M.Phil. CHEMISTRY

<table>
<thead>
<tr>
<th>SEM</th>
<th>COURSE CODE</th>
<th>COURSE</th>
<th>COURSE TITLE</th>
<th>NO. OF HOURS</th>
<th>CREDIT</th>
<th>CIA MARKS</th>
<th>SE MARKS</th>
<th>TOTAL MARKS</th>
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<tbody>
<tr>
<td>I</td>
<td>14MPCH1C1</td>
<td>CORE - I</td>
<td>Research Methodology in Chemistry</td>
<td>4*</td>
<td>4</td>
<td>40</td>
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<td>14MPCH1C2</td>
<td>CORE - II</td>
<td>Physical Methods in Chemistry</td>
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<td>14MPCH1C3</td>
<td>CORE-III</td>
<td>Research Topics in Chemistry</td>
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<td>14MPCH1C4</td>
<td>CORE-IV</td>
<td>Teaching Methodology</td>
<td>4*</td>
<td>4</td>
<td>40</td>
<td>60</td>
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* One hour library for each course

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<th>TOTAL</th>
<th>16</th>
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<th>160</th>
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<td>II</td>
<td>14MPCH2PW</td>
<td>PROJECT WORK</td>
<td>Dissertation **</td>
<td>-</td>
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| GRAND TOTAL | - | 24 | - | - | 600 |

** (Evaluation of the Dissertation shall be made jointly by the Research Supervisor and the External Examiner)

**Project (M.Phil)

Maximum Marks: 200

I review 20 Marks
II review 20 Marks
Evaluation of project 120 Marks
Viva voce 40 Marks
SEMESTER –I: CORE - I

RESEARCH METHODOLOGY IN CHEMISTRY

Course Code : 14MPCH1C1      Max. Marks : 100
Hours/Week : 4        Internal Marks : 40
Credit : 4        External Marks : 60

Objectives:

➢ To understand the principles of research, literature survey and writing research paper and thesis writing.
➢ To study the statistical analysis of data, C and C++ programming.

Unit - I                              Principles of Research                    12 hours

Unit - II                                Survey of Literature               12 hours

Unit - III                     Assignment, Research Paper and Thesis Writing                     12 hours
Unit – IV  Statistical Analysis of Data  12 hours

Various types of errors – precision and accuracy – significant figures, various statistical tests on the accuracy of results, positive and negative deviation from accurate results – the Gaussian distribution – the normal distribution of random errors, mean value, variance and standard deviation, reliability interval, deviations from the Gaussian law of error distribution, t-tests–comparison of the mean with the expected value, comparison of the results of two different methods, comparison of the precision of two methods by F-test, Gross errors and elimination of outlying results, graphical methods – Linear regression, regression line, #standard deviation, correlation coefficient – #Multiple Linear regression (one variable with two other variables).

Unit – V  C and C++ Programming  12 hours


C++ Programming

Object oriented programming - principles, Classes – Examples and structure. Declarations, reference arguments , arguments by value, Constructors and destructors. Virtual functions, Inheritance (Simple examples only). Overloading (Simple examples), # file handling techniques #.

# Self study

TEXT BOOKS:

UNIT I : Text Book 1
UNIT II : Text Book 1
UNIT III : Text Book 1
UNIT IV : Text Book 2
UNIT V : Text Book 3,4
REFERENCES:
2. How to write a research paper, R.Berry, Pergoman, 1969.
SEMESTER –I: CORE - II

PHYSICAL METHODS IN CHEMISTRY

Course Code : 14MPCH1C2
Max. Marks : 100
Hours/Week : 4
Internal Marks : 40
Credit : 4
External Marks : 60

Objectives:
- To study the applications of UV-Vis, IR, Raman, $^1$H NMR, $^{13}$C NMR and mass spectroscopy
- To study the application of computer modeling
- To understand the X-ray, neutron and electron diffraction studies

Unit – I

12 hours

Combined applications of UV-Vis, IR and Raman, $^1$H NMR, $^{13}$C NMR and mass spectral data for solving the structure of organic molecules, applications of NMR study relevant to stereochemistry of organic molecules. Calculation of $\lambda$-max for conjugated systems and carbonyl compounds, #Application of UV-Vis to study geometrical isomers#, Calculation of hydrogen index.

Unit – II 12 hours

Combined applications of UV-Vis, IR, $^1$H NMR and EPR spectral data for solving the structure of metal complexes. Calculation of g-value for Cu$^{2+}$, Mn$^{2+}$, Co$^{2+}$ and Ni$^{2+}$ and to establish geometry of the complexes. #Application of UV–Visible to study geometry of the complexes#.

Unit – III : Computational Chemistry 12 hours


Unit- IV: Application of XRD studies in structural analysis 12 hours

Neutron diffraction – magnetic scattering – application and comparison with X-ray diffraction.

Electron diffraction – basic principles and applications to simple molecules.

Unit – V 12 hours
Principles and applications of special techniques such as SEM, TEM, AFM and AAS.

Electro analytical techniques: Polarography – Principle, factors affecting limiting current, Ilkovic equation, Half wave Potential, Instrumentation, Polarographic analysis, Evaluation of Polarographic waves, # applications of polarography#. 
# _________ # Self study

TEXT BOOKS:

UNIT I : Text Book 1,6
UNIT II : Text Book 2
UNIT III : Text Book 3
UNIT IV : Text Book 4
UNIT V : Text Book 5

REFERENCES:
SEMESTER –I: CORE - IV
TEACHING METHODOLOGY

Course Code : 14MPCH1C4      Max. Marks : 100
Hours/Week : 4        Internal Marks : 40
Credit : 4        External Marks : 60

Objectives:
➢ To study the computer application, communication and education skill
➢ To study the teaching strategies and education technology

Unit – I  
Computer Application Skill  12 hours

- Internet – meaning – importance – types of networking – LAN, WAN, MAN – Internet – WWW, website and webpage’s, Internet connectively – Browsing the internet – Browsing software – URL addresses, search engines, exploring websites and downloading materials from websites, E-mail – sending, receiving and storing mail and chatting. Power point – creating a presentation – slide preparation – # popular websites for data collection in chemistry#.

Unit - II  
Communication and Interaction  12 hours

- The theory of communication – communication cycle – Types of communication, communication and language, communication in the class room, Lecture and Lecture demonstration as communication. Interaction methods – Interaction analysis, observation schedule and record. Bale’s interaction process categories – Flander’s system of interaction analysis – verbal interaction category system. # Reciprocal category system – Equivalent talk categories#.

Unit – III  
Educative Skill  12 hours


Unit – IV  
Uses of teaching strategies  12 hours


TEXT BOOKS:


UNIT I : Text Book 1
UNIT II : Text Book 2,3
UNIT III : Text Book 2,3
UNIT IV : Text Book 2,3
UNIT V : Text Book 2,3

References: