FATIMACOLLEGE (AUTONOMOUS)

Re-Accredited with "A++"(CGPA 3.61) Grade by
NAAC (Cycle-IV)
Maryland, Madurai- 625 018, Tamil Nadu, India

NAME OF THE DEPARTMENT: CHEMISTRY

NAME OF THE PROGRAMME : M.Sc.

PROGRAMMECODE : PSCH

ACADEMICYEAR : 2022-2023

Fatima College (Autonomous) Madurai-18

The Minutes of the Board of Studies
Department of Chemistry
To be implemented from 2022-2023 onwards
Convened on 21.3.2022. Convened at 2 p.m
Venue : R3

External Members

S.No.	Name	Designation
1	Dr.S. Murugesan Professor, Dept. of Inorg. Chem. SOC, MKU, Madurai-21	University Nominee 21/3/22
2.	Dr. S. Abraham John Prof. of Chemistry GRI (Deemed to be University) Gandhigram Dindigul	Subject Expert 21/3/22
3.	Dr. A. Mary Imelda Jayaseeli Associate Professor & Head Jeyaraj Annapackiam College for Women Periyakulam	Subject Expert 21/3/2022
4.	Mr. S. Manikandan Senior Research Associate Par Pharma, R&D. Dept. Chengalpattu	Industrialist (Absent)
5.	Miss. B. Shobana Research scholar, Research Dept. of Chemistry, Thiagarajar college, Madurai	Alumna. 21/03/22

6	Dr. N. Malathi	Dean of Academic Affairs
7.	Dr. S. Sukumari	Staff Member
8.	Dr. A. Rajeswari	Staff Member
9.	Dr. B. Vinosha	Staff Member
10	Dr. B. Suganthana	Staff Member
11	Dr. Sr. Arul Mary	Staff Member
12	Dr. V. Arul Deepa	Staff Member
13	Mrs. R.M. Nagalakshmi	Staff Member
14.	Dr. M. Priyadharsani	Staff Member
15	Dr. K.M. Subimol	Staff Member
16	Dr. P. Sylvia Reeta	Staff Member

1. Action Taken Report For 2021-2022 - For M.Sc Chemistry

S.No	Common suggestion offered in the Previous Board	Action Taken for the Academic Year 2021-22
1.	21PGC2SL1 - Research methodology - Plagiarism can be added in unit V	Included in unit V
2.	In EDC paper - Instead of fertilizer Oil Analysis can be included	Fertilizers is removed & Oil unit is included as unit V

Change of Course Title

S.No	Old Course Code	New Course Code	Old Course Title	New Course Title	Need for Change
—	—	—	—	NIL	—

New Courses Introduced

For B.Sc.

S.No	Course Code	Course Title	Relevance to				Scope for			Need for
			L	R	N	G	EMP	ENTRE	SD	Introduction
1.	21C2SL A1	Household Products Marketing		R			EMP	ENTRE		To make Leaves Entrepreneurs

Internal Members.

1. Dr. N. Malathi Dean of Academic Affairs. Staff Member - Dept of Chemistry

N. Malathi
24/03/2022

S.NO.	Name	
1.	Dr. B. Medona [Head of the Dept.]	B. Medona.
2	Dr. S. Sukumari	S.
3.	Dr. A. Rajeswari	
4	Dr. B. Vinosha	
5.	Dr. B. Sugantharaj	
6	Dr. Sr. Arul Mary	
7	Dr. V. Arul Deepa	
8.	Mrs. R.M. Nagalakshmi	
9.	Dr. M. Priyadharsini	
10.	Dr. K.M. Subimol	
11.	Dr. P. Silviya Reeka.	

Members Present.

1.	Dr. B. Medona	Head of the Department
2.	Dr. S. Murugesan, Professor, Dept of Inorganic Chemistry, SOC, MKU	University Nominee
3	Dr. S. Abraham John, Professor, Dept of Chemistry, GRI, Dindigul	Subject Expert
4	Dr. A. Mary Imelda Jayaseeli, Head & Associate Prof. of Chemistry JAC, Periyakulam	Subject Expert
5	Miss. B Shobana Research Scholar, Research Dept of Chemistry Thiagarajar College, Madurai	Alumna.

For M. Sc.

S.No	Course Code	Course Title	Relevance to				Scope for			Need for Introduction
			L	R	N	G	EMP	EMRE	SD	
1.	21PGC2SL1	Research Methodology				G	EMP		SD	offered to the advanced Learners
2.	21C1EDC / 21C2EDC	Analysis of Soil, Water Food, Cosmetics And oil.			N		EMP		SD	As per the Recommendation of course Teachers

Revised Courses -

S.No	Course code	Course Title	No. & Title of units Revised	% of Revision	Need for Revision	Relevance to				Scope for		
						L	R	N	G	EMP	ENTRE	SD
-	-	-	NIL	-	-	-	-	-	-	-	-	-

2. updation of Open Educational Resources in the list of references of each course.

S.No	Course Code	Course Title	Details of updation
-	-	-	NIL

3 Revision of Courses.

FOR B.SC.

S.No	Course code	Course Title	No. & Title of units Revised with the Revised Content	% of Revision	Need for Revision	Relevance to				Scope for		
						L	R	N	G	EMP	ENTRE	SD
1.	19C4SB2	NEW TITLE "Dyes and Pigments" Old Title Natural & Synthetic Dyes	Unit-IV g-Pigments Title Instead of Structure of Dyes. Revised content - Anthocyanin, Flavones Phthalocyanin, Carotenoids & Chlorophyll	20%	As per the Recommendation of Course Teacher			N		EMP		
2.	19C5CC16	NEW TITLE "Conventional & Green Synthesis OLD TITLE Green chemistry Practicals [Lab Course]	Under Greener methods of Preparation of organic compounds - Preparation of Aspirin using MW, use of greener Nitrating & Brominating Mixture are used for Nitration & Bromination - Included. Under Conventional methods - Three New Experiments to be included.	50%	To include Experiments in the revised Lab course, To increase the use of Microwave radiation & Greener Reagents				G	EMP		SD

For M.Sc.

S.No	Course Code	Course Title	No. & Title of units revised with the revised content	% of Revision	Relevance to L	R	N	G	Scope for Emp	Entre	SD
1.	19PG4 CI7	Physical Chemistry - IV	Unit I, II & III Title - to be changed as Rotational & Vibrational Spectroscopy, Electronic Spectroscopy & Spin Resonance & Mossbauer spectroscopy with minor Revisions in unit I, II & V In unit III - NMR Spectroscopy - Frequency, Instrumentation & Comparison of NMR with ESR are Included.	15%				G	Emp	Entre	
2.	19PG4 CE3	Analytical Chemistry	Unit I - Title for Error Analysis Unit II - Chromatography unit V - Computers in Chemistry With minor Changes in Content. Unit III - DTA to be Included.	10%				G	Emp	Entre	SD
3.	19PG1C5	New Title organic Qualitative Analysis & Preparation - I Old Title organic Qualitative Analysis	Spectral Analysis of the Synthesized Compounds Using IR and UV are included.	10%			N		Emp		SD
4.	19PG2C10	New Title Organic Estimation & Preparation - II Old Title. Organic Estimation & Preparation - II *Quantitative Analysis	Under Estimation - Estimation of Phenol & Aniline are Included instead of Estmn. Of Glucose by Eynon-Lane Method. Under preparation - Spectral Analysis of the synthesized Compounds using UV & IR are included.	20%			N		Emp		SD

4 New Courses Introduced - For B.Sc.

S.No	Course code	Course Title	Relevance to L	R	N	G	Scope for Emp	Entre	SD	Need for Introduction
1.	22N4SLC4	Textile Colouration			N		Emp	Entre		To make Learners Entrepreneur

For M.Sc

S.No	Course code	Course Title	Relevance to				Scope for			Need for Introduction
			L	R	N	G	EMP	ENTRE	SD	
1.	22PGC4SL3	Batteries and its Application			N		EMP	ENTRE		To increase Employability & Entrepreneurship.

5 Introduction of Purely Skill Embedded Certificate Value added Course

S.No	Course Code	Course Title	MOU with Industry/ Organisation	Skills Sharpened	Course outcome
1.	22PGVACC1	Certificate course on Instrumentation in IR	-	Analytical Skill & Employability	To produce Analytical chemist.
2.	22PGVACC2	Certificate Course on Instrumentation in UV	-		
3.	22PGVACC3	Certificate course on Electrochemical Techniques	-		

6 Approval of Ph.D. Course work Syllabus - NIL
7 Rubrics for Internship/Project - NA
Details of Proposed MOU - Planned to have MOU with Materials Research Centre (MRC) Coimbatore.

Other Suggestions	Commendations
1. No need to have External Exam for Self Learning courses.	1. OUR UG & PG Syllabus is Very Good but too heavy.
2. In 19PG4CM - Unit I - Absorption & Emission LASER, EMR Interaction, Einstein Coefficient Can be deleted.	

Dr. B. Medona Head of the Department

21/3/22 Dr. S. Murugesan University Nominee

21/3/22 Dr. S. Abraham John Subject Expert

21/3/2022 Dr. A. Mary Imelda Jayaseeli Subject Expert

21/03/2022 Ms. B. Shobana Alumna

Name of	Signature
Dean of Academic affairs Dr. N. Malathi	21/03/2
Staff Members	
Dr. S. SUKumari	S.
Dr. A. Rajeswari	
Dr. B. Vinosha	
Dr. B. Sugarthana	
Dr. Sr. Arul Mary	
Dr. V. Arul Deepa	
Mrs. R.M. Nagalakshmi	
Dr M. Priyadharsani	
Dr. K.M. Subimol	
Dr P. Sylvia Reeta	

VISION OF THE DEPARTMENT

To transform the students entrusted in our hands into competent chemists.

MISSION OF THE DEPARTMENT

- To transfer the knowledge of chemistry with values to create globally competent chemist.
- To promote scientific enquiry and inculcate research.
- To inculcate in students the skills of problem solving.
- To create in them the awareness about ecological concerns.
- To train to adopt cost effective and eco-friendly green chemistry methodologies.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

After five years,

PEO1	Our graduates will be academic, digital and information literates, creative, inquisitive, innovative and committed researchers who would be desirous for the "more" in all aspects
PEO2	They will be efficient individual and team performers who would deliver excellent professional service exhibiting progress, flexibility, transparency, accountability and in taking up initiatives in their professional work
PEO3	The graduates will be effective managers of all sorts of reallife and professional circumstances, making ethical decisions, pursuing excellence within the time framework and demonstrating apt leadership skills.

PEO4	They will engage locally and globally evincing social and environmental stewardship demonstrating civic responsibilities and employing right skills at the right moment.

GRADUATE ATTRIBUTES (GA)

Fatima College empowers her women graduates holistically. A Fatimite achieves all-round empowerment by acquiring Social, Professional and Ethical competencies. A graduate would sustain and nurture the following attributes:

I. SOCIAL COMPETENCE	
GA1	Deep disciplinary expertise with a wide range of academic and digital literacy
GA2	Hone creativity, passion for innovation and aspire excellence
GA3	Enthusiasm towards emancipation and empowerment of humanity
GA4	Potentials of being independent
GA5	Intellectual competence and inquisitiveness with problem solving abilities be fitting the field of research.
GA6	Effectiveness in different forms of communications to be employed in personal and professional environments through varied platforms.
GA7	Communicative competence with civic, professional and cyber dignity and decorum.
GA8	Integrity respecting the diversity and pluralism in societies, cultures and religions.

GA9	All–inclusive skill sets to interpret, analyse and solve social and environmental issues in diverse environments.
GA10	Self awareness that would enable them to recognize their uniqueness through continuous self-assessment in order to face and make changes building on their strengths and improving their weaknesses.
GA11	Finesse to co-operate exhibiting team-spirit while working in groups to achieve goals
GA12	Dexterity in self-management to control their selves in attaining the kind of life that they dream for.
GA13	Resilience to rise up instantly from their intimidating set backs.
GA14	Virtuosity to use their personal and intellectualautonomy inbeinglife-long learners
GA15	Digital learning and research attributes.
GA16	Cyber security competence reflecting compassion,careandconcerntowardsthemarginal ised
GA17	Rectitude to use digital technology reflecting civic and social responsibilities in local, national and global scenario.
II. PROFESSIONAL COMPETENCE	
GA18	Optimism, flexibility and diligence that would make them professionally competent
GA19	Prowess to be successful entrepreuners and become employees of trans-national societies
GA 20	Excellence in Local and Global Job Markets.
GA21	Effectiveness in Time Management.
GA 22	Efficiency in taking up Initiatives.

GA 23	Eagerness to deliver excellent service.
GA 24	Managerial Skills to Identify, Commend and tap Potentials.
III. ETHICALCOMPETENCE	
GA25	Integrity and be disciplined in bringing stability leading a systematic life promoting good human behaviour to build better society.
GA 26	Honesty in words and deeds.
GA27	Transparency revealing one's own character as well as self-esteem to lead a genuine and authentic life.
GA 28	Social and Environmental Stewardship
GA 29	Readiness to make ethical decisions consistently from the galore of conflicting choices paying heed to their conscience.
GA 30	Right life skills at the right moment.

PROGRAMME OUTCOMES (PO)

On completion of M.Sc Programme,The learners will be able to

PO1	Apply acquired scientific knowledge to solve major and complex issues in the society/industry.
PO2	Attain research skills to solve complex cultural, societal and environmental issues

PO3	Employ latest and updated tools and technologies to solve complex issues.
PO4	Demonstrate Professional Ethics that foster Community, Nation and Environment Building Initiatives.

PROGRAMME SPECIFIC OUTCOMES (PSO)

On completion of M.Sc. Chemistry programme, the learners would be able to

PSO1	Equip with an in-depth knowledge of varied fields namely Organic Chemistry, Inorganic Chemistry ,Physical and nanochemistry.
PSO2	Train in problem solving procedures enables to interpret the experimental data into structures and mechanisms.
PSO3	Provides a tremendous exposure and cultivates analytical and synthesising measures necessary to takeup project work in reputed institutions.
PSO4	Programme renders diversified thinking thereby promotes creative skills.
PSO5	To solve the problems that cause a negative impact on surroundings to pursue salient steps to safeguard environment.
PSO6	Application-oriented input sharpens the skill to undertake CSIR-NET exam.
PSO7	Knowledge with practical dimensions becomes adriving power to undertake research in different areas at a global level.

PSO8	Multi-layered input enables to avail opportunities at chemical, pharmaceutical industries.
PSO9	Becomes a contributing force and development agent in society.

FATIMA COLLEGE (AUTONOMOUS), MADURAI-18

DEPARTMENT OF CHEMISTRY

For those who joined in June 2019 onwards

(For the academic year 2021-2022)

PROGRAMME CODE : PSCH

COURSE CODE	COURSE TITLE	HRS / WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
SEMESTER – I						
19PG1C1	**INORGANIC CHEMISTRY-I** (Basic concepts, covalent and ionic bonding, solid state and crystallography, and Nuclear chemistry)	6	4	40	60	100
19PG1C2	**ORGANIC CHEMISTRY-I** (Reaction mechanism and stereochemistry)	6	4	40	60	100
19PG1C3	**PHYSICAL CHEMISTRY-I** (Applied electro chemistry & Statistical thermodynamics)	6	4	40	60	100
19PG1C4	**INORGANIC QUALITATIVE ANALYSIS**	4	2	40	60	100
19PG1C5	**ORGANIC QUALITATIVE ANALYSIS & PREPARATION-I**	4	2	40	60	100
21C1EDC	**ANALYSIS OF SOIL, WATER, FOOD, COSMETICS AND OIL**	3	3	40	60	100
	LIBRARY	1	-	-	-	-
Total		**30**	**19**			
SEMESTER – II						
19PG2C6	**INORGANIC CHEMISTRY-II** (Advanced coordination chemistry)	6	4	40	60	100

19PG2C7	**ORGANIC CHEMISTRY-II** (Elimination and addition reactions, organic spectroscopy and conformational analysis)	6	4	40	60	100
19PG2C8	**PHYSICAL CHEMISTRY-II** (Chemical kinetics and Quantum mechanics)	6	4	40	60	100
19PG2C9	**INORGANIC QUANTITATIVE ANALYSIS**	4	2	40	60	100
19PG2C10	**ORGANIC ESTIMATION &PREPARATION-II**	4	2	40	60	100
21C2EDC	**ANALYSIS OF SOIL, WATER, FOOD, COSMETICS AND OIL**	3	3	40	60	100
	LIBRARY	1		-	-	-
Total		**30**	**19**			
SEMESTER - III						
19PG3SIC1	**INTERNSHIP/SUMMER PROJECT***	-	3	50	50	100
19PG3C11	**ORGANIC CHEMISTRY-III** (Spectroscopy and Pericyclic reactions)	6	5	40	60	100
19PG3C12	**PHYSICAL CHEMISTRY-III** (Group Theory, Surface Chemistry and Macromolecules)	6	5	40	60	100
19PG3C13	**GREEN CHEMISTRY**	6	5	40	60	100
19PG3CE1 / 19PG3CE2	**MATERIAL CHEMISTRY / BIO ORGANIC CHEMISTRY**	4	4	40	60	100
19PG3C14	**PHYSICAL CHEMISTRY PRACTICALS-I (Electrical Experiments-I)**	6	4	40	60	100
	LIBRARY	2				
Total		**30**	**26**			

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

OFF-CLASS PROGRAMME

ADD-ON COURSES

Course Code	Courses	Hrs.	Credits	Semester in which the course is offered	CIA Mks	ESE Mks	Total Marks
	SOFT SKILLS	40	4	I	40	60	100
	COMPUTER APPLICATIONS	40	4	II	40	60	100
	MOOC COURSES (Department Specific Courses) * Students can opt other than the listed course from UGC-SWAYAM /UGC /CEC	-	Minimum 2 Credits	-	-	-	
	COMPREHENSIVE VIVA (Question bank to be prepared for all the papers by the respective course teachers)	-	2	IV	-	-	100
	READING CULTURE	15 / Semester	1	I-IV	-	-	-
	TOTAL		13 +				

- **EXTRA CREDIT COURSE**

- **Lab Courses :**
  - A range of 10-15 experiments per semester
- **Summer Internship:**
  - Duration-1 month (2nd Week of May to 2nd 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 inSem-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
22PG4SLCP	**BATTERIES AND ITS APPLICATIONS**	-	2	1V	40	60	100

SEMESTER –I

For those who joined in 2019 onwards -OLD

10%

PROGRAMME CODE	OURSE CODE	COURSE TITLE	ATEGORY	S/WEEK	CREDITS
PSCH	19PG1C5	ORGANIC QUALITATIVE ANALYSIS	LAB	4 Hrs.	2

COURSE DESCRIPTION

This course gives a hands on experience of qualitatively analyzing organic compounds and to synthesis simple organic compounds.

COURSE OBJECTIVES

To develop the skills of students to separate binary organic mixtures into individual compounds, identifying functional groups, confirming it by preparing suitable derivatives.

Qualitative Analysis of an organic binary mixture

- Pilot separation
- Bulk separation
- Analysis of organic compounds

The functional groups are combined in the following combinations

- Acidic + Phenolic compounds
- Basic + Phenolic compounds
- Acidic + Neutral compounds
- Basic +Neutral compounds

The possible functional groups are

Carboxylic acids, Phenols, Amines, Amides, Nitrocompounds, Carbohydrates, Ester & Carbonyl compounds

I. Single step Organicpreparations:

Preparation of

1. p-Nitro acetanilide fromAcetanilide
2. 2-Naphthylbenzoate from 2-Napthol
3. Dibenzalacetone fromBenzaldehyde
4. Acetyl salicylic acid from Salicylicacid.

Reference books:

1. Ganapragasam& Ramamurthy G, Organic Chemistry Lab Manual , 2 nd Ed., S. Vishwanathan Printers and Publishers (P) Ltd., Chennai,2007.
2. FurnissBS,HannafordAJ,SmithPWGandTatchellAR, Vogel's Textbook of Practical Organic Chemistry, 5 th Ed., Pearson Publication.
3. Vengataswaran V et al., Basic Principle of Practical Chemistry, Sultan Chand and sons, New Delhi,1997

COURSE OUTCOMES

On the successful completion of the course, students will beable :

NO.	COURSEOUTCOMES	PSOs ADDRESSED
CO1	To be skilled in the separation of binary organic mixtures	PSO1&PSO2
CO2	To gain knowledge on the skills of doing micro level analysis	PSO3
CO3	To know the methods of qualitative analysis of organic compounds	PSO5
CO4	To learn about the preparation of suitable derivative of the organic functional groups	PSO2

CO5	To prepare organic compounds.	PSO3

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	3	3	2	2	1	2	1	1	1
CO2	2	1	3	2	2	1	2	1	1
CO3	2	1	2	2	3	2	1	2	1
CO4	2	2	1	1	2	3	2	1	1
CO5	1	2	1	2	2	2	3	1	1

Mapping of C0s with POs

CO/PSO	PO1	PO2	PO3	PO4
CO1	3	2	1	1
CO2	2	3	1	1
CO3	3	2	1	1
CO4	2	3	1	1
CO5	3	2	1	1

Note: **Strongly Correlated –3** **Moderately Correlated– 2**

- WeaklyCorrelated-**1**

COURSE DESIGNER:

1. **Dr.M.Priyadharsani**

2. **Dr.V.Aruldeepa**

Forwarded By

HOD'S Signature

I M.Sc.,CHEMISTRY

SEMESTER –I

(For those who joined in 2022 onwards) - NEW

PROGRAMME CODE	OURSE CODE	COURSE TITLE	ATEGORY	S/WEEK	CREDITS
PSCH	19PG1C5	ORGANIC QUALITATIVE ANALYSIS AND PREPARATION -I	LAB	4 Hrs.	2

COURSE DESCRIPTION

This course gives hands on experience of qualitatively analyzing organ ic compounds and to synthesis simple organic compounds.

Thiscourseprovideshands on experience in spectral techniques of UV and IR.

COURSE OBJECTIVES

1. To develop the skills of students to separate binary organic mixtures into individual compounds, identifying functional groups, confirming it by preparing suitable derivatives.
2. To gain knowledge of organic spectroscopy (UV and IR), microwave assisted synthesis and structural elucidation of synthesized organic compounds.

Course Outcomes:

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

- Acquire the knowledge of qualitativeanalysis & Synthesize organic compounds by singlestage.
- Synthesise the compounds using Microwave oven.
- Describe the reactionmechanism.
- Analyse the experimental observations and inferences with theory behind practicals
- Analyse the prepared organic compounds by spectral techniques (UV and IR)

I. Qualitative Analysis of an organic binary mixture

1. Pilot separation
2. Bulk separation
3. Analysis of organic compounds

The functional groups are combined in the following combinations

1. A cidic + Phenolic compounds
2. B asic + Phenolic compounds
3. A cidic +Neutral compounds
4. B asic + Neutral compounds

The possible functional groups are

Carboxylic acids, Phenols, Amines, Amides, Nitro compounds, Carbohydrates, Ester &Carbonyl compounds

II. A) Single step Organicpreparations of the following compounds

Microwave assisted Synthesis of

1. p-Nitro acetanilide fromAcetanilide
2. 2-Naphthylbenzoate from2-Napthol
3. Dibenzalacetone fromBenzaldehyde
4. Acetyl salicylic acid from Salicylicacid.

II. B) Spectral Analysis of the synthesized compounds using UV and IR (Internal only)

Reference books:

1. Ganapragasam& Ramamurthy G, Organic Chemistry Lab Manual , 2 nd Ed., S. Vishwanathan Printers and Publishers (P) Ltd., Chennai,2007.
2. FurnissBS,HannafordAJ,SmithPWGandTatchellAR,Vogel's
3. Textbook of Practical Organic Chemistry, 5 th Ed., Pearson Publication.
4. Vengataswaran V et al., Basic Principle of Practical Chemistry, Sultan Chand and sons, New Delhi,1997.
5. W. Kemp, Organic spectroscopy, McMillan,1991.

6. R. M. Silverstein and F. X. Webster, Spectrometric Identification oforganic compounds, John Wiley & Sons, Inc., 6thEd.2004
7. P.S.Kalsi, Spectroscopy of organic compounds, New age international publishers, 6thedition,2009.

COURSE OUTCOMES

On the successful completion of the course, students will beable :

NO.	COURSEOUTCOMES	PSOs ADDRESSED
CO1	To be skilled in the separation of binary organic mixtures	PSO1&PSO2
CO2	To gain knowledge on the skills of doing micro level analysis	PSO3
CO3	To know the methods of qualitative analysis of organic compounds	PSO5
CO4	To learn about the preparation of suitable derivative of the organic functional groups	PSO2
CO5	To prepare organic compounds.	PSO3

Mapping of COs with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	3	3	2	2	1	2	1	1	1
CO2	2	1	3	2	2	1	2	1	1
CO3	2	1	2	2	3	2	1	2	1
CO4	2	2	1	1	2	3	2	1	1
CO5	1	2	1	2	2	2	3	1	1

Mapping of C0s with POs

CO/PSO	PO1	PO2	PO3	PO4
CO1	3	2	1	1
CO2	2	3	1	1
CO3	3	2	1	1
CO4	2	3	1	1
CO5	3	2	1	1

Note: Strongly Correlated –3 Moderately Correlated– 2

- WeaklyCorrelated-**1**

COURSE DESIGNER:

3. **Dr.M.Priyadharsani**

4. **Dr.V.Aruldeepa**

Forwarded By

HOD'S Signature

SEMESTER –II
For those who joined in 2019 onwards –OLD

20%

PROGRAMME CODE	OURSE CODE	COURSE TITLE	CATEGORY	S/WEEK	REDITS
PSCH	19PG2C10	ORGANIC QUANTITATIVE ANALYSIS	Lab	4	2

Course Descriptive:

This course gives a hands on experience of quantitatively analyzing organic compounds and to synthesis organic compounds using two stages.

Course Objective:

To make the students to estimate quantitatively the givensubstance using suitable procedure and also prepare organic compounds using single stage.

Course Outcomes:

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

- Acquire the knowledge of quantitativeanalysis
- Synthesize organic compounds by singlestage.
- Synthesize organic compounds by doublestage.
- Describe the reactionmechanism.
- Analyse the experimental observations and inferences with theory behindpracticals

Organic Estimations

1. Estimation of Glucose (Lane andeynon'smethod)
2. Estimation of Glucose (Bertrand'smethod)

3. Estimation ofGlycine
4. Estimation of Ethyl MethylKetone

Double stage organic synthesis:
Synthesis of:

1. Benzanilide frombenzophenoneoxime
2. p-bromoanilinefromp-bromoacetanilide
   Usage of Green reagent CAN, KBr instead of Br_2 and Glacial acetic acid)
3. Tribromoanilinefromaniline
   (Usage of Green reagent CAN, KBr instead of Br2 and Glacial acetic acid)
4. P-Nitroaniline fromacetanilide

References:

1. Ganapragasam& Ramamurthy G, Organic Chemistry Lab Manual , 2 nd Ed., S. Vishwanathan Printers and Publishers (P)Ltd.,Chennai,2007.
2. Furniss B S, Hannaford A J, Smith P W G and Tatchell A R, Vogel's Textbook of Practical Organic Chemistry, 5 th Ed., Pearson Publication. Vengataswaran V et al., Basic Principle of Practical Chemistry, Sultan Chand andsons, New Delhi, 1997

COURSE OUTCOMES

On the successful completion of the course, students will beable :

NO.	COURSEOUTCOMES	PSOs ADDRESSED
CO1	To be skilled in the separation of binary organic mixtures	PSO1&PSO2
CO2	To gain knowledge on the skills of doing micro level	PSO3

	analysis	
CO3	To know the methods of qualitative analysis of organic compounds	PSO5
CO4	To learn about the preparation of suitable derivative of the organic functional groups	PSO2
CO5	To prepare organic compounds.	PSO3

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	**3**	**3**	**2**	**2**	**1**	**2**	**1**	**1**	**1**
CO2	**2**	**1**	**3**	**2**	**2**	**1**	**2**	**1**	**1**
CO3	**2**	**1**	**2**	**2**	**3**	**2**	**1**	**2**	**1**
CO4	**2**	**2**	**1**	**1**	**2**	**3**	**2**	**1**	**1**
CO5	**1**	**2**	**1**	**2**	**2**	**2**	**3**	**1**	**1**

Mapping of C0s with POs

CO/PSO	PO1	PO2	PO3	PO4
CO1	**3**	**2**	**1**	**1**
CO2	**2**	**3**	**1**	**1**

CO3	**3**	**2**	**1**	**1**
CO4	**2**	**3**	**1**	**1**
CO5	**3**	**2**	**1**	**1**

Note: Strongly Correlated –3 Moderately Correlated– 2

- WeaklyCorrelated-**1**

COURSE DESIGNER:

5. **Dr.M.Priyadharsani**

6. **Dr.V.Aruldeepa**

Forwarded By

HOD'S Signature

FATIMA COLLEGE (AUTONOMOUS),MADURAI-18

SEMESTER –II

For those who joined in 2022 onwards - NEW

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSCH	19PG2C10	ORGANIC ESTIMATION & PREPARATION - II	Lab	4	2

CourseDescriptive:

Thiscoursegiveshandsonexperienceofquantitativelyanalyzingorganiccompoundsandtosynthesisorganiccompoundsusingtwostages. Thiscourseprovideshands on experience in spectral techniques of UV and IR.

CourseObjective:

Tomakethestudentstoestimate quantitativelythegivensubstance using suitable procedure and also prepare organiccompoundsusingdoublestage.

To gain knowledge of organic spectroscopy (UV and IR), microwave assisted synthesis and structural elucidation of synthesized organic compounds.

Course Outcomes:

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

- Acquire the knowledge of quantitativeanalysis & Synthesize organic compounds by doublestage.
- Synthesize organic compounds by doublestage.
- Describe the reactionmechanism.
- Analyse the experimental observations and inferences with theory behind practicals
- Analyse the prepared organic compounds by spectral techniques (UV and IR)

OrganicEstimations

1. Estimationof Glycine
2. EstimationofGlucose(Bertrand'smethod)
3. EstimationofEthylMethyl Ketone
4. Estimation of Aniline
5. Estimation of phenol

Double stageOrganic synthesis and spectral analysis (UV&IR)

Microwave assisted Synthesisof:

1. Benzanilidefrom benzophenoneoxime
2. p-bromoanilinefromp-bromo acetanilide
   UsageofGreenreagentCAN,KBrinstead ofBr2andGlacialaceticacid)
3. Tribromoanilinefromaniline
   (Usage of Green reagent CAN, KBr instead of Br2 and Glacial acetic acid)
4. P-Nitroaniline from acetanilide
5. Analysis of prepared samples by IR & UV spectral techniques(internal only).

References:

1. Ganapragasam & Ramamurthy G, Organic Chemistry LabManual, 2 ndEd.,S.VishwanathanPrintersand Publishers(P)Ltd.,Chennai,2007.

2. Furniss BS,HannafordAJ,SmithPWG andTatchellAR,Vogel'sTextbookof PracticalOrganicChemistry,5th Ed.,Pearson Publication.Vengataswaran V et al., Basic Principle of Practical Chemistry, Sultan Chand andsons,New Delhi, 1997

COURSE OUTCOMES

On the successful completion of the course, students will beable :

NO.	COURSEOUTCOMES	PSOs ADDRESSED
CO1	To be skilled in the separation of binary organic mixtures	PSO1&PSO2

CO2	To gain knowledge on the skills of doing micro level analysis	PSO3
CO3	To know the methods of qualitative analysis of organic compounds	PSO5
CO4	To learn about the preparation of suitable derivative of the organic functional groups	PSO2
CO5	To prepare organic compounds.	PSO3

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	**3**	**3**	**2**	**2**	**1**	**2**	**1**	**1**	**1**
CO2	**2**	**1**	**3**	**2**	**2**	**1**	**2**	**1**	**1**
CO3	**2**	**1**	**2**	**2**	**3**	**2**	**1**	**2**	**1**
CO4	**2**	**2**	**1**	**1**	**2**	**3**	**2**	**1**	**1**
CO5	**1**	**2**	**1**	**2**	**2**	**2**	**3**	**1**	**1**

Mapping of C0s with POs

CO/PSO	PO1	PO2	PO3	PO4
CO1	**3**	**2**	**1**	**1**

CO2	**2**	**3**	**1**	**1**
CO3	**3**	**2**	**1**	**1**
CO4	**2**	**3**	**1**	**1**
CO5	**3**	**2**	**1**	**1**

Note: Strongly Correlated –3 Moderately Correlated– 2

- WeaklyCorrelated-**1**

COURSE DESIGNER:

7. **Dr.M.Priyadharsani**

8. **Dr.V.Aruldeepa**

Forwarded By

HOD'S Signature

II M.Sc.

SEMESTER –IV

For those who joined in 2019 onwards -OLD

15%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS /WEEK	CREDITS
PSCH	19PG4C17	Physical chemistry-1V (Spectroscopy, Kinetic theory of Gases, Photochemistry and Radiation chemistry)	MAJOR CORE	6Hrs.	5

UNITS

UNIT-I Spectroscopy-I 18hrs

Absorption and emission of Electro Magnetic Radiation -LASER-Interaction of EMR with matter-Einstein coefficients, Microwave, IR and Raman spectroscopy of diatomic molecules, determination of molecular parameters-Vibrational spectra of polyatomic molecules-IR and Raman active modes- overtone and combination bands-Fermi resonance-Group frequencies and coupling interaction.

UNIT-II Spectroscopy-II 18hrs

Electronic spectra of diatomic molecules-molecular Quantum numbers-dissociation energy calculations- BirgeSponer extrapolation technique- fortrat diagram-predissociation spectra of the electronic states of polyatomic molecules-absorption of light- oscillator strength- charge transfer spectra, Photoelectron Spectroscopy- basic principle - UV and X-ray (ESCA) photoelectron spectroscopy, PES of Ar and O_2 and N_2.

UNIT-III Spectroscopy-III 18hrs

ESR spectroscopy- principles of g-factor, experimental methods, spectrum –fine and hyperfine structures- applications.

NQR spectroscopy-Quadrupole moment. Coupling constant- Quadrupole transition- electric field gradient and molecular structure.

Mossbauer spectroscopy - recoilless emission and resonant absorption-experimental methods. Isomer shifts, Quadrupole and magnetic interactions. Applications.

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT-I Spectroscopy-I				
1.1	Microwave spectroscopy- theory, spectra of rigid diatomic rotators ,selection rules, determination of bond length,	2	Chalk & Talk	Black Board
1.2	spectra of polyatomic molecules	2	Chalk & Talk	Black Board
1.3	Effect of isotopic substitution	3	Chalk & Talk	Black
1.4	IR spectroscopy – simple harmonic and unharmonic oscillator, selection rules,	2	Chalk & Talk	Black Board
1.5	spectrum of diatomic vibrating rotator,	3	Chalk & Talk	Black Board
1.6	Raman spectroscopy, quantum theory of Raman scattering, Classical theory of Raman scattering,	2	Chalk & Talk	Black Board
1.7	Rotational Raman spectrum of diatomic molecules, IR and Raman active modes- overtone and combination bands	2	Chalk & Talk	Black Board
1.8	Fermi resonance-Group frequencies and coupling interaction.	2	Chalk & Talk	Black Board
UNIT -2 Spectroscopy-II				
2.1	Electronic spectra of diatomic molecules	2	Chalk & Talk	Black Board

2.2	molecular Quantum numbers- dissociation energy calculations- BirgeSponer extrapolation technique.	4	Chalk & Talk	Black Boar d
2.3	fortrat diagram- predissociation spectra of the electronic states of polyatomic molecules	2	Chalk & Talk	Black Boar d
2.4	Absorption of light- oscillator strength.	1	Chalk & Talk	Black Boar d
2.5	Photoelectron Spectroscopy- basic principle.	2	Chalk & Talk	Black Boar d
2.6	Instrumentation, UV spectroscopy, X-ray (ESCA) photoelectron spectroscopy	3	Chalk & Talk	Black Boar d
2.7	Applications of PES	2	Chalk & Talk	Black Boar d
2.8	PES of Ar, O2 and N2	2	Chalk & Talk	Black Boar d
UNIT -3-Spectroscopy-III				
3.1	NMR Spectroscopy–Principles and instrumentation- ESR spectroscopy, Principle - Comparison of ESR and NMR frequencies,g-factor	2	Chalk & Talk	Black Boar d
3.2	Experimental methods, spectrum- fine and hyperfine structures-applications	4	Chalk & Talk	Black Boar d
3.3	NQR spectroscopy- Quadrupolemoment. Coupling constant, electric field gradient	2	Chalk & Talk	Black Boar d

3.4	Quadrupole transitions of some Nuclei.	3	Chalk & Talk	Black Board
3.5	molecular structure and Applications	2	Chalk & Talk	Black Board
3.6	Mossbauer spectroscopy- Introduction, recoilless emission and resonant absorption,experimental methods.	1	Chalk & Talk	Black Board
3.7	Isomer shifts, Quadrupole Interaction and Zeeman Splitting in Mossbauerspectroscopy	2	Chalk & Talk	Black Board
3.8	Applications of Mossbauer spectroscopy	2	Chalk & Talk	Black Board
UNIT -4 Kinetic theory of gases				
4.1	Equation of state – molecular speeds	2	Chalk & Talk	Black Board
4.2	distribution of molecular velocities- one, two andthree	3	Chalk &	Black
	dimensions		Talk	Board
4.3	Maxwell Boltzmann distribution law-	2.5	Chalk &Talk	Black Board
4.4	Principles of equipartition of energy	2.5	Chalk & Talk	Black Board
4.5	- rotations and vibrations of molecules	2	Chalk & Talk	Black Board
4.6	the molecular collisions- mean free path	2	Chalk & Talk	Black Boar

				d
4.7	transport properties- thermal conductivity	2	Chalk & Talk	Black Board
4.8	viscosity and diffusion of gases.	2	Chalk & Talk	Black Board
UNIT-5 Photochemistry and Radiationchemistry				
5.1	Physical properties of the electronically excitedmolecules	2	Chalk & Talk	Black Board
5.2	excited state dipole moments excited state pKa, excited state redox potential	5	Chalk & Talk	Black Board
5.3	Fluorescence, phosphorescence and other deactivation process	2	Chalk & Talk	Black Board
5.4	Stern –Volmer equation and its applications	1	Chalk & Talk	Black Board
5.5	Photosensitisation and chemiluminescence.	1	Chalk & Talk	Black Board
5.6	Experimental techniques in photochemistry flashphotolysis technique. Radiationchemistry-	3	Chalk & Talk	Black Board
	Introduction, source of high energy			
5.7	Interaction of high energy radiation with matter, radiolysis of water	2	Chalk & Talk	Black Board
5.8	G value, Primary and secondary processes.	2	Chalk & Talk	Black

				Boar d

UNIT-IV Kinetic theory of gases 18hrs

Equation of state –molecular speeds-distribution of molecular velocities- one, two and three dimensions-Maxwell Boltzmann distribution law- Principles of equipartition of energy- rotations and vibrations of molecules- the molecular collisions- mean free path-transport properties-thermal conductivity-viscosity and diffusion of gases.

UNIT-V Photochemistry and Radiation chemistry 18hrs

Physical properties of the electronically excited molecules-excited state dipole moments excited state pKa, excited state redox potential. Fluorescence, phosphorescence and other deactivation process- Stern –Volmer equation and its applications. Photosensitisation and chemiluminescence experimental techniques in photochemistry- flash photolysis technique.

Radiation chemistry- source of high energy- interaction of high energy radiation with matter, radiolysis of water- definition of G value. Primary and secondary process.

Reference Books:

1. C. N. Banwell and E. M. McCash, Fundamentals of Molecular Spectroscopy, 4th edn., Tata McGraw Hill, New Delhi, 2000.
2. R. S. Drago, PhysicaI Methods in Chemistry; Saunders: Philadelphia, 1977.
3. P.W. Atkins and J. de Paula, Physical Chemistry, 7th ed., Oxford University Press, Oxford, 2002.
4. Gilbert W. Castellan, Physical Chemistry, Narosa publishing house, New Delhi, 3rd Edn, 2002.
5. Walter J. Moore, Physical Chemistry, Orient Longmann, London, 5thEdn, 2004.

COURSE CONTENTS & LECTURESCHEDULE:

CIA Evaluation Pattern

Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% ofAssessment -
	Better of W1, W2 5	M1+M2 5+5=10	Mid-Sem.Test 15	Once in a Sem. 5			40	
K1	-	-	-	-	-		-	-
K2	-	2	3	-	5		5	12.5 %
K3	5	3	4	-	12		12	30 %
K4	-	5	4	-	9		9	22.5%
K5	-	-	4	5	9		9	22.5 %
Non-Scho.							5	12.5 %
Total	5	10	15	5	35	5	40 mks.	100 %

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

- ✓ 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 IPG are**:**

K2*-Understand****, K3****-Apply****, K4****-Analyse, K5 -Evaluate***

EVALUATIONPATTERN

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

C1 – Best of Two WeeklyTests

C2 – Average of Two Monthly Tests

C3 - Mid SemTest

C4 – Seminar (Once in aSem.)

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	To Outline the selection rules for rotational andvibrational spectra and rationalize the role of the molecular dipolemoment in the selection rules.	K2,K3, K4 & K5	PSO1, PSO2, PSO3, PSO4, PSO6,PS07

			& PS08
CO 2	To apply knowledge to detailed understanding of electronic states of atoms, molecules, Franck-Condon Principle	K2,K3, K4 & K5	PSO1, PSO2, PSO3, PSO4, PSO6,PS07 & PS08
CO 3	To predict the number of ESR signals of organic radical anions, Complexes and NQR transitions.	K2,K3, K4 & K5	PSO1, PSO2, PSO3, PSO4, PSO6,PS07 & PS08
CO 4	To understand molecular velocities in one, two and three dimensions	K2,K3, K4 & K5	PSO1, PSO2, PSO3, PSO4, PSO6&PS0 8
CO 5	To distinguish between between Fluorescence and Phosphorescence, Primary and secondary processes, radiative and non-radiative transitions,To compare Ground and excited state acidity, dipolemoments and redox potentials	K2, K3, K4& K5	PSO1, PSO2, PSO3, PSO4, PSO6,PS07 & PS08

Mapping of C0s with PSOs

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

Mapping of C0s with POs

CO / PSO	PO1	PO2	PO3	PO4
CO1	3	2	3	1
CO2	3	2	3	1
CO3	3	2	3	1
CO4	3	2	3	1
CO5	3	3	3	1

Note: Strongly Correlated–**3** Moderately Correlated –**2**

♦ Weakly Correlated-**1**

COURSE DESIGNER:

1. **Dr.S.Sukumari**
2. **Dr.K.R.Subimol**

ForwardedBy

S-Tedana.

HOD'S Signature

II M.Sc.

SEMESTER –IV

For those who joined in 2022 onwards-New

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSCH	19PG4C17	Physical chemistry-1V (Spectroscopy, Kinetic theory of Gases, Photochemistry and Radiation chemistry)	MAJOR CORE	6Hrs.	5

COURSE DESCRIPTION

This paper focuses on all the important aspects of Physical concepts of Spectroscopy, Kinetic theory of gases and Photochemistry and Radiation Chemistry

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

- To Outline the selection rules for rotational and vibrational spectra and rationalize the role of the molecular dipole moment in the selection rules.
- To apply knowledge to detailed understanding of electronic states of atoms, molecules, Franck-Condon Principle
- To predict the number of ESR signals of organic radical anions, Complexes and NQR transitions.
- To understand molecular velocities in one, two and three dimensions.
- To distinguish between between Fluorescence and Phosphorescence, Primary and secondary processes, radiative and non-radiative transitions,To compare Ground and excited state acidity, dipole moments and redox potentials

UNIT-I Rotational and Vibrational Spectroscopy

18hrs

Microwave spectroscopy- theory, spectra of rigid diatomic rotators, selection rules, determination of bond length, spectra of polyatomic molecules- Effect of isotopic substitution, IR spectroscopy – simple harmonic and unharmonic oscillator, selection rules, spectrum of diatomic vibrating rotator, Raman spectroscopy, quantum theory of Raman scattering, Classical theory of Raman scattering, Rotational Raman spectrum of

diatomic molecules, IR and Raman active modes- overtone and combination bands- Fermi resonance-Group frequencies and coupling interaction.

UNIT-II Electronic Spectroscopy 18hrs

Electronic spectra of diatomic molecules-molecular Quantum numbers-dissociation energy calculations- BirgeSponer extrapolation technique- fortrat diagram- predissociation spectra of the electronic states of polyatomic molecules. Photoelectron Spectroscopy- basic principle - UV and X-ray (ESCA) photoelectron spectroscopy, PES of Ar, O_2 and N_2,

UNIT-III Resonance and Mossbauer Spectroscopy 18hrs

NMR Spectroscopy –Principles and instrumentation- ESR spectroscopy, Principle - Comparison of ESR and NMR frequencies, g-factor, experimental methods, spectrum –fine and hyperfine structures- applications. NQR spectroscopy- Quadrupole moment, Coupling constant- Quadrupole transition- electric field gradient and molecular structure. Mossbauer spectroscopy - recoilless emission and resonant absorption- experimental methods. Isomer shifts, Quadrupole and magnetic interactions. Applications.

UNIT-IV Kinetic theory of gases 18hrs

Equation of state –molecular speeds-distribution of molecular velocities- one, two and three dimensions-Maxwell Boltzmann distribution law- Principles of equipartition of energy- rotations and vibrations of molecules- the molecular collisions- mean free path- transport properties-thermal conductivity-viscosity and diffusion of gases.

UNIT-V Photochemistry and Radiation chemistry 18hrs

Physical properties of the electronically excited molecules-excited state dipole moments excited state pKa, excited state redox potential. Fluorescence, phosphorescence and other deactivation processes- Stern –Volmer equation and its applications. Photosensitisation and chemiluminescence, Radiation chemistry- source of high energy- interaction of high energy radiation with matter, radiolysis of water- definition of G value. Primary and secondary process.

Reference Books:

6. C. N. Banwell and E. M. McCash, Fundamentals of Molecular Spectroscopy, 4th edn., Tata McGraw Hill, New Delhi, 2000.

7. R. S. Drago, PhysicaI Methods in Chemistry; Saunders: Philadelphia, 1977.

8. P.W. Atkins and J. de Paula, Physical Chemistry, 7th ed., Oxford University Press, Oxford, 2002.

9. Gilbert W. Castellan, Physical Chemistry, Narosa publishing house, New Delhi, 3rd Edn, 2002.

10. Walter J. Moore, Physical Chemistry, Orient Longmann, London, 5thEdn, 2004.

11. K.K.Rohatgi Mukherjee, Fundamentals of photochemistry (Revised edition), Wiley,Eastern Ltd., 1996.

12. H.J. Arnicker, Essentials of Nuclear Chemistry, New Age International Pvt. Ltd., 2005.

COURSE CONTENTS & LECTURESCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT–IRotational and Vibrational Spectroscopy				
1.1	Microwave spectroscopy- theory, spectra of rigid diatomic rotators ,selection rules, determination of bond length,	2	Chalk & Talk	Black Board
1.2	spectra of polyatomic molecules	2	Chalk & Talk	Black Board
1.3	Effect of isotopic substitution	3	Chalk & Talk	Black
1.4	IR spectroscopy – simple harmonic and unharmonic oscillator, selection rules,	2	Chalk & Talk	Black Board
1.5	spectrum of diatomic vibrating rotator,	3	Chalk & Talk	Black Board
1.6	Raman spectroscopy, quantum theory of Raman scattering, Classical theory of Raman scattering,	2	Chalk & Talk	Black Board
1.7	Rotational Raman spectrum of diatomic molecules, IR and Raman active modes- overtone and combination bands	2	Chalk & Talk	Black Board
1.8	Fermi resonance-Group frequencies and coupling interaction.	2	Chalk & Talk	Black Board

UNIT -2 Electronic Spectroscopy				
2.1	Electronic spectra of diatomic molecules	2	Chalk & Talk	Black Board
2.2	molecular Quantum numbers- dissociation energy calculations- Birge Sponer extrapolation technique.	4	Chalk & Talk	Black Board
2.3	fortrat diagram- predissociation spectra of the electronic states of polyatomic molecules	2	Chalk & Talk	Black Board
2.4	Absorption of light- oscillator strength.	1	Chalk & Talk	Black Board
2.5	Photoelectron Spectroscopy- basic principle.	2	Chalk & Talk	Black Board
2.6	Instrumentation, UV spectroscopy, X-ray (ESCA) photoelectron spectroscopy	3	Chalk & Talk	Black Board
2.7	Applications of PES	2	Chalk & Talk	Black Board
2.8	PES of Ar, O_2 and N_2	2	Chalk & Talk	Black Board
UNIT -3Resonance and Mossbauer Spectroscopy				
3.1	NMR Spectroscopy–Principles and instrumentation- ESR spectroscopy, Principle - Comparison of ESR and NMR frequencies, g-factor	2	Chalk & Talk	Black Board

3.2	Experimental methods, spectrum- fine and hyperfine structures-applications	4	Chalk & Talk	Black Boar d
3.3	NQR spectroscopy-Quadrupolemoment.Coupling constant,electric field gradient	2	Chalk & Talk	Black Boar d
3.4	Quadrupole transitions of some Nuclei.	3	Chalk & Talk	Black Boar d
3.5	molecular structure and Applications	2	Chalk & Talk	Black Boar d
3.6	Mossbauer spectroscopy-Introduction, recoilless emission and resonant absorption, experimental methods.	1	Chalk & Talk	Black Boar d
3.7	Isomer shifts, Quadrupole Interaction and Zeeman Splitting in Mossbauer spectroscopy	2	Chalk & Talk	Black Boar d
3.8	Applications of Mossbauer spectroscopy	2	Chalk & Talk	Black Boar d
UNIT -4 Kinetic theory of gases				
4.1	Equation of state – molecular speeds	2	Chalk & Talk	Black Boar d
4.2	distribution of molecular velocities- one, two and three dimensions	3	Chalk & Talk	Black
4.3	Maxwell Boltzmann distribution law-	2.5	Chalk &Talk	Black Boar d
4.4	Principles of equipartition of energy	2.5	Chalk & Talk	Black Boar d

4.5	rotations and vibrations of molecules	2	Chalk & Talk	Black Boar d
4.6	the molecular collisions- mean free path	2	Chalk & Talk	Black Boar d
4.7	transport properties- thermal conductivity	2	Chalk & Talk	Black Boar d
4.8	viscosity and diffusion of gases.	2	Chalk & Talk	Black Boar d
UNIT-5 Photochemistry and Radiationchemistry				
5.1	Physical properties of the electronically excited molecules.	2	Chalk & Talk	Black Boar d
5.2	excited state dipole moments excited state pKa, excited state redox potential	5	Chalk & Talk	Black Boar d
5.3	Fluorescence, phosphorescence and other deactivation process	2	Chalk & Talk	Black Boar d
5.4	Stern –Volmer equation and its applications	1	Chalk & Talk	Black Boar d
5.5	Photosensitisation and chemiluminescence.	1	Chalk &Talk	Black Boar d
5.6	Experimental techniques in photochemistry flash photolysis technique. Radiation chemistry-	3	Chalk & Talk	Black Boar d
	Introduction, source of high energy			
5.7	Interaction of high energy radiation with matter, radiolysis of water	2	Chalk & Talk	Blac k Boar

				d
5.8	G value, Primary and secondary processes.	2	Chalk & Talk	Blac k Boar d

CIA Evaluation Pattern

Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% ofAssessment -
	Better of W1, W2 5	M1+M2 5+5=10	Mid-Sem.Test 15	Once in a Sem. 5			40	
K1	-	-	-	-	-		-	-
K2	-	2	3	-	**5**		**5**	**12.5 %**
K3	5	3	4	-	**12**		**12**	**30 %**
K4	-	5	4	-	**9**		**9**	**22.5%**
K5	-	-	4	5	**9**		**9**	**22.5 %**
Non-Scho.							**5**	**12.5 %**
Total	**5**	**10**	**15**	**5**	**35**	**5**	**40 mks.**	**100 %**

CIA	
Scholastic	**35**
Non Scholastic	**5**
	40

- ✓ **AllthecourseoutcomesaretobeassessedinthevariousCIAcomponents.**
- ✓ **ThelevelsofCIAAssessmentbasedonRevisedBloom'sTaxonomyforIPGare:**

K2*-Understand****, K3****-Apply****, K4****-Analyse, K5 -Evaluate***

EVALUATIONPATTERN

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

C1 – Best of Two WeeklyTests

C2 – Average of Two Monthly Tests

C3 - Mid SemTest

C4 – Seminar (Once in aSem.)

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	To Outline the selection rules for rotational andvibrational spectra and rationalize the role of the molecular dipolemoment in the selection rules.	K2,K3, K4 & K5	PSO1, PSO2, PSO3, PSO4, PSO6,PS07 & PS08
CO 2	To apply knowledge to detailed understanding of electronic states of atoms, molecules, Franck-Condon Principle	K2,K3, K4 & K5	PSO1, PSO2, PSO3, PSO4, PSO6,PS07 & PS08
CO 3	To predict the number of ESR signals of organic radical anions, Complexes and NQR transitions.	K2,K3, K4 & K5	PSO1, PSO2, PSO3, PSO4, PSO6,PS07 & PS08
CO 4	To understand molecular velocities in one, two and three dimensions	K2,K3, K4 & K5	PSO1, PSO2, PSO3, PSO4, PSO6&PS0 8
CO 5	To distinguish between between Fluorescence and Phosphorescence, Primary and secondary processes, radiative and non-radiative transitions,To compare Ground and excited state acidity, dipolemoments and redox potentials	K2, K3, K4& K5	PSO1, PSO2, PSO3, PSO4, PSO6,PS07 & PS08

Mapping of C0s with PSOs

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

Mapping of C0s with POs

CO / PSO	PO1	PO2	PO3	PO4
CO1	3	2	3	1
CO2	3	2	3	1
CO3	3	2	3	1
CO4	3	2	3	1
CO5	3	3	3	1

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

COURSE DESIGNER:

3. Dr.S.Sukumari
4. Dr.K.R.Subim
ol
ForwardedBy

HOD'S Signature

II M.Sc.,CHEMISTRY

SEMESTER –IV

For those who joined in 2019 onwards - OLD

10%

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSCH	19PG4CE3	ANALYTICAL CHEMISTRY	PG Core	5 Hrs.	4

COURSE DESCRIPTION

This paper focuses on all the important aspects of Analytical chemistry techniques and applications of C-programming to solve problems in CHEMISTRY.

COURSE OBJECTIVES

This paper deals with analytical methods. It also deals with programming in C language and its applications to solve problems in chemistry.

UNITS

UNIT –I PROGRAMMING IN C LANGUAGE (15HRS.)

Introduction, Character set in C, Style of C Language – Identifiers and Key words – Constants, Variables and Data types, Operators in C.

Input and Output in C, Control statements in C, Storage classes in C, Functions in C, Arrays and pointers, Preprocessors in C, The type def statement and Files in C language.

UNIT –II APPLICATIONS OF C LANGUAGE IN CHEMISTRY(15HRS.)

Writing the Program using the various features of C language – Determination of mass number of any atom-Determination of electronegativity of an atom from bond energy data using pauling's relation, Calculation of ionic strength, Determination of lattice energy of a crystal using Born-Lande equation, Determination of Shapes of molecules or ions using VSEPR Theory, Detemination of Normality, Molarity and Molality of solutions, Determination of half life of a radioactive nucleus.

UNIT –III ELECTRO ANALYTICAL AND THERMAL METHODS(15HRS.)

Coulometry and coulometric titrations, Cyclic Voltametry, Principles of TGA, and DSC - Applications to simple salts – Oxysalts, Carbonates and complex salts.

UNIT –IV ERROR ANALYSIS AND CHROMATOGRAPHY (15HRS.)

Accuracy and Precision, Determinate and Indeterminate errors, Significant figures, Ways of expresssing accuracy – Absolute and relative error, Standard deviation, The confidence limit, Tests of significance – The F test and The student T test, Rejection of a result – The Q test, Linear least squares to plot the data, Correlation coefficient.

Principles, Adsorption, Partition, ion exchange chromatography, HPLC, Paper and Gas Chromatography.

UNIT –V SPECTROPHOTOMETRIC AND RADIOCHEMICAL METHODS (15 HRS.)

Principles and applications of photometry, Flame emission spectrometry, Atomic absorption spectrophotometry – Principles, Instrumentation (Block diagram), Fluorimetry, and photometric titrations.

REFERENCES:

1. Douglas A. Skoog, Donald M. West and F. James Holler, Fundamentals of analyticalChemistry, Harcourt Asia Pvt. Ltd., 2001.
2. R.A. Day, Jr. and A.L. Underwood, Analytical Chemistry,Prentice-Hall of India, 2001.
3. H. Kaur, Instrumental methods of chemical analysis, PragatiPrakashan, 2003.
4. G.H. Jeffery, J. Bassett, J. Mendham and R.C. Denney, Vogel's Textbook of QuantitativeChemical Analysis, Longman Scientific and Technical, 1989.
5. Balagurusamy E, Programming in ANSI C.

COURSE CONTENTS AND LECTURE SCHEDULE

Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	Seminar 5 Mks.	Better of W1, W2 5+5=10 Mks.	M1+M2 15 Mks	MID-SEM TEST 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	5	-	-	2 ½	-		-	-
K2	-	5	4	2 ½	5		5	12.5 %
K3	-	-	3	5	12		12	30 %
K4	-	-	3	5	9		9	22.5%
Non Scholastic	-	-	-	-	9		9	22.5 %
Total	5	5	10	15	35	5	40	100 %

CIA

Scholastic	35
Non Scholastic	5
	40

✓ **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 II PG are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

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

C1 – Seminar Marks

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	To acquire the complete knowledge of C language	K2, K3, K4 & K5	PSO1& PSO2
CO 2	To develop logics which will help them to create programs, applications ofchemistry problems in C.	K2, K3, K4 & K5	PSO3

CO 3	To explicate the theoretical principles of selected instrumental methods withinelectro analytical and spectrometric/spectrophotometric methods, and maincomponents in such analytical instruments.	K2, K3, K4 & K5	PSO5
CO 4	To explain the confidence level and confidence limit, the sources of random errors and effects of random errors on analytical results.	K2, K3, K4 & K5	PSO2
CO 5	To illuminate the theoretical principles of various separation techniques inchromatography, and typical applications of chromatographic techniques	K2, K3, K4 & K5	PSO3

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	**3**	**3**	**2**	**2**	**1**	**2**	**1**	**1**	**1**
CO2	**2**	**1**	**3**	**2**	**2**	**1**	**2**	**1**	**2**
CO3	**2**	**1**	**2**	**2**	**3**	**2**	**1**	**2**	**1**
CO4	**2**	**2**	**1**	**1**	**2**	**3**	**2**	**1**	**1**
CO5	**1**	**2**	**1**	**2**	**2**	**2**	**3**	**1**	**1**

Mapping of COs with Pos

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	2	1	1
CO2	2	3	1	1
CO3	3	2	1	1
CO4	2	3	1	1
CO5	3	2	1	1

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

COURSE DESIGNER:

Dr.M.Priyadharsani

Forwarded By

HOD' SIGNATURE

II M.Sc.,CHEMISTRY

SEMESTER –IV

For those who joined in 2022 onwards -NEW

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PSCH	19PG4CE3	ANALYTICAL CHEMISTRY	PG Core	4 Hrs.	4

COURSE DESCRIPTION

This paper focuses on all the important aspects of Analytical chemistry techniques and applications of C-programming to solve problems in CHEMISTRY.

COURSE OBJECTIVES

This paper deals with analytical methods. It also deals with programming in C language and its applications to solve problems in chemistry.

UNITS

UNIT –I ERROR ANALYSIS (12HRS.)

Accuracy and Precision, Determinate and Indeterminate errors, Significant figures, Ways of expresssing accuracy – Absolute and relative error, Standard deviation, The confidence limit, Tests of significance – The F test and The student T test, Rejection of a result – The Q test, Linear least squares to plot the data, Correlation coefficient.

UNIT –II CHROMATOGRAPHY

Principles, Adsorption, Partition, ion exchange chromatography, Instrumentation – Applications of TLC, HPLC, Paper Chromatography and Gas Chromatography.

UNIT –III ELECTROANALYTICAL AND THERMAL METHODS(12HRS.)

Coulometry and coulometric titrations, Cyclic Voltametry, Principles of DTA, TGA– Thermogravimetric curve, and DSC - Applications to simple salts – Oxysalts, Carbonates and complex salts.

UNIT –IV SPECTROPHOTOMETRIC AND RADIOCHEMICAL METHODS (12 HRS.)

Principles and applications of photometry, Flame emission spectrometry, Atomic absorption spectrophotometry – Principles, Instrumentation (Block diagram), Fluorimetry, and photometric titrations.

UNIT –V COMPUTERS IN CHEMISTRY (12HRS.)

Introduction, Character set in C, Style of C Language – Identifiers and Key words – Constants, Variables and Data types, Operators in C.

Input and Output in C, Control statements in C, Storage classes in C, Functions in C, Arrays and pointers, Preprocessors in C.

Writing the Program using the various features of C language – Determination of mass number of any atom-Determination of electronegativity of an atom from bond energy data using pauling's relation, Calculation of ionic strength, Determination of Shapes of molecules or ions using VSEPR Theory, Detemination of Normality, Molarity and Molality of solutions, Determination of half life of a radioactive nucleus.

REFERENCES:

1. Douglas A. Skoog, Donald M. West and F. James Holler, Fundamentals of analyticalChemistry, Harcourt Asia Pvt. Ltd., 2001.
2. R.A. Day, Jr. and A.L. Underwood, Analytical Chemistry,Prentice-Hall of India, 2001.
3. H. Kaur, Instrumental methods of chemical analysis, PragatiPrakashan, 2003.
4. G.H. Jeffery, J. Bassett, J. Mendham and R.C. Denney, Vogel's Textbook of QuantitativeChemical Analysis, Longman Scientific and Technical, 1989.
5. Balagurusamy E, Programming in ANSI C.
6. Raman KV, Computers in Chemistry.

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 ERROR ANALYSIS				
1.1	Accuracy and Precision	2	Discussion	PPT & White board

1.2	Determinate and Indeterminate errors	1	Discussion	PPT & White board
1.3	Significant figures, Ways of expressing accuracy	2	Discussion	Black Board
1.4	Absolute and relative error, Standard deviation, The confidence limit	1	Chalk & Talk	LCD
1.5	Tests of significance – The F test and	2	Discussion	PPT & White board
1.6	The student T test, Rejection of a result	2	Lecture	Smart Board
1.7	The Q test, Linear least squares to plot the data, Correlation coefficient.	2	Lecture	Black Board
UNIT -2 CHROMATOGRAPHY				
2.1	Principles, Adsorption	2	Lecture	Black Board
2.2	Partition chromatography	2	Chalk & Talk	Black Board
2.3	Ion exchange chromatography	2	Chalk & Talk	Black Board
2.4	HPLC	2	Chalk & Talk	Black Board
2.5	Paper Chromatography.	2	Chalk & Talk	Black Board
2.6	Gas Chromatography.	2	Chalk & Talk	PPT & White board
UNIT –III ELECTROANALYTICAL AND THERMAL METHODS				

3.1	Coulometry	2	Chalk & Talk	Green Board
3.2	Coulometric titrations	2	Discussion	LCD
3.3	Cyclic Voltametry	2	Chalk & Talk	Black Board
3.4	Principles of TGA	2	Discussion	LCD
3.5	Principles of DSC	2	Lecture	Black Board
3.6	Applications to simple salts	1	Lecture	Black Board
3.7	Applications to Oxysalts	2	Chalk & Talk	Black Board
3.8	Carbonates and complex salts.	2	Chalk & Talk	Green Board
UNIT -4 SPECTROPHOTOMETRIC AND RADIOCHEMICAL METHODS				
4.1	Principles of photometry	2	Chalk & Talk	Black Board
4.2	Applications of photometry	1	Lecture	Black Board
4.3	Flame emission spectrometry	2	Chalk & Talk	Black Board
4.4	Atomic absorption spectrophotometry	1	Chalk & Talk	Black Board
4.5	PrinciplesofFluorimetry	2	Chalk &Talk	BlackBoard
4.6	Instrumentation (Block diagram) Fluorimetry	2	Discussion	LCD
4.7	Photometric titrations.	2	Lecture	Black Board

UNIT -5 COMPUTERS IN CHEMISTRY				
5.1	Introduction, Character set in C, Style of C Language	1	Chalk & Talk	Black Board
5.2	Identifiers and Key words – Constants, Variables and Data types, Operators in C	1	Lecture	Black Board
5.3	Input and Output in C, Control statements in C	1	Chalk & Talk	Black Board
5.4	Storage classes in C, Functions in C, Arrays and pointers, Preprocessors in C.	1	Chalk & Talk	Black Board
5.5	Writing the Program using the various features of C language – Determination of mass number of any atom	2	Chalk &Talk	BlackBoard
5.6	Determination of electronegativity of an atom from bond energy data using pauling's relation, Calculation of ionic strength	2	Chalk & Talk	Black Board
5.7	Determination of Shapes of molecules or ions using VSEPR Theory	2	Discussion	LCD
5.8	Detemination of Normality, Molarity and Molality of solutions, Determination of half life of a radioactive nucleus.	2	Lecture	Black Board

Levels	**C1**	**C2**	**C3**	**C4**	**Total Scholastic Marks**	**Non Scholastic Marks C5**	**CIA Total**	**% of Assessment**

	Seminar 5 Mks.	Better of W1, W2 5+5=10 Mks.	M1+M2 15 Mks	MID-SEM TEST 5 Mks	35 Mks.	5 Mks.	40Mks.	
K1	**5**	**-**	**-**	**2 ½**	**-**		**-**	**-**
K2	**-**	**5**	**4**	**2 ½**	**5**		**5**	**12.5 %**
K3	**-**	**-**	**3**	**5**	**12**		**12**	**30 %**
K4	**-**	**-**	**3**	**5**	**9**		**9**	**22.5%**
Non Scholastic	**-**	**-**	**-**	-	**9**		**9**	**22.5 %**
Total	**5**	**5**	**10**	**15**	**35**	**5**	**40**	**100 %**

CIA

Scholastic	35
Non Scholastic	5
	40

- ✓ **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 II PG are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

EVALUATION PATTERN

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

C1 – Seminar Marks

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	To explain the confidence level and confidence limit, the sources of random errors and effects of random errors on analytical results.	K2, K3, K4 & K5	PSO1& PSO2
CO 2	To illuminate the theoretical principles of various separation techniques inchromatography, and typical applications of chromatographic techniques	K2, K3, K4 & K5	PSO3
CO 3	To explicate the theoretical principles of electro analytical and spectrometric methods	K2, K3, K4 & K5	PSO5
CO 4	To illuminate the theoretical principles of selected instrumental methods and main components in such analytical instruments.	K2, K3, K4 & K5	PSO2

CO 5	To acquire the complete knowledge of C language AND To develop logics which will help them to create programs, applications ofchemistry problems in C.	K2, K3, K4 & K5	PSO3

Mapping of C0s with PSOs

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	3	3	2	2	1	2	1	1	1
CO2	2	1	3	2	2	1	2	1	2
CO3	2	1	2	2	3	2	1	2	1
CO4	2	2	1	1	2	3	2	1	1
CO5	1	2	1	2	2	2	3	1	1

Mapping of C0s with Pos

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	2	1	1
CO2	2	3	1	1
CO3	3	2	1	1
CO4	2	3	1	1
CO5	3	2	1	1

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

COURSE DESIGNER:

Dr.M.Priyadharsani

Forwarded By S-Tedona.