

**SCHEME OF EXAMINATION
AND
COURSE OF STUDY**

**Pre-Ph.D. course (CHEMISTRY)
(w.e.f. 2023-24)**



**DEPARTMENT OF CHEMISTRY
GURUKUL KANGRI DEEMED TO BE UNIVERSITY,
HARIDWAR**

26 August, 2023

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GURUKULA KANGRI VISHWAVIDYALAYA, HARIDWAR
Pre Ph.D. CHEMISTRY COURSE STRUCTURE

S.No.	Course/Paper Code	Course/Paper Title	Periods Per Week(L)	Credit	ESE	MM
1	PCH-C101	RESEARCH METHODOLOGY AND ANALYTICAL TECHNIQUES	4	4	100	100
2	PCH-C102	RESEARCH & PUBLICATION ETHICS	2	2	100	100
3	PCH-E103	RESEARCH CONCEPTS IN CHEMISTRY	4	4	100	100
4	PCH-E104	LITERATURE SURVEY, REVIEW OF RESEARCH PAPERS & PRESENTATION	-	4	100	100
		TOTAL		14		400

L = Lecture, P = Practical, CT =Cumulative Test, TA =Teacher Assessment, ESE= End semester Examination,

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Pre-Ph.D. Course Work (Chemistry)

Subject Code: PCH-C101

w.e.f. the session 2023-24 and onwards

Max. Marks =100

Lectures:60

Credit:04

Time: 3 hrs

ESE: 100

Pass Marks: 55

Paper - I (RESEARCH METHODOLOGY AND ANALYTICAL TECHNIQUES)

Objectives:

Unit - I

Data Analysis: Different ways to express concentrations, Accuracy, Precision, Expressing accuracy & precision, Standard deviation, Types of errors, Elimination and Minimization of errors, Significant figures, Criterion for the rejection of data (Q test).

Unit- II

Chromatographic Techniques: Gas-solid, Gas-liquid and High-Performance Liquid Chromatography (excluding specific applications), Retention capacity, Relative column capacity factor, operation efficiency and Resolution.

Unit- III

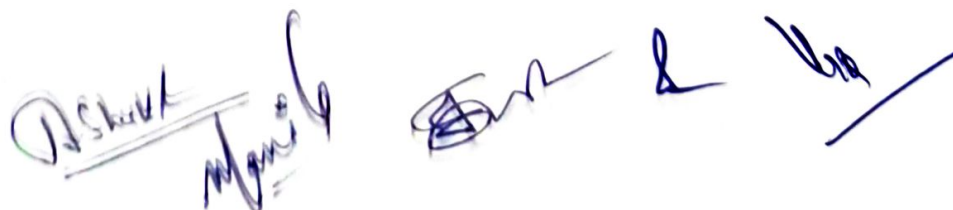
Spectroscopic Techniques: UV-VIS and I.R. spectroscopic methods of Analysis. Chromophore, Auxochrome, bathochromic shift, hypsochromic shift, factors affecting vibrational frequencies. and Mass spectrometry (Basic concepts ONLY).

Unit- IV

Introduction to Computers: Block diagram of computers; Input and output devices, Primary & secondary memory - RAM, ROM, Secondary Memory devices, Volatile and non-volatile memory; CPU - ALU and control unit; Hardware & software, Software - system software and application software. Applications of Microsoft Office and Internet.

Unit- V

Paper/Report writing: Basic concept of paper writing and report generation, Literature survey, Method of citation and referencing, styles of referencing: APA and Oxford, Method of presentation of report.



Pre-Ph.D. Course Work (Chemistry)

Subject Code: PCH-C102

w.e.f. the session 2023-24 and onwards

Max. Marks =100

Lectures:30

Credit:02

Time: 3 hr

ESE: 100

Pass Marks: 55

Paper - II (RESEARCH & PUBLICATION ETHICS)

Objectives:

I Theory:

RPE 01: Philosophy and Ethics (3 hours)

1. Introduction to philosophy: definition, nature and scope, concept, branches
2. Ethics: definition, moral philosophy, nature of moral judgements and reactions

RPE 02: Scientific Conduct (5 hours)

1. Ethics with respect to science and research
2. Intellectual honesty and research integrity
3. Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP)
4. Redundant publications: duplicate and overlapping publications, salami slicing
5. Selective reporting and misrepresentation of data

RPE 03: Publication Ethics (7 hours)

1. Publication ethics: definition, introduction and importance
2. Best practices / standards setting initiatives and guidelines: COPE, WAME, etc.
3. Conflicts of interest
4. Publication misconduct: definition, concept, problems that lead to unethical behaviour and vice versa, types
5. Violation of publication ethics, authorship and contributorship
6. Identification of publication misconduct, complaints and appeals
7. Predatory publishers and journals

II. Practice

RPE 04: Open Access Publishing (4 hours)

1. Open access publications and initiatives
2. SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies
3. Software tool to identify predatory publications developed by SPPU
4. Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggested, etc.

RPE 05: Publication Misconduct (4 hours)

A. Group Discussions (2 hours) 1. Subject specific ethical issues, FFP, authorship

2. Conflicts of interest

3. Complaints and appeals: examples and fraud from India and abroad

B. Software Tools (2 hours) 1. Use of plagiarism software like Turnitin, Urkund and other

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open source software tools

RPE 06: Databases and Research Metrics (7 hours)

- A. Databases (4 hours) 1. Indexing databases
2. Citation databases: Web of Science, Scopus, etc.

B. Research Metrics (3 hours) 1. Impact Factor of journal as per Journal Citation Report, SNIP, SIR, IPP, Cite Score

2. Metrics: h-index, g index, i10 index, altmetrics

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Pre-Ph.D. Course Work (Chemistry)

Subject Code: PCH-E103

w.e.f. the session 2023-24 and onwards

Max. Marks =100

Lectures:60

Credit:04

Time: 3 hrs

ESE: 100

Pass Marks: 55

Paper - III (RESEARCH CONCEPTS IN CHEMISTRY)

Objectives:

Unit - I

Principle, instrumentation and application of Atomic absorption spectroscopy and atomic emission spectroscopy

Inductively Coupled Plasma: Introduction, Instrumentation and applications.

Unit - II

Adsorption: General definitions and terminology associated with adsorption, Physiorption and chemisorption, type of Adsorption isotherms, Adsorbents, Activated carbons, Carbonization and activation, Uses of activated carbons.

Synthesis and Analysis of polymers: General introduction of polymers and classification. Isolation and purification of polymers, types of polymerization techniques, synthesis of polymers.

Unit - III

Chemical Kinetics: Collision theory for uni, and bi reactions, Basic idea of Linear free energy relationship particularly Hammett's equation, Theory of absolute reaction rates, Effect of ionic strength.

Bioinorganic: General introduction, Classification of metalloproteins, role of metal ions in biological system Na, K, Ca and Mg., Hemoglobin and myoglobin as oxygen carrier, Nitrogen fixation

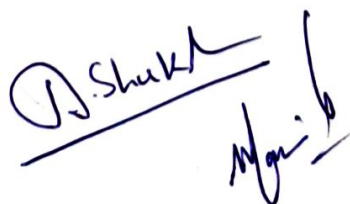
Unit - IV

Instrumentation, basic terms of H-NMR spectroscopy, Chemical shift, spin-spin coupling (AX & AX₂ only), spin decoupling

T.G.A. and D.T.A methods of analysis. Thermometric titrations

Unit - V

- i) Classification and Constituents of Crude Drugs: Brief and introductory idea of drug constituents and their Morphological, Chemical and Pharmacological classification.
- ii) Plant Analysis: Methods of extraction, Isolation, separation and identification of various constituents (Introductory description).


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Pre-Ph.D. Course Work (Chemistry)

Subject Code: PCH-E104

w.e.f. the session 2023-24 and onwards

Max. Marks =100

Time: 3 hrs

ESE: 100

Credit:04

Pass Marks: 55

Paper - IV (LITERATURE SURVEY, REVIEW OF RESEARCH PAPERS & PRESENTATION)

NOTE:

1. This paper will be internally evaluated by RAC
2. Marks shall be awarded jointly by all the members of RAC.
3. There shall be a presentation on review of the literature to be evaluated by RAC.
4. Marks for attendance shall be awarded by the supervisor of the candidate.

DISTRIBUTION OF MARKS

Review Report	
Report Evaluation	30
Presentation	30
Viva Voice	10
Attendance	30
Total	100

