MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY BATHINDA-151001 (PUNJAB), INDIA

(A State University Estb. by Govt. of Punjab vide Punjab Act No. 5 of 2015 and Approved u/s 2(f) & 12 (B) of UGC; Member AIU)

Department: **Department of Chemistry**
MRSPTU

Program: B.Sc. Chemistry 2019 onwards

COs, POs, PSOs Mapping

Subject: Inorganic Chemistry – I	**Subject Code: BCHMS1-101**	**Semester: 1st**
Credit: 4	**L T P 4 0 0**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Wave mechanics, atomic theories and shapes of orbitals	1	2						
CO2	Periodic table and various periodic properties	1	2						
CO3	Ionic bond, covalent bond, metallic bond and various weak chemical forces	1	2						
CO4	Redox reactions and applications of redox reactions	1	2						

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Physical Chemistry – I	**Subject Code: BCHMS1-102**	**Semester: 1st**
Credit: 4	**L T P 4 0 0**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Acquire the knowledge of kinetic modular model of gases, behaviour of ideal and real gases	2		1					
CO2	Acquire the knowledge of concept of equilibrium, its types and the factors affecting the state of equilibrium	2		1		1			1
CO3	Acquire the knowledge of different type of crystal systems, Bragg's law and Miller indices	2							
CO4	Acquire the knowledge of comparison of the behaviour of ideal and real gases	2		1					

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Inorganic Chemistry – I Lab	**Subject Code: BCHMS1-103**	**Semester: 1st**
Credit: 2	**L T P 0 0 4**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Preparation of solutions	1	3				2		
CO2	Estimation of carbonates, bicarbonates and free alkalis in solution with acid base titrations	1	3				2		
CO3	Estimation of Fe(II) and oxalic acid with oxidation reduction titrimetry	1	3				2		

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Physical Chemistry – I Lab	**Subject Code: BCHMS1-104**	**Semester: 1st**
Credit: 2	**L T P 0 0 4**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Acquire the knowledge of surface tension and viscosity measurement		2				1	1	1
CO2	Acquire the knowledge of preparation of buffer solution		2				1	1	1
CO3	Acquire the knowledge of pH metric titrations		2				1	1	1

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Organic Chemistry – I	**Subject Code: BCHMS1-201**	**Semester: 2nd**
Credit: 4	**L T P 4 0 0**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Stereochemistry concepts	1		3	1				
CO2	Reaction intermediates, electronic effects and types of reactions	1		3	1				
CO3	Formation of carbon-carbon sigma and pi bonds	1		3	1				
CO4	Conformational analysis of cycloalkanes	1		3	1				
CO5	Aromaticity concepts	1		3	1				

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Physical Chemistry – II	Subject Code: BCHMS1-202	Semester: 2nd
Credit: 4	L T P 4 0 0	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Acquire the knowledge of systematic knowledge of concepts of thermodynamics and able to identify and describe energy exchange processes	2		1					
CO2	Acquire the knowledge of concept of chemical equilibrium, and the factors affecting the state of equilibrium	2		1		1			1
CO3	Acquire the knowledge of variation of system properties with composition	2							
CO4	Acquire the knowledge of solutions and their properties	2		1		1			1

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Organic Chemistry Lab I	Subject Code: BCHMS1-203	Semester: 2nd
Credit: 2	L T P 0 0 4	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Purification of organic compound using various solvent combinations	1	3	1					
CO2	Determination of melting and boiling points of various organic compound	1	3	1					
CO3	Chromatographic techniques	1	3						

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Physical Chemistry Lab II	**Subject Code:** BCHMS1-204	**Semester:** 2nd
Credit: 2	**L T P 0 0 4**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Acquire the knowledge of heat capacity and its calculations		2				1	1	1
CO2	Acquire the knowledge of determination of enthalpy		2				1	1	1
CO3	Acquire the knowledge of handling calorimeter		2				1	1	1

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Environment Sciences	**Subject Code: BCHMA0-002**	**Semester:** 2nd
Credit: 2	**L T P 2 0 0**	**Duration: 30 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Multiple utility of Environment chemistry in the regions of Industrial chemistry.		2		3		2		
CO2	The general and specific approaches in Environment sciences establish a firm foundation for pursuing career.				1		2		
CO3	The conscious attribute towards environment and its issues.		2		2				
CO4	Acquire the fundamental knowledge of allied fields of science which will enable them to contribute effectively in the field of education.		2				3		

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Organic Chemistry II	**Subject Code:** BCHMS1-301	**Semester: 3rd**
Credit: 4	**L T P 4 0 0**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Acquire the knowledge of kinetic modular model of gases, behaviour of ideal and real gases	2		2					
CO2	Acquire the knowledge of concept of equilibrium, its types and the factors affecting the state of equilibrium	1		2					
CO3	Acquire the knowledge of different type of crystal systems, Bragg's law and Miller indices	2		2					
CO4	Acquire the knowledge of comparison of the behaviour of ideal and real gases	2		3					

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Physical Chemistry III	**Subject Code: BCHMS1-302**	**Semester: 3rd**
Credit: 4	**L T P 4 0 0**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Acquire the knowledge of catalysis and its mechanism	2		1		1		1	1
CO2	Acquire the knowledge of concept of chemical kinetics, including kinetics of complex reactions	2		1		1		1	1
CO3	Acquire the knowledge of theories and mechanism associated with rate of reactions	2		1		1		1	1
CO4	Acquire the knowledge of concept of phase equilibria and its applications	2		1		1			

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Organic Chemistry II – Lab	**Subject Code: BCHMS1-303**	**Semester: 3rd**
Credit: 2	**L T P 0 0 4**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	After completion of course students will acquire the knowledge of Synthesis of organic compound using using chemical reactions	1	3		1				
CO2	After completion of course students will acquire the knowledge of determination of melting and boiling points of synthesised organic compound	2							
CO3	After completion of course students will acquire the knowledge of Functional group tests	2			1				

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Physical Chemistry Lab III	**Subject Code: BCHMS1-304**	**Semester: 3rd**
Credit: 2	**L T P 0 0 4**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Acquire the knowledge of drawing phase diagram and calculating various parameters associated with phase concept		2				1	1	1
CO2	Acquire the knowledge of study of kinetics of a reaction practically		2				1	1	1
CO3	Acquire the knowledge of applying adsorption isotherm to study adsorption phenomena		2				1	1	1

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Chemistry of Cosmetics and Perfumes	Subject Code: BCHMD1-311	Semester: 3rd
Credit: 2	L T P 2 0 0	Duration: 30 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1. Cosmetics and its ingredients.	3							1
CO2	2. Safety, efficacy testing and microbiological impacts of cosmetic products.	3	1					2	1
CO3	3. Practical preparation of some cosmetics products.	3	3		1		2		1

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Green Methods in Chemistry	Subject Code: BCHMD1-312	Semester: 3rd
Credit: 2	L T P 2 0 0	Duration: 30 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Acquire the knowledge of kinetic modular model of gases, behaviour of ideal and real gases	2						2	
CO2	Acquire the knowledge of concept of equilibrium, its types and the factors affecting the state of equilibrium	1			2			3	

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Inorganic Chemistry II	Subject Code: BCHMS1-401	Semester: 4th
Credit: 4	L T P 4 0 0	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1. Metallurgy Principles and concepts behind acids and bases	3			1				1
CO2	2. Chemistry of s and p block elements	3			1				1
CO3	3. Noble gases and inorganic polymers	3			1				1

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Organic Chemistry-III	Subject Code: BCHMS1-402	Semester: 4th
Credit: 4	L T P 4 0 0	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1. Reactions of nitrogen containing functional groups			2		2			2
CO2	2. Structures, preparations and chemistry behind polynuclear and heterocyclic compounds			1					2
CO3	3. Structural features, isolation, synthesis and medicinal properties of alkaloids			1		1			2
CO4	4. Classification, structure and synthesis of terpenes					2			1

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Inorganic Chemistry – II Lab	Subject Code: BCHMS1-403	Semester: 4th
Credit: 2	L T P 0 0 4	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	To understand the concepts behind Iodo/Iodimetric titrations	1	2						
CO2	To synthesize various inorganic compounds	1	2						

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Organic Chemistry III Lab	Subject Code: BCHMS1-404	Semester: 4th
Credit: 2	L T P 0 0 4	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1. Detection techniques of extra elements		1		2	3			1
CO2	2. Concepts of functional groups detection		3			3			
CO3	3. Quantitative analysis of organic molecules				3				2

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Fuel Chemistry	Subject Code: BCMD1-411	Semester: 4th
Credit: 2	L T P 2 0 0	Duration: 30 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Industrial applications of coal	1	2						2
CO2	Industrial uses and applications of petroleum	1	3						2

CO3	Properties and uses of lubricants	1	3						2

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Pharmaceutical Chemistry	**Subject Code: BCHMD1-412**	**Semester: 4th**
Credit: 2	**L T P 2 0 0**	**Duration: 30 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1. Synthetic methods used for the drug design and development			1		2			
CO2	2. Aerobic and anaerobic fermentation			3	1	3			

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Inorganic Chemistry – III	**Subject Code: BCHMS1-501**	**Semester: 5th**
Credit: 4	**L T P 4 0 0**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1. Coordination chemistry	3	1		1				1
CO2	2. Concepts of chemistry of various transition elements	3	1		1				1
CO3	3. Chemistry lanthanoids and actinoids	3			1				1
CO4	4. Fundamentals of bioinorganic chemistry	3			1			1	1

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Organic Chemistry – IV	**Subject Code: BCHMS1-502**	**Semester: 5th**

Credit: 4	L T P 4 0 0	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Basic concepts of nucleic acids	1		2	1				
CO2	Concepts of chemistry of various amino acids, peptides and proteins	1		2	1				
CO3	Enzymes chemistry and their mechanism of action	1		2	1				
CO4	Fundamentals of energy in bio systems	1		2	1				

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Physical Chemistry – IV	Subject Code: BCHMS1-503	Semester: 5th
Credit: 4	L T P 4 0 0	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Acquire the knowledge of basic concepts of conductance, related theories and applications of conductance measurements	2		1					1
CO2	Acquire the knowledge of concepts of electrochemistry	2		1		1		1	1
CO3	Acquire the knowledge of applications of EMF measurements	2		1		1		1	1
CO4	Acquire the knowledge of fundamentals of electrical & magnetic properties of atoms and molecules	2		1		1		1	1

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Inorganic Chemistry III Lab	Subject Code: BCHMS1-504	Semester: 5th
Credit: 2	L T P 0 0 4	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1. Gravimetric analysis and estimation of different metals using the concept.	2	3		2		3		
CO2	2. Concepts of inorganic preparations	2	3		2		3		
CO3	3. Principles involved in chromatographic separations and by hand separation of metal ions	2	3		2		3		

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Organic Chemistry – IV Lab	**Subject Code: BCHMS1-505**	**Semester: 5th**
Credit: 2	**L T P 0 0 4**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Estimation of amino acids and proteins	1	3						
CO2	Concepts of action of salivary amylase and effect of various parameters on its action	1	3		2				
CO3	Calculation of physical parameters of oil and fat	1	3						
CO4	Procedures for synthesis of drugs and peptides	1	3		2				

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Physical Chemistry IV Lab	**Subject Code: BCHMS1-506**	**Semester: 5th**
Credit: 2	**L T P 0 0 4**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Acquire the knowledge of conductivity meter, calculation of various parameters and conductometric titrations		2				1	1	1
CO2	Acquire the knowledge of Working of potentiometer and performance of potentiometric titrations		2				1	1	1

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Instrumental Method of Analysis	Subject Code: BCHMD1-512	Semester: 5th
Credit: 3	L T P 3 0 0	Duration: 45 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Acquire the knowledge of basic concepts of qualitative and quantitative aspects of analysis	2		1				1	1
CO2	Acquire the knowledge of concepts of optical methods of analysis	2		1		1		1	1
CO3	Acquire the knowledge of basic concepts of thermal methods and electroanalytical methods of analysis	2		1		1		1	1
CO4	Acquire the knowledge of fundamentals of separation techniques	2		1		1		1	1

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Novel Inorganic Solids	Subject Code: BCHMD1-513	Semester: 5th
Credit: 3	L T P 3 0 0	Duration: 45 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Basic concepts of synthesis and modification of inorganic solids	1							3
CO2	Concepts of nanomaterials	1							3
CO3	Basic concepts engineering materials for mechanical construction	1							3
CO4	Fundamentals of composite materials and polymers	1							3

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Instrumental Method of Analysis Lab	Subject Code: BCHMD-515	Semester: 5th
Credit: 1	L T P 0 0 2	Duration: 30 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Acquire the knowledge of basic concepts of chromatographic separation of mixtures		2				1	1	1
CO2	Acquire the knowledge of basic concept of extractions techniques		2				1	1	1

CO3	Acquire the knowledge of working of UV/VIS spectrophometer, recording spectrogram and deducing various parameters using the data		2				1	1	1

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Novel Inorganic Solids Lab	**Subject Code: BCHMD1-516**	**Semester: 5th**
Credit: 1	**L T P 0 0 2**	**Duration: 30 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Basic concepts of determination of cation exchange method and total difference of solids		2						2
CO2	Basic concept of synthesis of hydrogels and nanoparticals		2						3

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Physical Chemistry V	**Subject Code: BCHMS1-601**	**Semester: 6th**
Credit: 4	**L T P 4 0 0**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Quantum chemistry with reference to particle in one dimensional box, Heisenberg uncertainty principle	1					2		
CO2	Qualitative treatment of hydrogen atom and hydrogen-like ions	1					2		
CO3	Principle and applications of spectroscopy	1					2		1
CO4	Laws of photochemistry, photochemical equilibrium, chemiluminescence	1					2		

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Inorganic Chemistry IV	Subject Code: BCHMS1-602	Semester: 6th
Credit: 4	L T P 4 0 0	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Solubility products, common ion effect. group reagents and interfering anions	1		2					
CO2	Preparation methods of organometallic compounds, p acceptor ligands and metal alkyls	1		2		3			
CO3	Mechanism of substitution in square planar and octahedral complexes	1		2		3			
CO4	Mechanism of various catalytic processes including hydrogenation, Hydroformylation	1		2		3			
CO5	Preparation methods and reactions of ferrocene	1		2		3			

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Organic Chemistry V	Subject Code: BCHMS1-603	Semester: 6th
Credit: 4	L T P 4 0 0	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Solubility products, common ion effect. group reagents and interfering anions	1		2					
CO2	Preparation methods of organometallic compounds, p acceptor ligands and metal alkyls	1		2		3			
CO3	Mechanism of substitution in square planar and octahedral complexes	1		2		3			
CO4	Mechanism of various catalytic processes including hydrogenation, Hydroformylation	1		2		3			
CO5	Preparation methods and reactions of ferrocene	1		2		3			

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Physical Chemistry Lab V	Subject Code: BCHMS1-604	Semester: 6th

Credit: 2	L T P 0 0 4	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Spectroscopy techniques to find energy of transitions, reaction kinetics and dissociation constant	1	2				1		1
CO2	Analysis of vibration spectrum	1	2				1		1

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Inorganic Chemistry Lab – IV	Subject Code: BCHMS1-605	Semester: 6th
Credit:2	L T P 0 0 4	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Analysis of mixture for cations and anions	1	3			1	2		
CO2	Syntheses of inorganic complexes	1	3			1	2		

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Organic Chemistry Lab V	Subject Code: BCHMS1-606	Semester: 6th
Credit: 2	L T P 0 0 4	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	The students will acquire knowledge of Analysis of unknown organic molecules	1	2	1					
CO2	The students will acquire knowledge of Structure elucidation of organic compounds by IR spectroscopy and NMR spectroscopy	1	2		2				

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Polymer Chemistry	**Subject Code: BCHMS1-611**	**Semester: 6th**
Credit: 3	**L T P 3 0 0**	**Duration: 45 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1 Classification of polymers and polymerization mechanism.			2					
CO2	2Mechanism and kinetics of step growth			3	1				
CO3	3. Structure, properties and applications of polymers			2	2		2		

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Molecular Modelling and Drug Design	**Subject Code: BCHMD1-612**	**Semester: 6th**
Credit: 3	**L T P 3 0 0**	**Duration: 45 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Coordinate Systems. Potential Energy Surfaces. Molecular Graphics	1					1		1
CO2	First and second order minimization methods. Computer simulation methods. Simple thermodynamic properties	1					1		1
CO3	Molecular Dynamics using simple models, Metropolis method	1					1		1

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Inorganic Materials of Industrial Importance	**Subject Code: BCHMD1-613**	**Semester: 6th**
Credit: 3	**L T P 3 0 0**	**Duration: 45 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Types, classification and manufacturing process of glass, ceramics and cement	1	2			2			
CO2	Classification of surface coatings paints and pigment formulation	1	2			2			
CO3	Different types of fertilizers and their manufacturing processes	1	2			2			
CO4	Classification of alloys, properties of different types of steel	1	2			2			
CO5	Homogeneous and heterogeneous catalyst and their industrial applications	1	2			2			

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Polymer chemistry lab	**Subject Code: BCHMD1-614**	**Semester: 6th**
Credit: 1	**L T P 0 0 2**	**Duration: 30 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Synthesis of different polymers			2					
CO2	Molecular weight determination using viscometer			2	3				

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: MOLECULAR MODELLING AND DRUG DESIGN LAB	**Subject Code: BCHMD1-615**	**Semester: 6th**
Credit: 1	**L T P 0 0 2**	**Duration: 30 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	The students will acquire knowledge one software (ChemSketch / ArgusLab (www.planaria-software.com)/ TINKER 6.2 (dasher.wustl.e	1	2				1		1

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

COs, POs, PSOs Mapping

Subject: Inorganic materials of Industrial Importance Lab	**Subject Code: BCHMD1-616**	**Semester: 6th**
Credit: 1	**L T P 0 0 2**	**Duration: 30 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Different analytical techniques for analysis different materials	1					3		3
CO2	Preparation of buffer	1					3		

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%