CODE	UGCHEM
PROGRAMME NAME	BSc. Chemistry Honours

Sl No	Course Code	Title of the course	Experiential learning	Participative learning	Problem solving methodologies	Remarks
1	UGCHEMCC01	Organic Chemistry 01	✓	✓	✓	The students will learn the basic properties of organic molecules and their spatial orientation. The experimental techniques, such as, purification, melting point determination, and special element detection. They can participate in purifying and determining new organic molecules.
2	UGCHEMCC02	Physical Chemistry 01	✓	✓	✓	By studing this part students will acquire knowledge in various thermodynamic and kinetic parameters of a reaction. Additionally they will be accustomed with several physical experiments, like determination of rate constant, heat of neutralization etc. They can partcipate in solving thermodynamic and kinetic parameteres of new reactions utilizing this knowledge.
3	UGCHEMCC03	Inorganic Chemistry 01	✓	✓	✓	The structure, chemical properties and redox behavior of atom will be taught in this part. Students will be able to solve new problems by utilizing the concepts of redox, acid -base etc. They will also become expertise in different experimental techniques by participating different titrimetric methods.
4	UGCHEMCC04	Organic Chemistry 02	✓	✓	✓	The spectroscopic aspects of organic molecules as well as the conformation will be taught in this part. This concept will make them to particate in solving new organic chemistry related problems. Additionally, the experimetal techinques for detecting functional groups will make the students capable to detect unknown functionality.

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5	UGCHEMCC05	Physical Chemistry 02	✓	✓	✓	The concept of transport properties of fluid along with the thermodymic parameters of a chemical reaction will be taught in this part. Students will be introduced into the quantum world and thus they can particapate to solve several quantum mechanical problems. The experimental techniques such as cunductometry, viscomentry etc. will make them capable to study physical parameters of new chemical reactions
6	UGCHEMCC06	Inorganic Chemistry 02	✓	✓	✓	The studedents will learn different types of interactions in molecules. This will help them to participate in solving the chemical properties of molecules. They will also become expertise in different experimental techniques by participating different titrimetric mnethods.
7	UGCHEMCC07	Organic Chemistry 03	✓	✓	✓	The spectroscopic aspects of organic molecules as well as the reactions of carbonyl group will be taught in this part. This concept will make them to particate in solving new organic chemistry related problems. Students will also gather knowledge in organic synthesis. These experemental as well as theoretical knowledge will help them to understand and explain new organic reaction.
8	UGCHEMCC08	Physical Chemistry 03	✓	✓	✓	The electrical properties of ions in solution will be taught in this part. Also, they will be able to partcipate in solving several quantum mechanical aspects of subatomic particles. The experimental techniques such as potentiometry, pH-metry etc. will make them capable to study physical parameters of new chemical reactions
9	UGCHEMCC09	Inorganic Chemistry 03	✓	✓	✓	The chemistry of s- and p-block elements will make students capable to understand the chemical properties of elements and their compounds. This concept will be very benefical to solve the chemistry of differet compounds via participation. The inorganic prepration experiments will make them competent to synthesize new inorganic compounds.

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10	UGCHEMCC10	Organic Chemistry 04	✓	✓	✓	Students will acquire knowledge on retrosynthetic approach for synthesizing organic compounds. Students will be able to participate in designing new drug molecules. The experimental techniques involving estimation of organic molecules will make students competent to solve problems by estimating organic compounds in a mixture.
11	UGCHEMCC11	Inorganic Chemistry 04	✓	✓	✓	The structure, bonding and properties of inorganic complexes will be taught in this part. Students can participate to solve different phenomenon utilizing the concepts gathered. The experimental techniques involving the qualitative detection of acidic and basic radicals will make students capable to detect unknown sample.
12	UGCHEMCC12	Organic Chemistry 05	✓	✓	✓	The chemistry of heterocyles, carohydrates, natural products and biomolecules will be taught in this part. The acquired knowledge will make the students capable to solve different chemical phenomenon in the nature. The experimental techniques involving seperation of biomolecules via chromatography will make the students able to seperate organic molecules.
13	UGCHEMCC13	Inorganic Chemistry 05	✓	✓	✓	This part will enlighten different biological phenomenon involving metal and metal ions. Also the reactivity and properties of organometallic compounds will be taught. Students will be able to participate in explaining the biological phenomenon in living systems. he experimental techniques involving the qualitative detection of acidic and basic radicals will make students capable to solve different unknown samples via qualitative detection.

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14	UGCHEMCC14	Physical Chemistry 04	✓	✓	✓	The molecular spectroscopy, photochemical processes and surface phenomenon will be taught in this part. Students will be able to participate to solve different physical aspects of chemical reactions utilizing the concepts taught. The experimental techniques, such as, spectrophotometry will make them capable to study physical parameters of new chemical reactions
15	UGCHEMDSE01	Advanced Physical Chemistry	✓	✓	✓	From this topic students will learn the various advanced topics related to physical chemistry like structural aspcts of solids, computer based programmings, statistical thermodynamics, polymers etc. Hence theses learning will be helpful for them to solve related academic and industrial research problems as well as will help them to actively participate for designing new experiments.
16	UGCHEMDSE02	Analytical Methods of Chemistry	✓	✓	✓	Studying this topic students will learn the basic and in-depth knowledge on analytical chemistry which will be fruitful for them to solve new analytical chemistry problems as well as they will participate in related experimental techniques. This learning will be truly helpful for both industry and academia.
17	UGCHEMDSE03	Green Chemistry	✓	✓	✓	This topic will be fruitful for students for learning ideas on green chemistry and its different aspects. Students will participate to solve problems to circumvent the use of hazardous chemicals employing green chemistry as well as will participate to design novel experimental methods to minimize the laboratory and industry related pollutions.
18	UGCHEMDSE04	Inorganic Materials of Industrial Importance	✓	✓	✓	Learning this topic, students will be able to understand and gather knowledge on industry based materials like ceramics, glass, composites, fertilizers. Hence they will solve problems on the topic ratlated problems and also they will participate to design new experimental techniques for fabrication of new important materials.

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19	UGCHEMDSE05	Industrial Chemicals and Environment	✓	✓	✓	From this topic students will learn the idea on industrial chemistry and its environmental aspects. Therefore they will be able to participate in related industrial based environmental issues to solve problems as well as they will learn to design new experiments to minimize environmental pollution.
20	UGCHEMSEC01	Pharmacutical Chemistry	✓	✓	✓	From this topic students will learn the basics as well as details on pharmaceutical chemistry. Hence students will be able to solve new problems based on synthesis and structural activity of new drug molecules. They will also participate to design new experiments for synthesis of novel drug molecules.
21	UGCHEMSEC02	Fuel Chemistry	✓	✓	✓	Studying this topic will help the students to learn the basics as well as details on fuel chemistry subject like renewable and non-renewable sources of energy, different petroleum products, different industrial techniques related to petrochemical based experiments etc. Hence students will be able to solve new industry related problems based on this topic and also can participate to design new experiments.
22	UGCHEMGE01	Generic Elective 01	✓	✓	✓	Students will learn from the topics the basic concepts and ideas on organic, physical and inorganic chemistry. Hence they will be able to apply the knowledge to solve related new problems as well as to participate in learning new experimental techniques.
23	UGCHEMGE02	Generic Elective 02	✓	✓	✓	Students will learn the topics on physical chemistry like chemical kinetics, photochemistry, organic chemistry like proteins and carbohydrates, inorganic chemistry IUPAC nomenclatures and semimicro qualitative analysis. Therefore they will be able to solve new problems based on these topics and can participate to design new chemistry experiments.

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24	UGCHEMGE03	Generic Elective 03	✓	✓	✓	Students will be able to apply the knowledge of the learned topics based on organic and physical chemistry to solve new problems and to participate in different new chemical experiments.
25	UGCHEMGE04	Generic Elective 04	✓	✓	✓	Students will be able to apply the knowledge of the topics based on inorganic and physical chemistry to participate in different new experiments and to solve new problems.
26	UGCHEMAECC01	English for Communication	✓	✓	✓	
27	UGCHEMAECC02	Environmental Sciences	✓	✓	✓	

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PROGRAMME CODE	PGCHEM					
PROGRAMME NAME	MSc. Chemistry					
Sl No	Course Code	Title of the course	Experiential learning	Participative learning	Problem solving methodologies	Remarks
1	PGCHEMMCT01	Inorganic Chemistry 01		✓	✓	The students will learn the modern theories to explain electronic properties of metal complexes. This will enable them to participate in solving problems involving metal complexes utilising the theories taught.
2	PGCHEMMCT02	Organic Chemistry 01		✓	✓	Students will acquire knowledge on retrosynthetic approach for synthesizing organic compounds. Students will be able to participate in designing new drug molecules. They will also gather knowledge on natural products. These concepts will enble them to solve several problems in related areas.
3	PGCHEMMCT03	Physical Chemistry 01		✓	✓	By studing this part students will acquire knowledge in various thermodynamic and kinetic parameters of a reaction. They can partcipate in solving thermodynamic and kinetic parameteres of new reactions utilizing this knowledge.
4	PGCHEMMCP01	Inorganic Chemistry 01 Practical	✓	✓	✓	The students will learn experimental techiniques like spectrophotometric estimation of metal ions in complex or in binary mixture. This procedure will help them to partcipate in the quantitative estimation of metal ion and solve problems associated with heavy metal pollution.
5	PGCHEMMCP02	Organic Chemistry 01 Practical	✓	✓	✓	The student will be able to detect single organic compound by participating in the experimental procedures of compound detection. They will also be separate and isolate organic compounds in mixture by different chromatographic techniques and solve the problems of organic synthesis.
6	PGCHEMMCP03	Physical Chemistry 01 Practical	✓	✓	✓	The students will be able to construct phase diagram in different types of liquid mixtures. They can also partcipate in studying kinetics of different order reactions. These experimental techniques will grow problem solving aptitudes in them.
7	PGCHEMMCT04	Inorganic Chemistry 02	✓	✓	✓	The structure and bonding of boranes and related compounds will be taught in this part. Students will also acqure knowledge on different types of organometallic compounds and their reactivity. This knowledge will help to participate students in solving problems related to boranes and organometallics.
8	PGCHEMMCT05	Organic Chemistry 02		✓	✓	Students will acquire knowledge on structure activity relationship of organic compounds. The concepts of photochemistry and pericyclic reactions will enable students to participate in solving related problems.
9	PGCHEMMCT06	Physical Chemistry 02		✓	✓	The concepts of quantum mechanics will be taught in this part. The concepts of quantum mechanics will help the students to solve related problem via participation. Additionally, the concepts of electrochemistry will help to solve the electrochemical phenomenon.
10	PGCHEMMCP04	Inorganic Chemistry 02 Practical	✓	✓	✓	The students will be able to detect cations, anions and insoluble materials by utilizing the experimental techniques involved in semimicro qualitative analysis. They will also able to participate in the detecion of metals in unknown samples and solve several problems.
11	PGCHEMMCP05	Organic Chemistry 02 Practical	✓	✓	✓	The students will be able to design new drug molecules via participating in experimental techniques of organic synthesis and solve different problems in related areas.

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12	PGCHEMMCP06	Physical Chemistry 02 Practical	✓	✓	✓	The students will get hands on training on several experimental techniques, such as, conductometry, potentiometry, colourimetry etc. This training will help them to solve several physical parameters via participation among themselves.
13	PGCHEMMCT07	Inorganic Chemistry 03		✓	✓	The students will acquire knowledge on experimental techniques for chemical seperation. The concepts of environmental chemistry will motivate students in partcipating programmes to solve environmental issues.
14	PGCHEMMCT08	Organic Chemistry 03		✓	✓	The concepts of green chemistry and bio organic chemistry will be taught in this part. This part will motivate students in partcipating in green experimental methods to solve environmetal issues.
15	PGCHEMMCT09	Physical Chemistry 03		✓	✓	Students will learn different aspects of group theory, solid state chemistry in advanced level as well as biophysical chemistry. The learning will help the students to solve new related chemical problems as well as to participate in designing new physical chemistry based experiments.
16	PGCHEMMCP07	Inorganic Chemistry 03 Practical	✓	✓	✓	Here students will learn the synthesis and characterizations of different inorganic salt and complexes. They will also participate for experimental evaluation of their magnetic and spectroscopic properties.
17	PGCHEMMCP08	Organic Chemistry 03 Practical	✓	✓	✓	Here students will learn the both qualitative and quantitative analyses realted to organic chemistry. They will also participate for new experimental design.
18	PGCHEMMCP09	Physical Chemistry 03 Practical	✓	✓	✓	Here students will learn the both theoretical and experimental ideas of different advanced level physical chemistry experiments and thus will participate the related new subject problems.
19	PGCHEMSCC	Interdisciplinary Adv. Chemistry	✓	✓	✓	Learning the topics of the paper, the students will engross knowledge on different instrumental techniques majorly utilized in chemical analysis. Therefore the topics will help the students to solve new and related problems as well as the students will likely participate in spectroscopiy based experiments which will be truly interesting for characterizations of molecular level to bulk level chemistry.
20	PGCHEMOE01	Supramolecular Chemistry	✓	✓	✓	From this chapter students will learn the basic concepts of supramolecular chemistry and different supramolecular forces. Therefore they will be able to apply the knowledge in solving different problems on supramolecular chemistry as well as they will participate actively to design new experiments for synthesis of novel and important molecules based on this chemistry.
21	PGCHEMOE02	Medicinal Chemistry	✓	✓	✓	From this chapter students will learn types of drugs, drug – receptor interactions, and mechanisms of drug actions. Therefore the knowledge will be utilized for solving problems on medicinal chemistry and students will participate to apply the knowledge to design new drug molecules.
22	PGCHEMME01	Advanced Inorganic Chemistry 01	✓	✓	✓	Students will learn different advanced inorganic chemistry topics ranging from metal ligand complex equilibria in solution to advanced bioinorganic chemistry and radiochemical analyses. Therefore the students will be able to solve new and related problems as well as they will participate to develop new experiments as required.

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23	PGCHEMME02	Advanced Inorganic Chemistry 02	✓	✓	✓	Students will learn different advanced inorganic chemistry topics ranging from different inorganic materials like zeolites, polysilanes etc to reaction mechanism in inorganic chemistry and magnetochemistry. Therefore the students will be able to solve new and related problems as well as they will participate in solving related problems and will develop new experiments as required.
24	PGCHEMME03	Advanced Organic Chemistry 01	✓	✓	✓	Students will learn different advanced organic chemistry topics ranging from advanced spectroscopy to advance stereochemistry. Therefore the students will be able to solve new and related problems as well as they will participate in solving related problems and will participate in designing advanced organic chemistry based experiments.
25	PGCHEMME04	Advanced Organic Chemistry 02	✓	✓	✓	Students will learn different advanced organic chemistry topics related to bioorganic and biological advanced aspects of organic chemistry. Therefore the students will be able to solve new and related problems as well as they will participate to develop new experiments as required.
26	PGCHEMME05	Advanced Physical Chemistry 01	✓	✓	✓	Students will learn different advanced physical chemistry topics based on statistical mechanics and polymer chemistry. Therefore the students will be able to solve new and related problems as well as they will participate to develop new experiments as required.
27	PGCHEMME06	Advanced Physical Chemistry 02	✓	✓	✓	Students will learn different advanced physical chemistry topics based on different phenomea of surface chemistry as well as advnaced quantum mechanics. Therefore the students will be able to solve new and related problems as well as they will participate to develop new experiments as required.
28	PGCHEMOT01	Project and Presentation	✓	✓	✓	Students will learn to perform small research project(s) under their assigned teacher's mentorship. Therefore they will learn new experimental techniques and how to solve new research problems. They will also learn to write research report and participation in project presentation.
29	PGCHEMOT02	Grand Viva and Seminar		✓	✓	Students will participate in the grand viva and seminar for the evaluation of their subject related knowledge as well as they will learn how to approach and solve an unknown research problems.
30	PGCHEMSOC01	Yoga	✓	✓	✓	
31	PGCHEMSOC02	Communicative English	✓	✓	✓	
32	PGCHEMSOC03	VECC	✓	✓	✓	
33	PGCHEMSOC04	Computer For Chemists	✓	✓	✓	Students will learn the applications of computer based softwares in the field of chemistry. They will also learn different programming etc. Thus they will be able to participate in solving related theoretical and experimental problems.

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