. To understand the structure of carboxylic acid and their derivatives. 4. To understand the reactivity of different carboxylic acid derivatives. 5. To understand the chemical reactions of phenols. 6. To understand how to name different aldehydes and ketones. 7. To understand the reactivity of different carbonyl compounds towards nucleophilic reaction. 8. To understand how to write the products of addition reaction to carbonyl compounds. 9. To understand to differentiate between primary, secondary and tertiary amines. 10. To understand the concept of wave functions. 11. To understand different properties of molecular	The important development obtained from this course is- 1. Students will be able to recognize structures of acid halides, esters, amides, acid anhydrides. 2. Students will be able to recognize mechanism of different reactions related to carbonyl compounds. 3. Students will be able write mechanism of different condensation reaction. 4. Students will be able to recognize the reactivity of substituted aromatic amines. 5. Students will be able to recognize different regions for different spectroscopy.

										structure. 12. To understand the basic features of spectroscopy.	
8	**Qualitative Organic Analysis (Practical)**	4	CC4/GE 4	2		30				The motto of this course is- 1. To learn the confirmatory test for various functional groups. 2. To identify different compounds.	Students can understand the reaction Chemistry practically and can relate to any practical world differentiation or purification method

Programme Outcomes of B. Sc Chemistry

1. Demonstrate, solve and an understanding of major concepts in all disciplines of chemistry.
2. Solve the problem and also think methodically, independently and draw a logical conclusion.
3. Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of chemical reactions.
4. Create an awareness of the impact of chemistry on the environment, society, and development outside the scientific community.
5. Apply modern methods of analysis to chemical systems in a laboratory setting.

Programme Specific Outcomes (PSO) B. Sc Chemistry

1. Gain the knowledge of Chemistry through theory and practical.
2. To explain nomenclature, stereochemistry, structures, reactivity, and mechanism of the chemical reactions.
3. Understand good laboratory practices and safety.
4. Develop research oriented skills.
5. Make aware and handle the sophisticated instruments/equipment.
6. Learn the classical status of thermodynamics.
7. Introduce advanced techniques and ideas required in developing area of Chemistry.