Curriculum Plan of Dr. Kapil Mohan Saini
(Even Semester 2025-2026)
Semester-VI

Name of Paper & Code: CHEMISTRY –DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE-13): Research Methodology for Chemists (3 Periods Per Week)

Contents	Allocations of Lectures	Month wise Schedule to be followed	Tutorials/ Assignment/ Presentation
UNIT-1: Scope of Research (3 Hours) Introduction, overview of research process: define research problem, review literature, formulate hypothesis, design research/experiment, collect and analyse data, interpret and report, scope and importance.	3	1st Week of January – 2nd week of January	- Syllabus Overview - Reference Books - Problem Solving
UNIT-2: Literature Survey, Databases and Research metrics (15 Hours) Print: Sources of information: Primary, secondary, tertiary sources; Journals: Journal abbreviations, Digital: Databases and their responsible use: Google Scholar, Web of science, Scopus, UGC INFONET, SciFinder, PubMed, ResearchGate, E-consortium, e-books; Search techniques: Phrase, Field, Boolean, Proximity, Concept, Limiting/Refining Search Results. Research metrics: Impact factor of Journal, h-index, i10 index, Altmetrics, Citation index. Author identifiers/or profiles: ORCID, Publons, Google Scholar, ResearchGate, VIDWAN.	15	2nd Week of January – 2nd week of February	- Related Problems, Assignment
UNIT-3: Communication in Science (12 Hours) Types of technical documents: Full length research paper, book chapters, reviews, short communication, project proposal, Letters to editor, and thesis. Thesis writing – different steps and software tools (Word processing, LaTeX, Chemdraw, Chemsketch etc) in the design and preparation of thesis, layout, structure (chapter plan) and language of typical reports, Illustrations and tables, bibliography, referencing: Styles (APA, Oxford etc), annotated bibliography, Citation management tools: Mendeley, Zotero and Endnote; footnotes. Oral presentation/posters – planning, software tools, creating and making effective presentation, use of visual aids, importance of effective communication, electronic manuscript submission, effective oral scientific communication and presentation skills.	12	2nd Week of February -1st Week of March	- Related Problems, Assignment

UNIT-4: Research and Publication ethics (9 Hours) Scientific Conduct: Ethics with respect to science and research, Scientific Misconducts: falsification, fabrication and plagiarism, similarity index, software tools for finding plagiarism (Turnitin, Urkund etc), redundant dublications Publication Ethics: Introduction, COPE (Committee on Publication Ethics) guidelines; conflicts of interest, publication misconduct: problems that lead to unethical behaviour and vice versa, types, violation of publication ethics, authorship and contributorship, predatory publishers and journals IPR - Intellectual property rights and patent law, commercialization, copy right, royalty, trade related aspects of intellectual property rights (TRIPS)	9	2nd Week of March - 1st week of April	- Related Problems, Assignment
UNIT-5: Statistical analysis for chemists (6 Hours) Types of data, data collection-Methods and tools, data processing, hypothesis testing, Normal and Binomial distribution, tests of significance: t-test, F-test, chi- square test, ANOVA, multiple range test, regression and correlation. Features of data analysis with computers and softwares -Microsoft Excel, Origin, SPSS	6	2nd Week of April -4th week of April	Home Register Overview, Class Test, Related Problems, Previous Year Qsn Papers discussion