

### **PROGRAM EDUCATION OBJECTIVE (PEO)**

The overall objectives of the Learning Outcomes-based Curriculum Framework (LOCF) for **M.Sc. Chemistry program** are as follows.

<b>PEO No</b>	<b>Education Objective</b>
<b>PEO 1</b>	To prepare the post graduates in applying the knowledge in the field of chemistry to pursue higher studies and careers in chemical industries, consultancies and research institutions.
<b>PEO 2</b>	To enable the post graduate to exhibit critical thinking ability towards different aspects of chemistry.
<b>PEO 3</b>	To provide experience in planning and conducting the experiments in modern chemical laboratories with state-of-the-art facilities.
<b>PEO 4</b>	To instill professional attitude with ethical responsibility, effective communication skills, team work, multidisciplinary approach and train the students to apply their scientific expertise to social issues.
<b>PEO 5</b>	To engage in lifelong learning with knowledge of contemporary issues related to chemistry by using lab skills and techniques.

**PROGRAM OUTCOMES:** After successful completion of M.A. in Digital & Creative Marketing program, Students will be able to:

<b>PO No</b>	<b>Attribute</b>	<b>Competency</b>
<b>PO 1</b>	<b>Domain knowledge</b>	Apply the knowledge Organic, Physical, Inorganic and Analytical chemistry to solve the scientific problems.
<b>PO 2</b>	<b>Problem analysis</b>	Demonstrate the laboratory skills to enable them to perform both qualitative and quantitative analysis of given samples.
<b>PO 3</b>	<b>Design and development of the solution using modern techniques</b>	Execute the designed experiment document, interpret and report the data using advanced tools and techniques.
<b>PO 4</b>	<b>Environment and sustainability</b>	Understand the importance of scientific solutions in an environmental and societal context and apply the knowledge of chemistry for sustainable development.
<b>PO 5</b>	<b>Ethics</b>	Apply ethical principle and commit to professional ethics and responsibilities of scientific practice.
<b>PO 6</b>	<b>Individual and teamwork</b>	Perform effectively as an individual or as a team.
<b>PO 7</b>	<b>Communication</b>	Adopt critical thinking and communicate effectively on scientific activities.
<b>PO 8</b>	<b>Life- long learning</b>	To participate through self-paced and self-directed learning for personal development.



# MANIPAL

ACADEMY of HIGHER EDUCATION

*(Deemed to be University under Section 3 of the UGC Act, 1956)*

<b>PO 9</b>	<b>Scientific reasoning and research skills</b>	To inculcate the scientific temperament to recognize, analyze and formulate a solution for cause and effect relationship.
<b>PO 10</b>	<b>Digital literacy</b>	Employ information and communication technology in various learning situations.



# MANIPAL

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## Course structure

Semester	Subject code	Subject	Credits
<b>First semester</b>	CHM 5101	Inorganic Chemistry I	4
	CHM 5102	Organic Chemistry I	4
	CHM 5103	Physical Chemistry I	4
	CHM 5104	Spectroscopy I	4
	CHM 5105	Inorganic Chemistry Practical I	2
	CHM 5106	Organic Chemistry Practical I	2
	CHM 5107	Physical Chemistry Practical I	2
<i>Total credits</i>			<b>22</b>
<b>Second semester</b>	CHM 5201	Inorganic Chemistry II	4
	CHM 5202	Organic Chemistry II	4
	CHM 5203	Physical Chemistry II	4
	CHM 5204	Inorganic Chemistry Practical II	2
	CHM 5205	Organic Chemistry Practical II	2
	CHM 5206	Physical Chemistry Practical II	2
	CHM 5207	Research Methodology and Technical communication	3
<i>Total credits</i>			<b>21</b>
<b>Third semester</b>	CHM 6101	Spectroscopy II	4
	CHM 60XX	Elective I	3
	CHM 6051	Open elective	3
	CHM 6102	Seminar	1
	<b>Organic Chemistry Specialization</b>		
	CHM 6151	Advanced Organic Chemistry I	4
	CHM 6152	Organic Chemistry Practical III	3
	CHM 6153	Multistep Organic Synthesis	3
	<b>Applied Chemistry Specialization</b>		
	CHM 6161	Principles and Practice of Analytical Chemistry	4
	CHM 6162	Analytical Chemistry Practical	3
	CHM 6163	Applied Organic Chemistry Practical	3
	<i>Total credits</i>		
<b>Fourth semester</b>	CHM 60XX	Elective II	3
	CHM 60XX	Elective III	3
	CHM 6201	Project	6
	<b>Organic Chemistry Specialization</b>		
	CHM 6251	Advanced Organic Chemistry II	4
	<b>Applied Chemistry Specialization</b>		
	CHM 6261	Nuclear and Radiation Chemistry	4
<i>Total credits</i>			<b>16</b>
<b>Grand Total</b>			<b>80</b>

**PROGAM OUTCOMES (POS) AND COURSE OUTCMES (COS) MAPPING**



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S.No.	Course Code	Course Name	Credits	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
1	CHM 5151	Inorganic Chemistry I	4	CO1 CO2 CO3 CO4				CO3					
2	CHM 5152	Organic Chemistry I	4	CO1 CO2 CO3 CO4									
3	CHM 5153	Physical Chemistry I	4	CO1 CO2 CO3		CO3							
4	CHM 5154	Spectroscopy I	4	CO1 CO2 CO3		CO3							
5	CHM 5155	Inorganic Chemistry Practical I	3	CO1 CO4	CO3		CO1		CO1 CO3		CO1 CO2 CO3	CO1 CO2	
6	CHM 5156	Organic Chemistry Practical I	3	CO1	CO1		CO1		CO1	CO2	CO1 CO2	CO1 CO2	
7	CHM 5157	Physical Chemistry Practical I	3	CO1	CO3				CO1 CO2 CO3		CO1 CO2	CO2 CO3	
8	CHM 5201	Inorganic Chemistry II	4	CO1 CO2 CO3						CO1 CO3			
9	CHM 5202	Organic Chemistry II	4	CO1 CO2 CO3 CO4			CO2		CO1 CO4	CO2 CO3 CO4	CO4		
10	CHM 5203	Physical Chemistry II	4	CO1 CO2 CO3					CO1 CO3	CO2			
11	CHM 5204	Inorganic Chemistry Practical II	3	CO1	CO2				CO1 CO2			CO1 CO2	
12	CHM 5205	Organic Chemistry Practical II	3		CO1			CO1	CO1			CO1 CO2	
13	CHM 5206	Physical Chemistry Practical II	3		CO1 CO2				CO1 CO2	CO2		CO1	
14	CHM 5207	Research Methodology and Technical communication	3	CO1 CO2 CO3				CO1 CO3		CO1	CO3	CO1 CO3	CO3
15	CHM 6101	Spectroscopy II	4	CO1 CO2 CO3 CO4	CO1 CO2 CO3 CO4	CO1					CO4		
16	CHM 6102	Advanced Organic Chemistry I	4	CO1 CO2 CO3 CO4 CO5					CO3 CO4	CO1 CO3 CO4	CO3	CO2 CO3 CO4	

