

# Singhania University

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## **M.PHIL. – CHEMISTRY**

Scheme of Examination

|       |               |    |                      |                       |            |          |     |
|-------|---------------|----|----------------------|-----------------------|------------|----------|-----|
|       |               | 2. | M.Phil.CH. 02        | Instrumental Analysis | 100        | 3 Hrs.   |     |
|       |               | 3. | M.Phil.CH. 03        | Material Chemistry    | 100        | 3 Hrs.   |     |
|       |               | 4. | M.Phil.CH. 04        | Dissertation          | 100        |          |     |
| S.No. | Paper Code    |    | Name of Paper        | Total                 | Max. Marks | Duration | 400 |
| 1.    | M.Phil.CH. 01 |    | Research Methodology |                       | 100        | 3 Hrs.   |     |

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Methodology

Unit I :-  
Research  
Methods

Problem selection -  
Literature survey -  
Familiarity with ideas and concepts of investigation -  
acquiring technical

l skills -  
drawing inferences from data -  
qualitative and quantitative analysis -  
accessing the problems -  
results and conclusions -  
presenting a scientific seminar -  
publication of research paper -  
art of writing of thesis.

Unit II: Errors Analysis  
Limiting Errors,  
Types of errors -

gross,  
systematic and  
random –  
central  
value

of single sample  
data – linear  
regression –  
Polynomial  
regression.

Statistical  
treatments of data  
–  
rejection  
of data –  
method  
of least  
squares –  
variance  
and  
standard  
deviation

Unit III: -  
Chromatography  
Principles –  
classification of  
chromatography –  
TLC, Paper  
Chromatography  
Column  
chromatography – Ion  
exchange, Gas  
chromatography and  
HPLC.

– of  
combination  
components –  
uncertainty  
analysis  
and  
treatment

Unit IV: -  
Symmetry  
elements  
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Symmetry  
operations –  
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group  
( $C_{2v}$  and  
 $C_{3v}$ ) -  
distribution  
of  
fundamentals  
among the  
Symmetry  
species -  
Molecular  
vibrations.

analysis

Paper II  
Instrumental

Unit I: -  
Techniques in  
analytical  
chemistry

Introduction -  
Potentiometry -  
Principle,  
Reference  
electrode,  
Instrumentation  
and  
measurement.  
Spectrophotometry -  
Principle,  
Instrumentation,

simultaneous  
Spectrophotometry,  
Differential,  
Reflectance  
spectrophotometry,  
thermal  
analysis.

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Unit III :Fourier Transform  
Spectroscopy  
Enhancement of  
spectra: Computer  
averaging -  
fundamental laws of  
photometry -  
spectrophotometric  
accuracy -  
photometric precision-  
quantitative

methodology  
difference  
spectroscopy  
derivative  
spectroscopy.

Unit IV: Emission  
spectra  
Flame  
Emission  
spectroscopy  
/ Flame

photometry: Principles  
of Flame photometry,  
Inferences in Flame  
photometry. Plasma  
Emission spectroscopy:  
Introduction, direct  
current Plasma (DCP)  
inductively coupled  
Plasma (ICP), LCP  
instrumentation.

### Paper –III

## Materials Chemistry

Unit I: Polymer  
&  
polymerization  
Polymer  
& their  
classification,  
polymerization and  
their  
classification,  
Mechanism of  
polymerization

ation, molecular  
weights of  
polymers –  
number average  
molecular  
weight, weight  
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molecular weight  
(MW) structure  
property  
relationships in  
Polymers.  
Degradation of  
Polymers, Bio-  
Polymers.

Unit II: Composites

Introduction,  
classification,  
constituents of  
composites, fiber  
reinforced  
composite,  
unidirectional fiber  
reinforced  
composites, failure  
of fiber  
reinforced  
composite  
materials,  
short  
fiber  
reinforced  
composite,  
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particles  
reinforced  
composite,  
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reinforced  
composite,  
structural  
composite,  
advantage of  
composite,  
application of  
composites.

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Unit IV:-  
Cryogenics

Introduct  
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