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**

Program: M.Sc. Chemistry 2020 onwards

COs, POs, PSOs Mapping

Subject: Electronic Spectra & Magnetic Properties of Transition Metal Complexes	**Subject Code: MCHMS1-101**	**Semester: 1st**
Credit: 4	**L T P 4 0 0**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Interpretation of electronic and magnetic properties.	1		2					
CO2	Interpretation of molecular orbital diagrams of octahedral and tetrahedral diagrams for various electronic properties.	1		2					
CO3	Concepts of symmetry and group theory in solving chemical structural problems.	1		2					
CO4	Use of character tables and application of group theory in spectroscopy.	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 reaction and mechanism –I	Subject Code: MCHMS1-102	Semester: 1st
Credit: 4	L T P 4 0 0	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Various methods to determine the mechanisms of the reactions and different reaction intermediate involved	2			3			1	
CO2	Mechanistic aspects in nucleophilic and electrophilic substitution	1			3			1	
CO3	Reaction mechanism and various factors affecting rate of free radical reactions	1			3			1	
CO4	Reaction conditions, products formation and mechanisms of some named reactions	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: Thermodynamics & Solid State	Subject Code: MCHMS1-103	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 knowledge of classical thermodynamics and understanding thermodynamic phenomenon in a chemical system	2		1					
CO2	Acquire knowledge of statistical thermodynamics and understanding thermodynamic properties in terms of partition functions	2							
CO3	Acquire knowledge of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics	2							
CO4	Acquire knowledge of Theories of specific heat for solids	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: Computational Skills & Simulations in Chemistry	Subject Code: MCHMD1-111	Semester: 1st
Credit: 4	L T P 4 0 0	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Advantages and principle of computer based calculation methods in chemistry	1						2	
CO2	Fundamentals of various calculation methods viz: molecular mechanics, semiempirical method and density-functional theory	1						2	
CO3	Running calculation and model building using different algorithms in software packages, like Hyperchem, Gaussian	1						2	
CO4	Quantum mechanical calculations in gaseous phase with GAMESS and Liquid simulations in BOSS	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: Polymer Chemistry	Subject Code: MCHMD1-112	Semester: 1st
Credit: 4	L T P 4 0 0	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1. To impart knowledge about polymers and polymerization mechanism.							1	3
CO2	2. To understand the difference between crystalline and amorphous polymers.								
CO3	3. To familiarize polymer characterization with various spectroscopic techniques.			3					
CO4	4. To learn molecular weight measurement by osmometry, mass spectrometry and Viscometry.				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: Chemical Kinetics & Electrochemistry	Subject Code: MCHMD1-113	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 knowledge of kinetics of various complex reactions and their rate laws	2		1		1		1	
CO2	Acquire knowledge of activation energy and kinetics of reaction	2		1		1		1	
CO3	Acquire knowledge of electrolytic solution and conductance	2		1		1			
CO4	Acquire knowledge of interfacial electrochemistry	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.-I	Subject Code: MCHMS1-104	Semester: 1st
Credit: 2	L T P 0 0 4	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Volumetric and gravimetric analysis of cations and anions	1		3			2		
CO2	Understand complexometric and redox titrations.	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: Organic Chemistry Lab-I	Subject Code: MCHMS1-105	Semester: 1st
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 Distillation and separation methods	1		2	2				
CO2	The students will acquire knowledge of Chromatographic methods	1		2	2				

CO3	The students will acquire knowledge of Synthesis of various organic compounds and their structural analysis	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: Molecular Spectroscopy I	**Subject Code: (MCHMS1-201)**	**Semester: 2nd**
Credit: 4	**L T P 4 0 0**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1. Selection rules, line width and broadening.	3		1		2			1
CO2	2. Various spectroscopic techniques.	3	1	2		3			1
CO3	3.Importance of spectroscopy for structural elucidation.	3	1	3		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: ORGANOMETALLICS	**Subject Code: MCHMS1-202**	**Semester: 2nd**
Credit: 4	**L T P 4 0 0**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Organometallic compounds and their nomenclature.	1							
CO2	Bonding and reactivity of metal complexes	1							
CO3	Role of organometallic complexes in organic syntheses.	1	2						
CO4	Importance of catalyst in syntheses.	1	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: Organic reaction and mechanisms –II	Subject Code: MCHMS1-203	Semester: 2nd
Credit: 4	L T P 4 0 0	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Chemistry behind oxidation, reduction and Carbon-Carbon multiple bond reaction	2			3			1	
CO2	Chemistry behind rearrangement reactions	2			3			1	
CO3	Use of diverse reagents in organicsynthesis	2			3			1	
CO4	Retro synthetic approach in organic synthesis	1		2	2			3	

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

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COs, POs, PSOs Mapping

Subject: NANOCHEMISTRY	Subject Code: MCHMD1-211	Semester: 2nd
Credit: 4	L T P 4 0 0	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Introduction to the concept of nanochemistry and its classification and terminology.	1				3		3	
CO2	Synthesis of nanomaterials by different routes and their characterization.Applications in biological and electronic systems.	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: Bio-organic Chemistry	Subject Code: MCHMD1-212	Semester: 2nd
Credit: 4	L T P 4 0 0	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	The students will acquire knowledge of Relationship between organic chemistry and biochemistry.	1			1				
CO2	The students will acquire knowledge of Kinetics and mechanism of enzyme catalysis.	2			2				

CO3	The students will acquire knowledge of Determination of enantio- and diastereoselectivity using various analytical methods	2			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: Analytical Chemistry	**Subject Code: MCHMD1-213**	**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 knowledge of basic concepts and importance of analytical chemistry	2		1		1			
CO2	Acquire knowledge of significance of significant figures and data analysis	2		1					
CO3	Acquire knowledge of thermogravimetric, electroanalytical, chromatographic and radiochemical methods of analysis	2		1		1			
CO4	Acquire knowledge of electron microscopic techniques and their application	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: Natural Products	**Subject Code: MCMD1-221**	**Semester: 2nd**
Credit: 4	**L T P 4 0 0**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Isolation, purification, identification and standardization of natural products	1		1	2			2	
CO2	Structure elucidation of alkaloids, sterols and terpenoids	1		1	2				
CO3	Importance of vitamins, xanthophyll and carotenes	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: Bio-Physical Chemistry	Subject Code: MCHMD1-222	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 knowledge of basic concepts and mechanism of enzyme catalyzed reactions	2						1	
CO2	Acquire knowledge of interactions between various biomolecules	2						1	
CO3	Acquire knowledge of thermodynamics of ADP and ATP syntheses	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: Asymmetric Synthesis	Subject Code: MCMD1-223	Semester: 2nd
Credit: 4	L T P 4 0 0	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	The students will acquire knowledge of Methods for inducing enantio- and diastereoselectivity	1			3				
CO2	The students will acquire knowledge of Determination of enantio- and diastereoselectivity using various analytical methods.	2			2		2		
CO3	The students will acquire knowledge of Chemistry behind a range of asymmetricreactions	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: Inorganic Chemistry Lab – II	Subject Code: MCHMS1-205	Semester: 2nd
Credit: 2	L T P 0 0 2	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Volumetric and gravimetric analysis of cations and anions.	1	2						
CO2	Understand electro analytical techniques.	1	2						
CO3	Syntheses of various complexes and their structural analysis.	1							
CO4	Use of various spectroscopic techniques like UV, IR, NMR for structural determination	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: Molecular Spectroscopy II	**Subject Code: MCHMS1-301**	**Semester: 3rd**
Credit: 4	**L T P 4 0 0**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1. Concepts of NMR, ESR and mass spectroscopy.	3							
CO2	2. Advanced NMR techniques like DEPT, COSY, NOESY. HETCOR etc.			2					
CO3	3. Differences between PMR and CMR.			1		1			
CO4	4. Structural elucidation of molecules with UV, IR, NMR and mass spectroscopy.		3	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: Quantum Chemistry	**Subject Code: MCHMS1-302**	**Semester: 3rd**
Credit: 4	**L T P 4 0 0**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Quantum mechanical principles	2					2	1	
CO2	Approximate methods in quantum chemistry	2					2	1	
CO3	Angular momentum and electronic structure of atoms	2					2	1	
CO4	Working knowledge of terminology and tools used by quantum chemistry	2					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: Heterocyclic chemistry	**Subject Code: MCHMS1-303**	**Semester: 3rd**
Credit: 4	**L T P 4 0 0**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1. Be familiar with the structures of important classes of heterocyclic aromatic organic compounds,			3					
CO2	2. Be able to classify simple heterocyclic aromatic compounds as electron deficient or electron rich and explain their reactivity based on these properties,				3				
CO3	3. Be able to explain on a mechanistic level, reactions and synthesis of important electron deficient nitrogen containing heterocycles; pyridines, diazines and their benzo-condensed analogs,					3			
CO4	4. Be able to explain on a mechanistic level, reactions and synthesis of important electron rich heterocycles; furans, pyrroles and thiophenes and 1,3-azoles, and benzo-condensed analogs.								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: Seminar I & Seminar II	**Subject Code: MCHMS1-204 &MCHMS1-304**	**Semester: 2nd & 3rd**
Credit: 1	**L T P 0 0 2**	**Duration: 30 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1.Be able to prepare power point presentation.				3		3		
CO2	2. Be able to show and improve their presentation skills in the presence of audience.	1			3	1	3		
CO3	3. Feel Confident and will be able to remove stage fear.			1	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: Surface Chemistry and Catalysis	**Subject Code: MCHMD1-311**	**Semester: 3rd**
Credit: 4	**L T P 4 0 0**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1. Fundamental principles of surface chemistry, and their applications in industries.			2					
CO2	2. Application of homogeneous and heterogeneous catalysis in chemical synthesis			1					
CO3	3. Importance of adsorption process and catalytic activity at the solid surfaces					2			
CO4	4. Various catalyst and their applications in industry.						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: Medicinal Chemistry	**Subject Code: MCHMD1-312**	**Semester: 3rd**
Credit: 4	**L T P 4 0 0**	**Duration: 60 Hrs.**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Different antimicrobial agents	1			2	1			
CO2	Synthetic procedures for antimalarialdrugs	1			2	1			
CO3	Importance of CNS-stimulants and psychoactive drugs anddiuretics	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 Chemistry	Subject Code: MCHMD1-313	Semester: 3rd
Credit: 4	L T P 4 0 0	Duration: 60 Hrs

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	The students will acquire knowledge of Use of ultrasound and microwave in Green Chemistry	1			2				
CO2	The students will acquire knowledge of Importance of ionic liquids in green syntheses.	2			2	1			
CO3	The students will acquire knowledge of Advantages of phase transfer catalyst and crown ethers in green reactions.	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: Organic Chemistry Lab II	Subject Code: MCHMS1-305	Semester: 3rd
Credit: 2	L T P 0 0 4	Duration: 60

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Syntheses of various organic compounds	1		2	1			3	
CO2	Purification and isolation of compounds	1		2	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 – I	Subject Code: MCHMS1-306	Semester: 3rd
Credit: 2	L T P 0 0 4	Duration: 60

Cos	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Acquire knowledge of surface adsorption phenomena while performing experiments		2	1			2		
CO2	Acquire knowledge of various physical parameters		2	1			2		
CO3	Acquire knowledge of Conductivity related phenomena		2	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: Photochemistry and Pericyclic Reaction	Subject Code: MCHMS1-401	Semester: 4th
Credit: 4	L T P 4 0 0	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Acquire basic knowledge of pericyclic reaction	2							2
CO2	Solve the problems of pericyclic reactions			2					2
CO3	Acquire basic knowledge of principle and application of photochemical reaction	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: Bioinorganic chemistry	Subject Code: MCHMS1-402	Semester: 4th
Credit: 4	L T P 4 0 0	Duration: 60 Hrs.

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	After completion of the course the student be will able to: 1. Structures, properties and transport mechanisms of enzymes in physiological systems.			2			1		
CO2	Metal complexation with various nucleic acids and their role in transcription of nucleic acids.			2	3		2		
CO3	Basic Knowledge of porphyrins and their functions			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 Lab- II	Subject Code: MCHMS1-403	Semester: 4th
Credit: 2	L T P 0 0 4	Duration: 60

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	Acquire knowledge of colligative properties and phase rule while performing experiments		2	1			2		
CO2	Acquire knowledge of various physical parameters		2	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: **Dissertation**	Subject Code: **MCHMS1-404**	Semester: **4th**
Credit: 4	**L T P 0 0 8**	**Duration:**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1. Know about the various components of a research article and learn to do the literature survey for defining the research problem for minor project.	1				3	2		2
CO2	2. Will be able to prepare and present their progress from time to time.	1			3		1		
CO3	3. Will be able to apply their knowledge for analysing the studies related to research project.	1	3	3					3
CO4	4. Will be able to compile his/her work in the form of project report					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: **Term Paper**	Subject Code: **MCHMS1-405**	Semester: **4th**
Credit: 4	**L T P 0 0 8**	**Duration:**

COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	1. Know about the various components of a research article.								
CO2	2.Will learn how to do the literature survey for a pre-defined topic.		1	1	1	1	1	1	
CO3	3. Be able to write a review paper.			1	3	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: Advanced Lab	**Subject Code: MCHMS1-406**	**Semester: 4th**
Credit: 2	**L T P 0 0 4**	**Duration: 60**

Cos	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	The students will acquire knowledge of Structure elucidation of unknown compounds via interpretation of the spectra (NMR, UV &MS).	1			2		2		
CO2	The students will acquire knowledge of Various reactions conditions including modern reaction strategies and theirimplications	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%