FATIMA COLLEGE (AUTONOMOUS)

Re-Accredited with "A" Grade by NAAC (3rd Cycle)
74th 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. CHEMISTRY

PROGRAMME CODE : PSCH

ACADEMIC YEAR : 2020 - 2021

BOS 2019-2020

Date : 29.02.2020 Time : 10 a.m

External Members :

1. Dr. V.S Vasantha (University Nominee). ABSENT
Professor, Chairperson (i/c)
Department of Natural Products
MKU, Madurai

2. Dr. S. Abraham John.
Professor of Chemistry,
The Gandhigram Rural Institute
(Deemed to be University)
Gandhigram. 29/2/20

3. Dr. N. Rama,
Associate Prof + Head, ABSENT
Dept of chemistry,
Sarah Tucker college
Tirunelveli (MS University).

4. Miss. P. Sharmila, (Alumnus).
Assistant Chemistry,
Keswick Public School, (ICSE),
Madurai 29.2.20

Internal Members:

1. Dr. S. SelvaRani (HOD) — S. SelvaRani
2. Dr. B. Medona. — B. Medona.
3. Dr. S. Sukumari — S. Sukumari
4. Dr. A. Rajeswari — A. Rajeswari
5. Dr. B. Vinosha — B. Vinosha
6. Dr. B. Sugandhana — B. Sugandhana
7. Dr. Sr. Arul Mary. — Sr. Arul Mary
8. Mrs. R. M. Nagalakshmi — R. M. Nagalakshmi
9. Mrs. M. Priyadharshini — M. Priyadharshini
10. Mrs. V. Arul Deepa. — V. Arul Deepa
11. Dr. R. Sarika. — R. Sarika
12. Dr. K. R. SubiMol. — ~~K. R. SubiMol~~

All the suggestions from the previous board (2019-20) were carefully taken into account, necessary changes made in the Syllabi of I & II Semester major papers and implemented from 2019-2020 academic year onwards.

Agenda:

Contents for III & IV Semester papers to be presented for approval.

PG Syllabus for new theory paper in III Semester and Physical Chemistry practicals to be finalised.

Review of all the other papers/courses in V & VI Sem in UG and other PG papers.

The panel of examiners for all the external end semester practical examinations

including the Viva-Voce examination for II PG Project
Change of course title for all theory and Practical courses.
Comments, Suggestions and appreciation by the Board:

* All theory papers to be shared by more than one person.

* Appreciated the department for handling all the courses successfully though the contents seem to be very heavy.

* Appreciated the practice of sending the II M.Sc students to world known reputed Institutions/organization like IGCAR DRDO, CECRI, IIT (Palakkad) (This year 2020-21) and other research centres in and around Madurai.

The following suggestions were made in the curriculum which will be implemented from the forthcoming academic year.

19C3CC7 : Unit III Interhalogen Compounds
BrF_3, IF_3, ClF_5, IF_5 removed

19C3CC8 : Physical Chemistry
Instead of Nuclear Chemistry and Radiation Chemistry, the Unit titles are changed as Nuclear Chemistry I & Nuclear Chemistry II Application should be brought down as the last Unit in Nuclear Chemistry

19C3CC9- Inorganic Qualitative Analysis.
Only Eco-friendly radicals are to be

Retained in the syllabus, Hg^{2+}, Ag^{+} arsenic antimony to be deleted.

19C3SB1 – Agricultural Chemistry.
Water Analysis to be added in Unit V along with Soil analysis

Organic farming can be added in IV unit. In Pesticides Unit (III) natural pesticides to be added.

19C4CC10 : Co-ordination Compounds
Butadiene deleted $Co(CO)_8$ & $Fe_2(CO)_9$ to brought as self study portion.
19C4CC11 (Physical Chem), 19C4CC12 – Org Analysis – no changes made.

19C5CC13 : Organic Chemistry
Optical activity of compounds Other than Carbon (ie Nitrogen and Sulphur) not to be deleted but need not be discussed in a detailed manner.
Diekmann Rearrangement brought from Unit I to Unit II.

19C5CC14 : Physical Chemistry IV.
Problems in Thermodynamics and point group for specific molecules to be added in the self study portion.
the units of are renamed as follows: Unit I. Thermodynamics. I Law
Unit II. II Law of Thermodynamics

Unit III: Applications of II Law
Unit IV: Group theory.
Unit I: Phase rule.

19C5ME1: Spectroscopy Instead of IR - FTIR
Self study - Application/fators affecting ¹H nmr.
19C5SB4: Nanochemistry Changed to Nano Science.
All the VI Semester theory & Practical paper checked & approved.
PG: From next academic year onwards Instead of 2 papers (8 hrs/week), 3 papers (6 hrs/week) to be offered Third paper - Green Chemistry in III Semester. Syllabus prepared
19PG3C11- Organic Chemistry
Allyl system in Pericyclic compounds, 1,3 dipolar addition, Instrumentation (Spectral techniques) & in double resonance to be deleted
NMR Restricted rotation upto AMX, ABX, A_2B_2 only to be included 19PG3CE1: contents to be elaborated, Props & Instrumentation to be Split up.
19PG3C13. Green Chemistry; 12 principles to be included, Instead of Case study, Application of green technique in industries.
Contents of Physical chemistry lab were much appreciated Board Member strongly suggested to have only one End Semester exam for Physical Chemistry lab (6 hrs/week). If at all it has to be offered in two Semesters Electrical expts in one Semester (6 hrs/week) & Non electrical expts (6 hrs/week instead of 8 hrs/week).
The following are the panel member for Practical/viravoce exam
1. Dr. P. Thamaraj (TC, Mdu)
2. Dr. Ilangovan (TC, Mdu)
3. Dr. Dorothy Sheela (AC, Mdu)
4. Dr. Rayappan (Karumathur college)
5. Dr. Gajendran (Madura college)
6. Dr. Gubendran (SN college)
7. Dr. Harihara (Madura College)
8. Dr. Karthick (AC, Mdu)
9. Dr. Ramona (Meenakshi college)
10. Dr. Prakash (TC, Mdu).

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S. Selvarani

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V. Anbalagan

T. B. [signature]

[signature] 29/02/2020

FATIMA COLLEGE (AUTONOMOUS), MADURAI-18

DEPARTMENT OF CHEMISTRY

For those who joined in June 2019 onwards (for the academic year-2020-2021)

PROGRAMME CODE : PSCH

COURSE CODE	COURSE TITLE	Hours/week	Credits	Maximum Marks		
				CIA	ESEM	Total
SEMESTER 1						
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**	4	2	40	60	100
19CIEDC	**ESSENTIALS OF LIFE**	3	3	40	60	100

	LIBRARY	1	-	-	--	
Total		**30**	**19**			
		SEMESTER –11				
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 QUANTITATIVE ANALYSIS**	4	2	40	60	100
19C2EDC	**ESSENTIALS OF LIFE**	3	3	40	60	100
	LIBRARY	1	-	-	-	-
Total		**30**	**19**			
		SEMESTER III				
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
19PG3CE1/19PG 3CE2	**MATERIAL CHEMISTRY/BIO ORGANIC CHEMISTRY**	4	4	40	60	100
19PG3C14	**PHYSICAL CHEMISTRY PRACTICALS-I**	6	4	40	60	100

	(Electrical Experiments)					
19PG3S1C1	**INTERNSHIP**	Off-class	3	50	50	100
	LIBRARY	2	-	-	-	-
Total		**30**	**26**			
		SEMESTER 1V				
19PG4C15	**INORGANIC CHEMISTRY –III** (Organometallic chemistry-I &ii, basic concepts for bio-inorganic chemistry-I &ii and inorganic chains, rings and cages)	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
19PG4CE3/19PG 4CE4	**ANALYTICAL CHEMISTRY/ CHEMICAL ENGINEERING**	4	4	40	60	100
19PG4C18	**PHYSICAL CHEMISTRY PRACTICALS-II** (Non-electrical experiments)	6	4	40	60	100
19PG4CPR	**PROJECT**	offclass	3	50	50	100
	LIBRARY	2	-	-	-	-
Total		**30**	**26**			
	TOTAL	**120**	**90**			
OFF CLASS	**SOFT SKILLS**		4			
	COMPUTER APPLICATION COURSES		4			
	COMPREHENSIVE VIVA		2			
	MOOC COURSES		MIN- 2			

	READING CULTURE		1			
	TOTAL		13+			

M.Sc CHEMISTRY-III SEMESTER – 19PG3C13
GREEN CHEMISTRY

(For those who joined from June 2019 onwards)

6 Hrs/week **5credits**

Course Objectives:

To know eco-friendly methods of synthesis. This helps in planning the synthesis of any type of organic compounds with the revolution of Green Chemistry.

Course Outcome:

After successful completion of the course, the students are able

- To know about the alternative feedstock and to study about the process and advantages of alternative materials
- To get familiarise about the green chemistry technology
- To understand the need of alternative energy sources
- To learn different types of renewable energy sources
- To acquire knowledge about the greener techniques in industries

UNIT I: PRINCIPLES & CONCEPT OF GREEN CHEMISTRY

UNIT II: MEASURING AND CONTROLLING ENVIRONMENTAL PERFORMANCE

UNIT III: EMERGING GREEN TECHNOLOGY AND ALTERNATIVE ENERGY SOURCES

UNIT IV: RENEWABLE RESOURCES

UNIT V: INDUSTRIAL CASE STUDIES

UNIT I: PRINCIPLES & CONCEPT OF GREEN CHEMISTRY

Introduction –Concept and Principles-development of Green Chemistry- Atom economy reactions –rearrangement reactions , addition reactions- atom uneconomic-sublimation-elimination-Wittig reactions-toxicity measures- Need of Green Chemistry in our day to day life.

UNIT II:MEASURING AND CONTROLLING ENVIRONMENTAL PERFORMANCE

Importance of measurement – lactic acid production-safer Gasoline – introduction to life cycle assessment-four stages of Life Cycle Assessment (LCA) –Carbon foot printing-green process Matrics-eco labels -Integrated Pollution and Prevention and Control(IPPC)-REACH (Registration, Evaluation, Authorization of Chemicals)

UNIT III: EMERGING GREEN TECHNOLOGY AND ALTERNATIVE ENERGY SOURCES

Design for Energy efficiency-Photochemical reactions- Advantages-Challenge faced by photochemical process. Microwave technology on Chemistry- Microwave heating – Microwave assisted reactions-Sono chemistry and Green Chemistry –Electrochemical Synthesis-Examples of Electrochemical synthesis.

UNIT IV: RENEWABLE RESOURCES

Biomass –Renewable energy – Fossil fuels-Energy from Biomass-Solar Power- Other forms of renewable energy-Fuel Cells-Alternative economics-Syngas economy- hydrogen economy-Bio refinery chemicals from fatty acids-Polymer from Renewable Resources – Some other natural chemical resources.

UNIT V: GREENER TECHNIQUES IN INDUSTRIES

Methyl Methacrylate (MMA)-Greening of Acetic acid manufacture-Vitamin C-Leather manufacture –Types of Leather –Difference between Hide and Skin-Tanning – Reverse tanning –Vegetable tanning –Chrome tanning-Fat liquoring –Dyeing –Application-Polyethylene- Ziegler Natta Catalysis-Metallocene Catalysis-Eco friendly Pesticides-Insecticides.

Reference Books:

1. Mike Lancaster , Green Chemistry and Introductory text, II Edition
2. P.T.Anastas and J.C Warner, Green Chemistry theory and Practice, Oxford University press, Oxford (1988).
3. P.Tundo*et. al.*, Green Chemistry, Wiley –Blackwell, London (2007).
4. Protti D.Dondi *et.al.*,Green Chemistry
5. T.E Graedel, Streamlined Life cycle Assessment, Prentice Hall, NewJersey (1998).
6. V.K. Ahluwalia,Methods and Reagents of Green Chemistry: An Introduction by Green Chemistry.

PHYSICAL CHEMISTRY PRACTICALS-I-19PG3C14

(Electrical experiments)

SEMESTER –III

(For those who joined from 2019 onwards)

HRS:6 **CREDIT:4**

Course Objective:

This course gives lab experience on physical experiments.

Course outcomes:

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

- Developed expertise relevant to the professional practice of chemistry
- Developed an understanding of the breadth and concepts of physical chemistry
- An appreciation of the role of physical chemistry in the chemical sciences and engineering
- Developed an understanding of the role of the chemist and chemical engineer in tasks employing physical chemistry
- An understanding of methods employed for problem solving in physical chemistry

PHYSICAL CHEMISTRY EXPERIMENTS

- Conductometric Titration of Strong acid with a Strong Base.
- Conductometric Titration of Mixture of Strong acid and Weak acid with a Strong Base.
- Verification of Ostwald's Dilution law and Determination of Dissociation Constant.
- Alkaline Hydrolysis of Ethylacetate by conductometrically.
- Determination of the strength of HCl using pH meter.
- Determination of strength of HCl and CH_3COOH by pH titration.
- Potentiometric Titration of FAS.
- Determination of solubility product by Potentiometrically.

Reference Book

B.Viswanathan, P.S. Raghavan, Practical Physical Chemistry, 2005.

S. Medona.
HEAD
Department of Chemistry
Fatima College (Autonomous)
Madurai 18