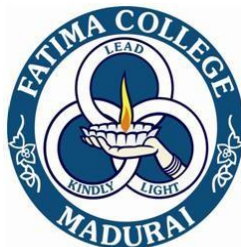


# **FATIMA COLLEGE(AUTONOMOUS)**



**Re-Accredited with “A” Grade by NAAC (3<sup>rd</sup> Cycle)  
74<sup>th</sup> Rank in India Ranking 2020 (NIRF) by MHRD  
Maryland, Madurai- 625 018, Tamil Nadu, India**

**NAME OF THE DEPARTMENT: CHEMISTRY**

**NAME OF THE PROGRAMME : M.Sc.,**

**PROGRAMME CODE : PSCH**

**ACADEMIC YEAR : 2021-2022**

# FATIMA COLLEGE (Autonomous) - Madurai 18

The Minutes of the Board of Studies.  
Department of Chemistry  
To be implemented from 2021-2022  
onwards.

Convened on 15.4.2021  
Through online Mode.

## Members Present:

S.No	Names	Designation.
1.	Dr. B. MEDONIA. Head & Associate Professor, Department of Chem, Fatima College.	Head of the Department
2.	Dr. S. Murugesan, Prof Dept of Indus chem, SOC, MKU, Madurai-21.	University Nominee. S. Murugesan
3.	Dr. S. Abraham John, Prof of Chemistry, GRI, Dindigul.	Subject Expert S. R.
4.	Dr. V. Rama Head & Associate Prof of Chem, Sarah Tucker College, Trinelveli.	Subject Expert
5.	Mr. S. Manikandan, Par pharma, R&D Dept Senior Research Associate Chengul pally	Industrialist. Alumna.
6.	Miss. P. Sharmila PGT Chemistry, Keswick ICSE School, NET Trainee	



	Names	Staff Members
1.	Dr. S. Sukumari	Sue S.
2.	Dr. A. Rajeswari	Rajin
3.	Dr. Sr. M. Azul Mary	Sr. Mary
4.	Dr. B. Vinosha	Binosha
5.	Dr. B. Sugandhara	S. Sugandhara
6.	Mrs. Rm Naga lakshmi	Rm. N
7.	Dr. M. Priya dhasani	M. Priya
8.	Dr. V. Azul Deepa	V. Azul
9.	Dr. K.M. Subimol	K.M. Subimol
10.	Dr. R. Sarika	R. Sarika

### Agenda of the Board of Studies:

#### 1. Presentation of Action taken Report

S.No	Common Suggestion from the previous Board	Action taken for Academic Year 2020
1.	Two Physical Chem Practical Courses to be offered in the end of III & IV Sem (Ph)	Implemented from 20-21
2.	A New paper on Green Chemistry in III Sem (Ph) finalised.	Offered from 2020-2021 on
3.	Overall OBE Syllabi for UG & PG Programmes reviewed.	Suggestions in 19C3CC7, 19C3CC8, 19C3CC9, 19C4CC10, 19C5CC1, 19C5CC14, 19C5SB4 and 19PG3C13 in

## New Courses Introduced.

S.No	Course Code	Course Title	Relevance To				Scope for			
			L	R	N	G	Emp	Entre	SD.	
1.	21C2SLA1	House Hold Products & Marketing		R			Emp	Entre.		
2	21PGCASH1	Research Methodology.			G		Emp		SD.	
3	19C3SB1(A)	Dairy Chemistry			N		Emp	Entre.		
4	19C4SB2(A)	Health and Chemistry			N				SD.	
5	19C1EDC/ 19C2EDC/ 21C1EDC/ 21C2EDC	Analysis of Soil, Water, food, Cosmetics & oil			N		Emp	Entre.	S.D.	



## Revised Combs

1

S No	Course code	Course title	Number and title of Unit revised with the revised comb	X. of revision	Relevance To	Scope for
					LRNG	EMP ENTER SD
1.	Crash Course	Clinical Chemistry	All	100%	N	Emp 250
2.	Crash Course	LAB Technical Beginner Course	All	100%	N	EMP 30

## Rubrics for Internship - PG

S.N	C1 20 Marks	C2 20 Marks	CIA Total	External 60 Marks
1.	Work Carried Out	Report	40	Thesis

## Rubrics for Project - Individual Project of PG.

S.no	C1 20 marks	C2 20 Marks	CIA Total	External 60 Marks
1.	Initial Presentation	Thesis writing	40	Viva Voce with External Exa

## Rubrics for Project - Group Project for U

SNO	C1 (20 Marks)	C2 (20 Marks)	CIA Total	External 60 Marks
1.	Work Carried	Report	40	Presentation

## Other Suggestions:

- 21PG CASL - Research Methodology.  
Instead of Unit I, Unit with plagiarism, Data compilation, Pictures and graphs, linear and Nonlinear regression and Regression Co-efficient can be added.
  - 19CHSB2(A) - Health and Chemistry  
CT Scan, Mammogram, MRI Contrast agents, Angiogram and Angioplasty to be added.
- In Enzyme unit, - Drug action



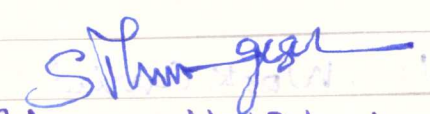
before and after meal, bioavailability  
and action, immediate Release  
and extended release of drugs to  
be added


3. 19C1 EDC / 19C2 EDC - Analysis of Soil, Water,  
food, cosmetics and oil.

Instead of fertilizers oil  
analysis is included.

4. Skill embedded Crash Course

- Instead of Pharmaceutical  
and diagnostic Chemistry it can  
be named as 'Clinical Chemistry'.

  
University Nominee.

  
Subject Nominee

Subject Expert

Industrialist

Alumna.

S. Medone  
Sr. Lecturer  
Sue S.  
Rajm

Run  
B. Luv  
Biosolus  
Kerika  
In the  
V. Alech  
H. Puy d

15/04/2024





**FATIMA COLLEGE (AUTONOMOUS)**

***Affiliated to Madurai Kamaraj University***  
***Re-Accredited with 'A++' (CGPA 3.61) by NAAC (Cycle - IV)***  
**Mary Land, Madurai - 625018, Tamil Nadu**

**DEPARTMENT OF CHEMISTRY**

***For those who joined in June 2019 onwards***

***(For the academic year 2021-2022)***

**PROGRAMME CODE : PSCH**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>HR S / W K</b>	<b>CREDI T</b>	<b>CIA Mk s</b>	<b>ES E Mk s</b>	<b>TOT . MKs</b>
<b>SEMESTER - I</b>						
<b>19PG1C1</b>	<b>INORGANIC CHEMISTRY-I</b> (Basic concepts, covalent and ionic bonding, solid state and crystallography, and Nuclear chemistry)	6	4	40	60	100
<b>19PG1C2</b>	<b>ORGANIC CHEMISTRY-I</b> ( Reaction mechanism and stereochemistry)	6	4	40	60	100
<b>19PG1C3</b>	<b>PHYSICAL CHEMISTRY-I</b> (Applied electro chemistry & Statistical thermodynamics)	6	4	40	60	100
<b>19PG1C4</b>	<b>INORGANIC QUALITATIVE ANALYSIS</b>	4	2	40	60	100
<b>19PG1C5</b>	<b>ORGANIC QUALITATIVE ANALYSIS</b>	4	2	40	60	100
<b>21C1EDC</b>	<b>ANALYSIS OF SOIL, WATER, FOOD, COSMETICS AND OIL</b>	3	3	40	60	100
	<b>LIBRARY</b>	1	-	-	-	-
<b>Total</b>		<b>30</b>	<b>19</b>			

SEMESTER – II						
<b>19PG2C6</b>	<b>INORGANIC CHEMISTRY-II</b> (Advanced coordination chemistry)	6	4	40	60	100
<b>19PG2C7</b>	<b>ORGANIC CHEMISTRY-II</b> (Elimination and addition reactions, organic spectroscopy and conformational analysis)	6	4	40	60	100
<b>19PG2C8</b>	<b>PHYSICAL CHEMISTRY-II</b> (Chemical kinetics and Quantum mechanics)	6	4	40	60	100
<b>19PG2C9</b>	<b>INORGANIC QUANTITATIVE ANALYSIS</b>	4	2	40	60	100
<b>19PG2C10</b>	<b>ORGANIC QUANTITATIVE ANALYSIS</b>	4	2	40	60	100
<b>21C2EDC</b>	<b>ANALYSIS OF SOIL, WATER, FOOD, COSMETICS AND OIL</b>	3	3	40	60	100
	<b>LIBRARY</b>	1		-	-	-
<b>Total</b>		<b>30</b>	<b>19</b>			
SEMESTER - III						
<b>19PG3SIC1</b>	<b>INTERNSHIP/SUMMER PROJECT*</b>	-	3	50	50	100
<b>19PG3C11</b>	<b>ORGANIC CHEMISTRY-III</b> (Spectroscopy and Pericyclic reactions)	6	5	40	60	100
<b>19PG3C12</b>	<b>PHYSICAL CHEMISTRY-III</b> (Group Theory, Surface Chemistry and Macromolecules)	6	5	40	60	100
<b>19PG3C13</b>	<b>GREEN CHEMISTRY</b>	6	5	40	60	100
<b>19PG3CE1 /</b>	<b>MATERIAL CHEMISTRY / BIO ORGANIC</b>	4	4	40	60	100



<b>19PG3CE2</b>	<b>CHEMISTRY</b>					
<b>19PG3C14</b>	<b>PHYSICAL CHEMISTRY PRACTICALS-I (Electrical Experiments-I)</b>	6	4	40	60	100
	<b>LIBRARY</b>	2				
<b>Total</b>		<b>30</b>	<b>26</b>			
<b>SEMESTER - IV</b>						
<b>19PG4C15</b>	<b>INORGANIC CHEMISTRY-III</b> (Organometallics & Bio-inorganic chemistry)	6	5	40	60	100
<b>19PG4C16</b>	<b>ORGANIC CHEMISTRY-IV</b> (Retrosynthesis, Reactions and Reagents, Natural Products)	6	5	40	60	100
<b>19PG4C17</b>	<b>PHYSICAL CHEMISTRY-IV</b> (Spectroscopy, Kinetic Theory of gases, Photochemistry And Radiation chemistry)	6	5	40	60	100
<b>19PG4CE3 / 19PG4CE4</b>	<b>ANALYTICAL CHEMISTRY / CHEMICAL ENGINEERING</b>	4	4	40	60	100
<b>19PG4C18</b>	<b>PHYSICAL CHEMISTRY PRACTICALS-II</b> (Non-electrical experiments)	6	4	40	60	100
<b>19PG4CPR</b>	<b>PROJECT*&amp; VIVA VOCE</b>		3	40	60	100
	<b>LIBRARY</b>	2				
<b>Total</b>		<b>30</b>	<b>26</b>			
	<b>Total</b>	<b>120</b>	<b>90</b>			

## OFF-CLASS PROGRAMME

### ADD-ON COURSES

<b>Cours e Cod e</b>	<b>Courses</b>	<b>Hrs .</b>	<b>Cred its</b>	<b>Semest e r in which the course is offered</b>	<b>CIA Mk s</b>	<b>ES E Mk s</b>	<b>Total Mark s</b>
	<b>SOFT SKILLS</b>	40	4	I	40	60	100
	<b>COMPUTER APPLICATIONS</b>	40	4	II	40	60	100
	<b>MOOC COURSES</b> (Department Specific Courses) * Students can opt other than the listed course from UGC-SWAYAM /UGC /CEC	-	Minim u m 2 Credit s	-	-	-	
	<b>COMPREHENSIVE VIVA</b> (Question bank to be prepared for all the papers by the respective course teachers)	-	2	IV	-	-	100
	<b>READING CULTURE</b>	15 / Se me ste r	1	I-IV	-	-	-
	<b>TOTAL</b>		13 +				



- **EXTRA CREDIT COURSE**

- **Lab Courses :**

- A range of 10-15 experiments per semester

- **Summer Internship:**

- Duration-1 month (2<sup>nd</sup> Week of May to 2<sup>nd</sup> week of June-before college reopens)

- **Project:**

- Off class
- Evaluation components-Report writing + Viva Voce (Internal marks-50) + External marks 50

- **EDC:**

Syllabus should be offered for two different batches of students from other than the parent department in Sem-I & Sem-II

**SELF LEARNING COURSE : OFFERED BY DEPARTMENT OF CHEMISTRY**

COURSE CODE	Course TITLE	Hrs.	Credits	Semester in which the course is offered	CIA Mks	ESE Mks	Total Marks
21PG2SLC	RESEARCH METHODOLOGY	-	2	II	40	60	100

**SEMESTER – II***For those who joined from 2021 onwards*

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEG ORY	HRS/WE EK	CREDI TS
PSCH	21C1EDC/ 21C2EDC	ANALYSIS OF SOIL, WATER, FOOD, COSMETICS AND OIL	EDC	3	3

**COURSE DESCRIPTION**

This paper focuses on all the important aspects of theory about soil, water, food chemistry, cosmetics and oil.

**COURSE OUTCOME:**

After completion of the course the students should be able to:

- Acquire the complete knowledge of soil and its texture
- Develop idea about water and its treatment
- Identify different types of food colour, additives and food adulterants
- Learn the ingredients required for the preparation of various types of shampoos, skin powder, nail polish.
- Understand the need of detoxification of oil and various adulterants present in oil.

**COURSE OBJECTIVES**

- ☐ To understand the concepts of soil texture, water analysis.
- ☐ To acquire the basic knowledge about food colour, food additives and food and adulterants.
- ☐ To learn sources of oil, analysis of oil and adulterant in oil.



## **UNITS**

### **UNIT –I SOIL**

**( 9 HRS.)**

Composition of soil: Organic and Inorganic constituents. Soil acidity : buffering capacity of soils. Liming of soil. Absorption of cations and anions: availability of soil nutrients to plants.

### **UNIT –II WATER**

**( 9 HRS.)**

Importance of water. Natural water. Sources of water. Drinking water – making water fit to drink – chlorination. Water pollution- Chemicals causing water contamination – contamination by fertilizers, soaps and detergents and their effect.

### **UNIT –III FOOD CHEMISTRY**

**( 9HRS.)**

Food- composition of food -Color- Natural colouring matters – chlorophylls – carotenoids -Synthetic colours – permitted colours- banned colours - FPO, FSSAC, Agmark – Flavors - Food additives-Food adulterants and their detection in various food items.

### **UNIT –IV COSMETICS**

**( 9HRS.)**

Dental preparations-Tooth paste-Ingredients, their characteristic functions- Soap-hard soap and soft soap- Hair care preparations-Shampoo Shampoos – different kinds of shampoos –anti dandruff, anti-lice, herbal and baby shampoos -Hair dye –manufacture of conditioners -skin preparation –skin powder, nail polish, lipsticks.

### **UNIT –V OIL**

**( 9 HRS.)**

Natural sources of oils and fats, oils rich in palmitic acid and stearic acid- processing of fats and oils- analysis of oils- technical refining of oils for industrial uses- detoxification- shelf life prediction test- adulterants in oils.

**REFERENCES:**

1. G.T. Austin : shreve's Chemical Process Industries, 5th edition, Mc- Graw-Hill, 1984
2. Lakshmi, S. Pharmaceutical Chemistry, S. Chand and Sons, New Delhi, 1995.
3. A.K. De, Environmental Chemistry, New Age International Publishers, 2018.
4. JayashreeGhosh, Fundamental concepts of Applied chemistry, S.Chand publications, New Delhi (2013).
5. J.V.Simons, Science and Beauty Business Vol-1, Macmilan Education Ltd, 1989.

**COURSE CONTENTS & LECTURE SCHEDULE:**

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
<b>UNIT -1 TITLE - SOIL</b>				
1.1	Composition of soil	1	Chalk & Talk	Black Board
1.2	Organic and Inorganic constituents	1	Chalk & Talk	Black Board
1.3	Soil acidity	1	Chalk & Talk	Black Board
1.4	buffering capacity of soils	1	Chalk & Talk	PPT & White board
1.5	Liming of soil	1	Chalk & Talk	Black Board
1.6	Absorption of cations	1	Chalk & Talk	Black Board
1.7	Absorption of anions:	2	Chalk & Talk	PPT & White board

## CBCS Curriculum for PG Chemistry

1.8	availability of soil nutrients to plants.	1	Chalk & Talk	Black Board
<b>UNIT - 2      TITLE -WATER</b>				
2.1	Importance of water. -	1	Chalk & Talk	Black Board
2.2	Naturalwater	1	Chalk & Talk	Black Board
2.3	Sources of water	1	Chalk & Talk	Black Board
2.4	Drinking water	1	Chalk & Talk	Black Board
2.5	Making water fit to drink – chlorination	1	Chalk & Talk	PPT & White board
2.6	Water pollution	1	Chalk & Talk	Black Board
2.7	Chemicals causing water contamination –	1	Chalk & Talk	Black Board
2.8	contamination by fertilizers, soaps and detergents and their effect	2	Demonstration	Various raw materials
<b>UNIT - 3      TITLE -FOOD CHEMISTRY</b>				
3.1	Food- composition of food	1	Chalk & Talk	Black Board
3.2	Food colour	1	Chalk & Talk	Black Board
3.3	Natural colouring matters chlorophylls – carotenoids	1	Chalk & Talk	Black Board
3.4	Synthetic colours	1	Chalk & Talk	Black Board
3.5	permitted colours	1	Chalk & Talk	Black Board
3.6	banned colours - FPO, FSSAC, Agmark – Flavors	1	Chalk & Talk	Black Board

## CBCS Curriculum for PG Chemistry

3.7	Food additives	1	Chalk & Talk	Black Board
3.8	Food adulterants and their detection in various food items.	2	Chalk & Talk	Black Board

**UNIT -4 TITLE-COSMETICS**

4.1	Dental preparations-Tooth paste-Ingredients, their characteristic functions	1	Chalk & Talk	Black Board
4.2	Soap-hard soap and soft soap	1	Chalk & Talk	LCD
4.3	Hair care preparations-Shampoo different kinds of shampoos –anti dandruff and anti-lice	2	Chalk & Talk	Black Board
4.4	herbal and baby shampoos	1	Chalk & Talk	Black Board
4.5	Hair dye –manufacture of conditioners	1	Chalk & Talk	Black Board
4.6	skin preparation –skin powder	1	Chalk & Talk	Black Board
4.7	nail polish	1	Chalk & Talk	Black Board
4.8	lipsticks	1	Chalk & Talk	Black Board

**UNIT - 5 TITLE -OILS**

5.1	Natural sources of oils and fats	1	Chalk & Talk	Black Board
5.2	oils rich in palmitic acid and stearic acid	1	Chalk & Talk	LCD
5.3	processing of fats and oils	1	Chalk & Talk	Black Board



CBCS Curriculum for PG Chemistry

5.4	analysis of oils	2	Chalk & Talk	Black Board
5.5	technical refining of oils for industrial uses	1	Chalk & Talk	Black Board
5.6	detoxification	1	Chalk & Talk	Black Board
5.7	shelf life prediction test	1	Chalk & Talk	Black Board
5.8	adulterants in oils	1	Chalk & Talk	Black Board

Levels	C1	C2	C3	Total Scholastic Marks	Non Scholastic Marks C4	CIA Total	% of Assessment
	Weekly	Monthly	MID-SEM TEST				
	5Mks.	10 Mks.	20 Mks.	35 Mks.	5 Mks.	40 Mks.	
K1	-	5 Mks.	5 Mks.	10	-	10	25 %
K2	-	5 Mks.	8 Mks.	13	-	13	32.5 %
K3	5 Mks.	-	7 Mks.	12	-	12	30 %
Non Scholastic	-	-	-	-	5	5	12.5 %
Total	5	10	20	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

S

- ✓ **All the course outcomes are to be assessed in the various CIA components.**
- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy for I PG are :**

**K1-Understand,      K2-Apply,      K3-Analyse**

- ✓ **The I PG course teachers are requested to start conducting S1, W1, M1,**

#### EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
5	10	15	5	5	40	60	100

**C1** – Average of Two Session Wise Tests

**C2** – Average of Two Monthly Tests

**C3** - Mid Sem Test

**C4** – Best of Two Weekly Tests

**C5** – Non - Scholastic

## COURSE OUTCOMES

On the successful completion of the course, students will be able to:

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Analyse the buffering capacity of soil, p H, cation exchange capacity, nutrient availability of soil, fertility status of soil.	K <sub>1</sub>	PSO <sub>1</sub>
CO 2	Analyze the p H of water, hardness of water and acquire knowledge of advanced water purification techniques (and water treatment)	K <sub>1</sub> , K <sub>2</sub>	PSO <sub>2</sub>
CO 3	Identify different types of food colour, additives and food adulterants	K <sub>1</sub>	PSO <sub>2</sub>
CO 4	Learn the ingredients required for the preparation of the various types of shampoos, skin powder and nail polish	K <sub>2</sub>	PSO <sub>4</sub>
CO 5	Analyze and Detect the presence of adulterants in oils and to compare the physical and chemical refining of oils	K <sub>3</sub>	PSO <sub>5</sub>

### Mapping COs Consistency with PSOs

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9
CO1	3	1	2	3	2	2	3	3	2
CO2	3	2	1	2	1	2	2	2	2
CO3	2	3	1	2	2	2	2	2	2
CO4	2	1	2	3	2	2	2	2	2
CO5	2	2	2	2	3	2	2	2	2

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CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	2	2	2
CO2	3	2	2	2
CO3	3	3	3	3
CO4	3	2	3	2
CO5	3	3	2	3

**Note:** ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

♦ Weakly Correlated -1

**COURSE DESIGNER:**

**1. Mrs. RM. Nagalakshmi**

**2. Dr. B.SUGANTHANA**

**Forwarded By**

**HOD'S Signature.**

*B. Sugantha.*



## Curriculum for M.Sc. Chemistry

### I M.Sc., SEMESTER –1

*For those who joined in 2019 onwards*

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WE EK	CREDITS
PSCH	21PG2SLC	Research Methodology	PG Self learning	-	2

#### COURSE DESCRIPTION

This paper focuses on all the important aspects of Research Methodology

#### COURSE OBJECTIVES

This course helps the students to study about all concepts related to Research problem, literature survey, Web and library resources for research and writing research papers and proposals.

#### Course Outcomes (COs)

<b>CO1</b>	Introduce the purpose and importance of research .
<b>CO2</b>	Understand the various sources of information for literature survey.
<b>CO3</b>	Illustrate the Web and library resources for research.
<b>CO4</b>	Understand the writing of research papers & know the methodology of writing thesis and journal articles.
<b>CO5</b>	Analyse the writing of research proposal.

#### UNIT - 1 : Introduction to Research

The search for knowledge, purpose of research, scientific method, characteristics of research, Types of research- fundamental or pure research, applied research, action research, historical research, experimental research.

Explanation of research problems, sources of research problems, selection of research problem characteristics of a good research problem, errors in selecting a research problem.

## **UNIT-II: Literature Survey**

Sources of information, Primary, Secondary, Tertiary sources, Journals, Journal abbreviations, Abstracts, Current titles, Reviews, Monographs, Textbooks, Current contents, Introduction to Chemical Abstracts. Online searching, Database, *Scifinder*, *Scopus*, Citation Index, Impact Factor.

## **UNIT-III: Use of Web resources**

The Internet and World Wide Web, internet resources for chemistry, internet search engines, using spreadsheets, word processors, databases and other packages, finding and citing information.

## **UNIT-IV: Scientific Writing**

General aspects of scientific writing, reporting practical and project work, Format of the research report, style of writing the report, references and bibliography, Steps to publish a scientific article in a journal: types of publications- communications, articles, reviews; when to publish, where to publish, specific format required for submission, organization of the material, abbreviations used in scientific writing.

**UNIT-V: Writing of Research Proposal:** Research Proposal: Format of research proposal, individual research proposal and institutional proposal.

## **Reference Books:**

1. Ranjit kumar, Research Methodology: A Step by Step Guide for Beginners, Pearson Education; 2<sup>nd</sup> Ed., (2005).
2. Dr.C.R. Kothari, Research Methodology: Methods and Techniques, New Age International Publishers, 2<sup>nd</sup> Ed., New Delhi (2014.)
3. M.D. Barbara Gastel and Robert A. Day, How to Write and Publish a Scientific Paper, Greenwood Publishing Group Inc, 8<sup>th</sup> Ed., 2016.

4. Tanmoy Chakraborty and Lalita Ledwani, Research Methodology in Chemical Sciences: Experimental and Theoretical Approach, Apple Academic Press; 1<sup>st</sup> Ed., 2016.
5. R. L. Dominoswki, Research Methods, Prentice Hall, 1981.
6. H. F. Ebel, C. Bliefert and W. E. Russey, The Art of Scientific Writing, VCH, Weinheim, 1988.
7. H. M. Kanare, Writing the Laboratory Notebook; American Chemical Society: Washington, DC, 1985.
8. J. S. Dodd, Ed., The ACS Style Guide: A Manual for Authors and Editors; American Chemical Society: Washington, DC, 1985.
9. Gibaldi, J. Achtert, W. S. Handbook for writers of Research Papers; 2nd ed.; Wiley Eastern, 1987.
10. Joseph, A. Methodology for Research; Theological Publications: Bangalore, 1986

## PSO

PSO 1	Equip with an in-depth knowledge of varied fields namely Organic Chemistry, Inorganic Chemistry, Physical and nanochemistry.
PSO 2	Train in problem solving procedures enables to interpret the experimental data into structures and mechanisms.
PSO 3	Provides a tremendous exposure and cultivates analytical and synthesising measures necessary to take up project work in reputed institutions.
PSO 4	Programme renders diversified thinking thereby promotes creative skills.
PSO 5	to solve the problems that cause a negative impact on surroundings to pursue salient steps to safeguard environment
PSO 6	Application-oriented input sharpens the skill to undertake CSIR-NET exam.
PSO 7	Knowledge with practical dimensions becomes a driving power to undertake research in different areas at a global level.
PSO 8	Multi-layered input enables to avail opportunities at chemical, pharmaceutical industries.
PSO 9	Becomes a contributing force and development agent in society.

### Mapping of COs with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9
CO1	1	2	3	3	1	1	3	2	1
CO2	2	1	1	3	1	1	3	2	1
CO3	1	2	1	3	1	1	3	2	1
CO4	3	3	3	3	1	1	3	2	1
CO5	1	3	3	3	1	1	3	2	1

### Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1									
CO2									
CO3									
CO4									
CO5									

**Note:** ♦ Strongly Correlated – 3      ♦ Moderately Correlated – 2  
 ♦ Weakly Correlated -1

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**HOD'S Signature**