Gujarat Vidyapith: Ahmedabad
Structure of Ph.D.(Chemistry) Course Work

Subject	Hours		Credits	Marks
	Theory	Practical		
CHEM-101: Research Methodology	60	-	4	100**(T)**
COMP-102: Computer Application in Research **(Compulsory for all subjects)**	15	30	2 (1+1)	25**(T)** + 25**(P)**
CHEM-103: Reviews of Literature in Specific Research Area of Chemistry (Practical) + Intellectual Property Right (IPR), Plagiarism, Data mining (Theory)	- 15	60 -	2	50**(T)** + 50**(P)**
CHEM-104: Research and Publication Ethics	30	-	2	50**(T)**
Total	**210**		**10**	**300**

Note: T= Theory P=Practical

Gujarat Vidyapith: Ahmedabad
Faculty of Science and Applied Science
Syllabus of Course work for Ph.D.(Chemistry)
CHEM-101: Research Methodology
(Total Teaching Hours=60, Credits=4, 100 Marks)
(Inforce from-2019)

Unit-1(A) Fundamental Laboratory Techniques **(8 hours) (15 Marks)**
(Ref. 1. Chapters 1 to 7 : pages 03 to 62)

1(A).1 Basic principles **(1 hour)**

1(A).2 Health and safety (general safety, explosives and fire hazards, reactive reagents, toxic chemicals, electric and UV safety) **(2 hours)**

1(A).3 Basic laboratory procedures (distillation, crystallization, drying, solvent extraction) **(2 hours)**

1(A).4 Preparation of standard solutions **(2 hours)**

1(A).5 Basics of pH and buffer solutions **(1 hour)**

(B) The investigative approach **(7 hours) (10 Marks)**
(Ref. 1. Chapters 8 to 11 : pages 65 to 83)

1(B).1 Making and recording measurements **(2 hours)**

1(B).2 SI units and their use **(1 hour)**

1(B).3 Statistics (Accuracy, Precision, comparison correlation and regression) **(4 hours)**

Unit-2 Information technology and library resources **(15 hours) (25 Marks)**
(Ref. 1. Chapters 45 to 49 : pages 299 to321)

2.1The Internet and World Wide Web **(2 hours)**

2.2 Internet resources for chemistry (CAS, STN, Science direct etc.) **(4 hours)**

2.3 Information and Library Network Centre (INFLIBNET) as a library resource**(1 hour)**

2.4 Use of spreadsheets, word processors, databases and other packages (CHEMDRAW) **(5 hours)**

2.5 Finding and citing information **(3 hours)**

Unit-3 (A) Research problem **(15 hours) (25 Marks)**
(Ref. 2. Chapters 1 to 2 : pages 1 to29)

3(A).1 Meaning of research problems **(1 hour)**

3(A).2 Sources of research problems **(2 hours)**

3(A).3 Criteria / characteristics of a good research problem **(2 hours)**

3(A).4 Errors in selecting a research problem **(1 hour)**

(B) Hypothesis
(Ref. 2. Chapter 9 : pages 184 to190)
3(B).1 Meaning of hypothesis **(1 hour)**

3(B).2 Types of hypothesis **(2 hours)**

(C) Research Proposal and Research Report
(Ref. 2. Chapter 14 : pages 344 to360)
3(C).1 General format of the research proposal and research report **(2 hours)**

3(C).2 Individual research proposal and Institutional proposal **(2 hours)**

3(C).3 Style of writing the report **(1hour)**

3(C).4 References and bibliography **(1 hour)**

Unit-4 (A) Communicating information (Ref. 8) **(10 hours) (15 Marks)**
4(A).1 General aspects of scientific writing **(2 hours)**

4(A).2 Essay (General article) writing **(1 hour)**

4(A).3 Research paper writing **(2 hours)**

4(A).4 Writing of literature surveys and reviews **(2 hours)**

4(A).5 Skill of poster and oral presentation **(3 hours)**

(B) Disaster Management **(5 hours) (10 Marks)**
(Ref. 3. Chapter 1,2)

4 (B) .1 **Emergency responses:** chemical spills, radiation spills, biohazard spills, leaking compressed gas cylinders, fires, medical emergency accident reporting **(2 hours)**

4(B).2 **Safety measurements:** General safety and operational rules, safety equipments, personal protective equipments, compressed gas safety, safety practices for disposal of broken glass wares, centrifuge safety, treated biomedical wastes and scientific ethics

(3 hours).

References

1. Practical Skills in Chemistry, J. R. Dean, A. M. Jones, D. Holmes, R. Reed, J. Weyers and A Jones, Pearson Education Ltd. [Prentice Hall] (2002)
2. Research Methodology. Methods and Techniques : C. R. Kothari
3. OSU(Oklahoma State University)Laboratory Safety Manual 1.01(1999).
4. Tests, Measurements and Research Methods in Behavioural Sciences : A. K.Singh.
5. Vogel's Textbook of Quantitative chemical Analysis, G.H.Jeffery, J Bassett, J Mendham and R C Denney, LongmanScientific and Technical Ltd.
6. Quantitative Chemical Analysis, Daniel C. Harris, W.H. Freeman and Company, New York (2003)
7. Experimental Organic Chemistry, John C. Gilbert, Stephen F. Martin, Harcourt College Publishers (1998)
8. Scientific Papers and Presentations, Martha Davis, A Harcourt Science and Technology Company,USA(1997)

ગૂજરાત વિદ્યાપીઠઃ અમદાવાદ-14

અનુપારંગત (M.Phil.) અને વિદ્યાવાચસ્પતિ (Ph.D.) અભ્યાસક્રમ

પ્રશ્નપત્ર-2 સંશોધનમાં કમ્પ્યૂટરનું ઉપયોજન

કુલ ગુણ 50

સૈદ્ધાંતિક કાર્ય – 25 ગુણ

એકમઃ1 સંશોધનમાં શબ્દ પ્રક્રિયન(Word Processing) નો ઉપયોગ **(10 ગુણ)**

1.1 ડોક્યુમેન્ટ ક્રિએટીંગ એન્ડ ફોરમેટીંગઃ પેરેગ્રાફ, ફોન્ટ, એલાઈમેન્ટ, લાઈન સ્પેસિંગ, પેજ સેટઅપ,

1.2 એડિટીંગઃ કટ, કોપી, પેસ્ટ, ફાઈન્ડ, રીપ્લેસ

1.3 ઈન્સર્ટ ઓબ્જેકટ

એકમઃ2 સંશોધનમાં અંક પ્રક્રિયન (Numeric Processing) નો ઉપયોગ **(10 ગુણ)**

2.1 ક્રિએટ વર્કશીટ

2.2 માહિતી વિશ્લેષણઃ ડેટા એનાલિસીસ પાર્ક (વર્ણનાત્મક) અંક શાસ્ત્રીય ગણતરીઓ, આવૃત્તિ વિતરણ અને કોષ્ટકીકરણ (Tabulation), T- ગુણોત્તર અને એકમાર્ગી વિચરણ વિશ્લેષણ (One Way Anova)

2.3 આલેખાત્મક રજૂઆતઃ લાઈન, કોલમબાર, પાઈઆલેખની રચના રીતી

એકમઃ3 સંશોધનમાં ઈન્ટરનેટનો ઉપયોગ **(05 ગુણ)**

3.1 ઓનલાઈન અને ઓફલાઈન માહિતી શોધની રીતો

3.2 ઈ-જર્નલ્સ અને ઈ-બુકનો ઉપયોગ

3.3 કમ્પ્યૂટર આધારિત પ્રત્યાયનનો સંશોધનમાં ઉપયોગ (ઈ-મેઈલ)

પ્રાયોગિક કાર્ય 25 ગુણ

1. એક પેજ ડોક્યુમેન્ટ (One Page Document) તૈયાર કરી સૂચવેલ પેજ સેટઅપ કરે.
2. એક પેજ ડોક્યુમેન્ટ (One Page Document) માં સૂચના મુજબ પેરેગ્રાફ, ટાઈટલ, ફોન્ટ અને લાઈન સ્પેશીંગ ફોર્મેટ કરે.
3. એક પેજ ડોક્યુમેન્ટ (One Page Document) માં સૂચના મુજબ કટ, કોપી, પેસ્ટ અને સ્પેલ ચેક કરે.
4. વર્ક શીટ તૈયાર કરી વર્ણનાત્મક અંક શાસ્ત્રીય ગણતરીઓ કરે. (મધ્યક, મધ્યસ્થ, પ્રમાણવિચલન, વિરૂપતા, કફૂદતા)
5. વર્ક શીટમાં ડેટા ફીડ કરી તેના આધારે આલેખ રચન કરે.
6. આલેખ રચનામાં આલેખનો પ્રકાર, આલેખ અને ધરીના શીષક, રંગમાં પરિવર્તન કરે.
7. Excelની સામગ્રી (વર્ક શીટ, આલેખ)ને Word Documentમાં ઈન્સર્ટ કરે.
8. પાવરપોઈન્ટનો ઉપયોગ કરી 10 સ્લાઈડવાળું પ્રેઝન્ટેશન તૈયાર કરે.
9. પોતાની સંશોધન સમસ્યા આધારિત સંબંધિત સાહિત્યની શોધ કરે.
10. E-mial ડાફટ કરે.

નોંધઃ- ઉપરોકત પ્રાયોગિક કાર્યોમાંથી કોઈપણ બે પ્રાયોગિક કાર્યો કરવાના રહેશે.

ગૂજરાત વિદ્યાપીઠઃ અમદાવાદ-14

અનુપારંગત (M.Phil.) અભ્યાસક્રમ

પ્રશ્નપત્ર-2 સંશોધનમાં કમ્પ્યૂટરનું ઉપયોજન

કુલ ગુણ 50

સમયઃ 1 કલાક	**સૈદ્ધાંતિક કાર્ય**	**25 ગુણ**

પ્રશ્નઃ-1 બહુવિકલ્પ પ્રકારના પ્રશ્નો	10 ગુણ
પ્રશ્નઃ-2 ટૂંક જવાબી પ્રશ્નો (સાતમાંથી પાંચ)	10 ગુણ
પ્રશ્નઃ-3 નિબંધલક્ષી પ્રશ્નો (બેમાંથી એક)	05 ગુણ

સમયઃ 1 કલાક	**પ્રાયોગિક કાર્ય**	**25 ગુણ**

પ્રાયોગિક કાર્ય -1 પ્રાયોગિક કાર્ય -2	15 ગુણ
મૌખિક	10 ગુણ

Gujarat Vidyapith: Ahmedabad
Faculty of Science and Applied Science
Syllabus of Course work for Ph.D.(Chemistry)
CHEM-103: Reviews of Literature in Specific Research Area of Chemistry
(Total Teaching Hours=60+15 , Credits=2, 100 Marks)
(Inforce From 2019)

Students must deeply review the literature in specific research area of chemistry and submit the summary of the same to the department through proper channel for evaluation. (50 Marks)

Intellectual Property Right (IPR), Plagiarism, Data mining (Theory)

(50 Marks)

ANNEXURE

Course Title:

- **Research and Publication Ethics (RPE)-**Course for awareness about the publication ethics and publication misconducts.

Course Level:

- 2 Credit course (30 hrs.)

Eligibility:

- M.Phil., Ph.D. students and interested faculty members (It will be made available to post graduate students at later date)

Fees:

- As per University Rules

Faculty:

- Interdisciplinary Studies

Qualifications of faculty members of the course:

- Ph.D. in relevant subject areas having more than 10 years' of teaching experience

About the course

Course Code: CPE- RPE

Overview

- This course has total 6 units focusing on basics of philosophy of science and ethics, research integrity, publication ethics. Hands-on-sessions are designed to identify research misconduct and predatory publications. Indexing and citation databases, open access publications, research metrics (citations, h-index, Impact Factor, etc.) and plagiarism tools will be introduced in this course.

Pedagogy:

- Class room teaching, guest lectures, group discussions, and practical sessions.

Evaluation

- Continuous assessment will be done through tutorials, assignments, quizzes, and group discussions. Weightage will be given for active participation. Final written examination will be conducted at the end of the course.

Course structure

- The course comprises of six modules listed in table below. Each module has 4-5 units.

Modules	Unit title	Teaching hours
Theory		
RPE 01	Philosophy and Ethics	4
RPE 02	Scientific Conduct	4
RPE 03	Publication Ethics	7
Practice		
RPE 04	Open Access Publishing	4
RPE 05	Publication Misconduct	4
RPE 06	Databases and Research Metrics	7
	Total	**30**

Syllabus in detail

THEORY

- **RPE 01: PHILOSOPHY AND ETHICS (3 hrs.)**

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

- **RPE 02: SCIENTIFICCONDUCT (5hrs.)**

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 hrs.)**

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 behavior 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

PRACTICE

- **RPE 04: OPEN ACCESS PUBLISHING(4 hrs.)**

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 Suggester, etc.

- **RPE 05: PUBLICATION MISCONDUCT (4hrs.)**

A. Group Discussions (2 hrs.)

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 hrs.)

Use of plagiarism software like Turnitin, Urkund and other open source software tools

- **RPE 06: DATABASES AND RESEARCH METRICS (7hrs.)**

A. Databases (4 hrs.)

1. Indexing databases
2. Citation databases: Web of Science, Scopus, etc.

B. Research Metrics (3 hrs.)

1. Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score
2. Metrics: h-index, g index, i10 index, altmetrics

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