

# MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE

(An Autonomous College)

Affiliated to Periyar University, Salem | Accredited by NAAC with 'A' Grade

Recognized by UGC under Section 2(f) & 12 (B)



ESTD-1994

**MUTHAYAMMAL  
COLLEGE OF ARTS  
AND SCIENCE**

(Autonomous)

A UNIT OF VANETRA GROUP

| Learn.  
Lead

[www.muthayammal.in](http://www.muthayammal.in)

## DEGREE OF MASTER OF SCIENCE

Learning Outcomes - Based Curriculum Framework

- Choice Based Credit System

### Syllabus for M.Sc., Organic Chemistry (Semester Pattern)

(For Candidates admitted from the academic year  
2021 -2022 and onwards)

## **MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS), RASIPURAM**

### **VISION**

To redefine the scope of higher education by infusing into each of our pursuits, initiatives that will encourage intellectual, emotional, social and spiritual growth, thereby nurturing a generation of committed, Knowledgeable and socially responsible citizens

### **MISSION**

- To Ensure State of the world learning experience
- To espouse Value Based Education
- To empower rural education
- To instill the spirit of entrepreneurship and enterprises
- To create a resource pool of socially responsible world citizens

### **QUALITY POLICY**

To Seek - To Strive - To Achieve greater heights in Arts and Science, Engineering, Technological and Management Education without compromising on the Quality of Education

## DEPARTMENT OF CHEMISTRY

### VISION

Department is dedicated to provide a high quality education in Chemistry for the students and to create young chemist to survive for social and scientific well-being.

### MISSION

- To develop the department as a research ground for rural students
- To ensure that the department is equipped with highly sophisticated instruments

## PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

**PEO1:** Post Graduates will be able to promote learning environment to meet the industry expectation

**PEO2:** Post Graduates will be incorporated the critical thinking with good Communication and Leadership skills to become a self-employed

**PEO3:** Post Graduates will be upholding the human values and environmental sustenance for the betterment of the society

## GRADUATE ATTRIBUTES

Graduate Attributes of M. Sc., Organic Chemistry are:

**GA 1:** Academic Excellence

**GA 2:** Communication skills

**GA 3:** Critical Thinking

**GA 4:** Problem Solving

**GA 5:** Individual and Team work

**GA 6:** Moral and Ethics

**GA 7:** Environment and Sustainability

### **PROGRAMME OUTCOMES (POs)**

**PO1:** Post graduates will attain profound proficiency and expertise

**PO2:** Post graduates will be ensured with corporative self - directed learning

**PO3:** Post graduates will acquire acumen to handle diverse contexts and function in domains of multiplicity;

**PO4:** Post graduates will exercise intelligence in research Investigations and Introducing innovations.

**PO5:** Post graduates will learn ethical values and commit to Professional ethics

### **PROGRAMME SPECIFIC OUTCOMES (PSOs)**

**PSO1:** Construct a firm foundation in the fundamentals and connect the application with the current developments in Organic Chemistry

**PSO2:** Gain knowledge in laboratory techniques and be able to perform new experiments, obtain experimental data and its interpretation through the theoretical principle

**PSO3:** Possess capacity of working in research labs and related fields, ability to design a synthetic route for new compounds and transform innovative ideas into reality,

**PSO4:** Carry professional skills to handle standard equipment and to analyze the data, to be employed in the various sectors like chemical, pharmaceutical, food, and materials industries

**PSO5:** Stimulate the students to prepare for competitive examinations, and professional careers and get trained for industrial entrepreneurship

**Structure of Credit Distribution as per the TANSCH/UGC guidelines**

S. No.	Study Components	Sem I		Sem II		Sem III		Sem IV		No. of Paper	Total Credit
		No. of Paper	Credit								
1	DISCIPLINE SPECIFIC CORESES(DSC)-THEORY	3	12	3	14	2	10	1	5	9	41
2	DSC-PRACTICAL			3	9			3	9	6	18
3	DISCIPLINE SPECIFIC ELECTIVE COURSES(DSE)	1	4			2	8	1	4	4	16
4	PROJECT WORK							1	5	1	5
5	INTERNSHIP					1	2			1	2
6	GENERIC ELECTIVE COURSES(GEC)-EDC			1	4					1	4
7	HUMAN RIGHTS			1	2					1	2
8	ONLINE - COMPETITIVE EXAMINATION							1	2	1	2
	<b>Cumulative Credits</b>	4	16	8	29	5	20	7	25	24	90

<b>Total No. of Subjects</b>	24
<b>Marks</b>	2200

<b>TOTAL CREDIT</b>	90
<b>EXTRA CREDIT</b>	2
<b>TOTAL CREDITS</b>	92

SEM	COURSE_CODE	TITLE OF THE COURSE	Hrs./W		CREDIT POINTS	MAX. MARKS		
			Lect.	Lab.		CIA	ESE	TOTAL
I	21M1POCC01	ORGANIC CHEMISTRY - I	5	-	4	25	75	100
I	21M1POCC02	INORGANIC CHEMISTRY - I	5	-	4	25	75	100
I	21M1POCC03	PHYSICAL CHEMISTRY - I	5	-	4	25	75	100
I	21M1POCE01	POLYMER CHEMISTRY	5	-	4	25	75	100
I	21M2POCP01	PRACTICAL : ORGANIC CHEMISTRY - I	-	4	-	-	-	-
I	21M2POCP02	PRACTICAL : INORGANIC CHEMISTRY	-	3	-	-	-	-
I	21M2POCP03	PRACTICAL : PHYSICAL CHEMISTRY	-	3	-	-	-	-
I		TOTAL	20	10	16	100	300	400
II	21M2POCC04	ORGANIC CHEMISTRY - II	5	-	5	25	75	100
II	21M2POCC05	INORGANIC CHEMISTRY - II	5	-	5	25	75	100
II	21M2POCC06	PHYSICAL CHEMISTRY - II	5	-	4	25	75	100
II	21M2POCP01	PRACTICAL : ORGANIC CHEMISTRY - I	-	3	3	40	60	100
II	21M2POCP02	PRACTICAL : INORGANIC CHEMISTRY	-	3	3	40	60	100
II	21M2POCP03	PRACTICAL : PHYSICAL CHEMISTRY	-	3	3	40	60	100
II	21M2PCSED1	FUNDAMENTALS OF COMPUTERS AND COMMUNICATION	4	-	4	25	75	100
II	21M2PHUR01	HUMAN RIGHTS	2	-	2	100	-	-
II		TOTAL	21	9	29	320	480	700

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III	21M3POCC07	ORGANIC CHEMISTRY - III	5	-	5	25	75	100
III	21M3POCC08	BIO-ORGANIC CHEMISTRY	5	-	5	25	75	100
III	21M3POCE03	ORGANIC SPECTROSCOPY	5	-	4	25	75	100
III	21M3POCE05	INSTRUMENTAL METHODS OF ANALYSIS	5	-	4	25	75	100
III	21M4POCP04	PRACTICAL : ORGANIC CHEMISTRY - II	-	4	-	-	-	-
III	21M4POCP05	PRACTICAL : ORGANIC CHEMISTRY - III	-	3	-	-	-	-
III	21M4POCP06	PRACTICAL : ORGANIC CHEMISTRY - IV	-	3	-	-	-	-
III	21M3POCIS1	INTERNSHIP	-	-	2	100	-	-
III		<b>TOTAL</b>	<b>20</b>	<b>10</b>	<b>20</b>	<b>200</b>	<b>300</b>	<b>400</b>
IV	21M4POCC09	SYNTHETIC AND INDUSTRIAL ORGANIC CHEMISTRY	5	-	5	25	75	100
IV	21M4POCE07 / 21M4POCE08	MEDICINAL CHEMISTRY / CHEMICAL APPROACH TO NANOMATERIALS	5	-	4	25	75	100
IV	21M4POCP04	PRACTICAL : ORGANIC CHEMISTRY - II	-	4	3	40	60	100
IV	21M4POCP05	PRACTICAL : ORGANIC CHEMISTRY - III	-	4	3	40	60	100
IV	21M4POCP06	PRACTICAL : ORGANIC CHEMISTRY - IV	-	4	3	40	60	100
IV	21M4POCPR1	PROJECT WORK	-	8	5	50	150	200
IV	21M4POCOE1	ORGANIC CHEMISTRY FOR COMPETITIVE EXAMINATIONS	-	-	2	100	-	-
IV		<b>TOTAL</b>	<b>10</b>	<b>20</b>	<b>25</b>	<b>320</b>	<b>480</b>	<b>700</b>
IV		<b>OVERALL TOTAL</b>	<b>71</b>	<b>49</b>	<b>90</b>	<b>940</b>	<b>1560</b>	<b>2200</b>
IV	21M4POCEC1	MOOC Courses offered in SWAYAM / NPTEL	-	-	2	-	-	-

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MUTHAYAMMAL COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)  
RASIPURAM - 637 408,  
NAMAKKAL DISTRICT.

## PG - REGULATIONS

### 1. Internal Examination Marks - Theory

Components	Marks
CIA I & II	10
Attendance	5
Assignment	5
Seminar	5
<b>Total</b>	<b>25</b>

Attendance Percentage	Marks
96 %to 100%	5
91%to 95%	4
86%to 90%	3
81%to 85%	2
75%to 80%	1
Below 75%	0

### 2. Question Paper Pattern for CIA I, II AND ESE (for 75 Marks) (3 hours)

**Section - A (10 Marks)                      (Objective Type)                      10 x 1= 10 Marks**

Answer **ALL** Questions

**ALL questions carry EQUAL Marks**

#### **Section - B (15 Marks)(Analytical Type)**

Answer any **THREE** Questions out of **FIVE** questions                      **3 x 5=15 Marks**

**ALL questions carry EQUAL Marks**

#### **SECTION-D (50 Marks)**

Answer **ALL** the Questions                      **5 x 10 = 50 Marks**

Either or Type.

**ALL Questions Carry EQUAL Marks**

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**Total            75 Marks**  
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(Syllabus for CIA-I 2.5 Unit, Syllabus for CIA-II All 5 Unit)

## 2a) Components for Practical CIA

Components	Marks
CIA -I	15
CIA - II	15
Observation Note	5
Attendance	5
<b>Total</b>	<b>40</b>

## 2b) Components for Practical ESE

Components	Marks
Completion of Experiments	50
Record	5
Viva	5
<b>Total</b>	<b>60</b>

## 3. Internship/Industrial Training, Mini and Major Project Work

Internship/ Field Work Industrial Training		Project Work	
Components	Marks	Components	Marks
<i>CIA</i> <sup>*1</sup>		<i>CIA</i>	
Work Diary	25	a)Attendance Marks	20
Report	50	b)Review Marks	30
Viva-voce	25		50
Examination			
<b>Total</b>	<b>100</b>	<i>ESE</i> <sup>*1</sup>	
		a)Final Report Marks	120
		b)Viva-voce Marks	30
		<b>Total</b>	<b>200</b>

<sup>\*1</sup>Evaluation of report and conduct of viva - voce will be done jointly by Internal and External Examiners

## 4. Components for Human Rights Course (CIA Only)

- The Course Human Rights is to be treated as 100% CIA course which is offered in II Semester for I year PG students.
- Total Marks for the Course = 100

Components	Marks
Two Tests	75
Assignments	25
<b>Total</b>	<b>100</b>

- In case the candidate fails to secure 50 marks, which is the passing minimum, he/she may have to reappear for the same in the subsequent semesters.

## 5. Guidelines for Competitive Exams- Online Mode- Online Exam 3 hours

Components	Marks
100 Objective Type Questions 100*1 = 100 Marks	100

Objective type Questions from Question Bank.

- The passing minimum for this paper is 50%
- In case, the candidate fails to secure 50% passing minimum, he/she may have to reappear for the same in the subsequent semesters.

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M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1POCC01	ORGANIC CHEMISTRY - I	DSC THEORY - I	I	5	3	2	0	4
<b>Objective</b>	Students should learn about various concepts of organic chemistry, Effect of structure on reactivity, Alkaloids and stereochemistry.							
Unit	Course Content			Knowledge Levels	Sessions			
<b>I</b>	<b>Stereochemistry, ORD and CD:</b> Wedge, Fischer, Newmann and Saw-horse formulae and their inter conversion, R and S notation, axial chirality (biphenyls, allenes and spiranes), planar chirality (cyclophanes, ansa compounds and trans cyclooctene), chirality due to helical shape, stereo selective and stereo specific reactions, asymmetric synthesis- Cram's rule. Homotopic, enantiotopic and diastereotopic atoms, groups in organic molecules. ORD & CD curves, octant rule, cotton effect, axial halo ketone rule and its applications			K1,K2	12			
<b>II</b>	<b>Reaction intermediates and aliphatic electrophilic substitution:</b> Reaction intermediates - Formation, stability and structure of carbonium ions, carbanions, carbenes, nitrenes and free radicals Aliphatic electrophilic substitution- SE1, SE2 and SEi mechanisms and electrophilic substitution by double bond shift, hydrogen electrophile-keto-enol tautomerism, halogen electrophile-halogenation of aldehydes and ketones, nitrogen electrophile-aliphatic diazonium coupling, sulphur electrophile- sulphonation and carbon electrophile- Stork-enamine reaction			K2,K3	12			
<b>III</b>	<b>Effect of structure on reactivity:</b> Resonance and field effects, resonance and steric effects, quantitative treatment- the Hammett equation- linear free energy relationship, substituent constant and reaction constant and limitations of Hammett equation, Taft equation, thermodynamically and kinetically controlled reactions, Hammond's postulate, Non- kinetic methods of determining mechanism-isolation, trapping and detection of intermediates, isotopic labeling, crossover experiments, product analysis, stereo chemical evidence, kinetic method -kinetic isotope effect			K3	12			
<b>IV</b>	<b>Aliphatic nucleophilic substitution:</b> The SN1, SN2, SNi and neighbouring group mechanisms, the neighbouring group participation by pi and sigma bonds, Non classical carbocations, nucleophilic substitution at an allylic, aliphatic trigonal and vinylic carbon. Reactivity- effect of substrates structure, attacking nucleophile, leaving group and reaction medium. Ambident nucleophile, Swain- Scott, Grunwald-Winstein relationship, phase transfer catalysis.			K4,K5	12			

<b>V</b>	<b>Alkaloids and Anthocyanins:</b> Synthesis and structural elucidation of morphine, quinine, papaverine and reserpine. General nature of anthocyanins, structure of anthocyanidins, synthesis of pelargonidin chloride, cyanidin chloride, delphinidin chloride and peonidin chloride. Synthesis and structural elucidation of flavones and isoflavones.	K3,K6	12
<b>Course Outcome</b>	CO1: Learn about the concepts and importance of stereochemistry of organic compounds	<b>K1</b>	
	CO2: Understand the reaction intermediates and aliphatic electrophilic substitution	<b>K2</b>	
	CO3: Comprehend the effect of structure on reactivity	<b>K3</b>	
	CO4: Gain in-depth knowledge about aliphatic nucleophilic substitution reactions	<b>K5</b>	
	CO5: Learn about structural elucidation of alkaloids, flavones, isoflavones and anthocyanins	<b>K6</b>	
<b>Learning Resources</b>			
<b>Text Books</b>	<ol style="list-style-type: none"> <li>1. Jerry March, Advanced Organic Chemistry Reactions, Mechanisms and Structure, Fourth Edition, John Wiley and Sons, 1992</li> <li>2. Gould, Mechanism and structure in organic chemistry, Rinehart and Winston, INC, 1960.</li> <li>3. Jagdamba Singh and Yadav, Advanced Organic Chemistry, Pragati Prakashan Publications, Sixth Edition, 2010.</li> </ol>		
<b>Reference Books</b>	<ol style="list-style-type: none"> <li>1. P. S. Kalsi, Stereochemistry and Mechanism through solved problems, Second Edition, New Age International Publishers, 1994.</li> <li>2. D. Nasipuri, Stereochemistry of Organic Compounds, Second Edition, New Age International Publishers, 1994.</li> <li>3. S. M. Mukherji and S. P. Singh, Reaction Mechanism in Organic Chemistry, First Edition, Macmillan, 1976.</li> </ol>		
<b>Website Link</b>	<ol style="list-style-type: none"> <li>1. <a href="https://nptel.ac.in/courses/104/103/104103110/">https://nptel.ac.in/courses/104/103/104103110/</a></li> <li>2. <a href="http://www.nptel.ac.in/courses/104/105/104105086/">http://www.nptel.ac.in/courses/104/105/104105086/</a></li> <li>3. <a href="http://www.nptel.ac.in/courses/104/105/104105040/">http://www.nptel.ac.in/courses/104/105/104105040/</a></li> </ol>		

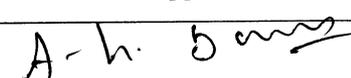
L-Lecture T-Tutorial P-Practical C-Credit

M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21MIPOCC01	ORGANIC CHEMISTRY - I	DSC THEORY - I	I	5	3	2	0	4

### CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	S	L	S	M	M	S	M
CO2	S	S	M	S	M	S	M	M	S	M
CO3	M	L	S	M	S	M	M	S	S	S
CO4	S	M	M	S	M	S	M	S	M	S
CO5	S	M	L	M	S	S	S	L	S	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

<b>Tutorial Schedule</b>	Unit IV- neighbouring group mechanisms Group discussions, Unit V- Synthesis- Seminar
<b>Teaching and Learning Methods</b>	Smart-Classroom, Google meet, Demo classes
<b>Assesment Methods</b>	Unit test, Internal examinations, Semester examinations

Designed By	Verified By	Approved By
MYB . A . DHIVYA	Dr . P . SUMATHI	A - h . S 

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P. Sumathi



M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1POCC02	INORGANIC CHEMISTRY - I	DSC THEORY - II	I	5	3	2	0	4
<b>Objective</b>	To learn about the structure and bonding of the molecule, boron compounds, solid state and nuclear chemistry.							
Unit	Course Content						Knowledge Levels	Sessions
<b>I</b>	<p><b>Structure and Bonding:</b> Hard and Soft acids and bases - classifications, Acid-Base strength, hardness, symbiosis, Theoretical basis of Hardness and Softness, applications of HSAB. Rings – Phosphazenes - Structure, Craig and Peddock model, Dewar model, polyorganophosphazenes, Polysulphur – nitrogen compounds.</p> <p>Inorganic polymers – Silicates - structure, Pauling's rule, properties, correlation and application; Molecular sieves.</p> <p>Polyacids - Isopolyacids of V, Cr, Mo and W; Heteropolyacids of Mo and W (only structural aspects)</p>						K1,K2	12
<b>II</b>	<p><b>Boron compounds and Clusters:</b> Boron hydrides – polyhedral boranes, hydroborate ions – a general study of preparation, properties and structure, STYX numbers, Wade's rules. Carboranes – types such as closo- and Nido - preparation, properties and structure. Metallocarboranes – a general study.</p> <p>Metal clusters – Chemistry of low molecularity metal clusters only – structure of <math>Re_2Cl_8</math>; multiple metal – metal bonds.</p>						K1,K3	12
<b>III</b>	<p><b>Solid State:</b>Types of solids - close packing of atoms and ions-bcc, fcc and hcp, voids and their types - Goldschmidt radius ratio-derivation-its influence on structures.</p> <p>Structures of NaCl, NiAs, CdI<sub>2</sub>, Pervoskite, rutile, fluorite and antiferite - zinc blende and wurtzite.</p> <p>Defects in solids - Point defects, line defects and surface defects; Dislocations-Non- stoichiometric compounds; Use of X-ray powder data in identifying inorganic crystalline solids</p>						K2,K5	12

IV	<p><b>Nuclear Chemistry – I:</b>The Nucleus - subatomic particles and their properties - mass defect - binding energy - n/p ratio in stable and metastable nuclei - Different types of nuclear forces - Liquid drop model and shell model. Modes of radioactive decay - Theory of alpha decay, beta decay and gamma radiation, Orbital electron capture, nuclear isomerism - internal conversion.</p> <p>Detection and determination of activity - GM, Scintillation and Cherenkov counters Particle Accelerators: Linear accelerator- cyclotron, synchrotron, betatron and bevatron.</p>	K2	12
V	<p><b>Nuclear Chemistry – II:</b> Nuclear Reactions: Q-value, columbic barrier - nuclear cross section-different types of nuclear reactions - projectile capture - particle emission, spallation, fission and fusion - product distributions - Theories of fission, use of fission products, fissile and fertile isotopes - U-238,U-235, Pu-239, Th-232 – stellar energy - synthesis of new elements.</p> <p>Radio-Isotopes: Applications - isotopes as tracers - neutron activation analysis and isotopic dilution analysis - uses in structure and mechanistic studies - Carbon dating – Radio pharmacology, Radiation protection and safety precautions - Disposal of nuclear waste.</p>	K3,K4	12
Course Outcome	<b>CO1:</b> Learn the basics of hard, soft acids and bases and structure of inorganic polymers and polyacids	K1	
	<b>CO2:</b> Understand the Nucleus-subatomic particles properties and different types of nuclear forces	K2	
	<b>CO3:</b> Gain knowledge about different types of nuclear reactions and radio isotopes.	K3	
	<b>CO4:</b> Acquire brief knowledge about Boron compounds and Clusters	K3	
	<b>CO5:</b> To Study and determinethe structure of crystal systems and their defects	K4	
<b>Learning Resources</b>			
<b>Text Books</b>	1.F. A Cotton and Wilkinson, Advanced Chemistry Emelius and Sharpe, Modern Aspects of Inorganic Chemistry. 2.A. R. West, Basic Solid State Chemistry, John Wiley, 1991 3.J. D. Lee, Concise Inorganic Chemistry		
<b>Reference Books</b>	1.H. A. O. Hill and P. Day, Physical methods in advanced Inorganic chemistry, John Wiley,1986 2.G. S. Manku, Inorganic Chemistry, T. M. H. Co., 1984 3.K. F. Purcell and J. C. Kotz, Inorganic Chemistry, WB Saunders Co., USA,1977		

<b>Website Link</b>	1. <a href="http://www.t.soka.ac.jp/chem/iwanami/inorg/INO_ch2.pdf">http://www.t.soka.ac.jp/chem/iwanami/inorg/INO_ch2.pdf</a> 2. <a href="http://onlinelibrary.wiley.com/doi/book/10.1002/9781119275602">http://onlinelibrary.wiley.com/doi/book/10.1002/9781119275602</a> 3. <a href="https://www.sas.upenn.edu/~mcnemar/apchem/nuclear.pdf">https://www.sas.upenn.edu/~mcnemar/apchem/nuclear.pdf</a>
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L-Lecture      T-Tutorial      P-Practical      C-Credit

Course Code	Course Title	Course Type	Se m	Ho urs	L	T	P	C
21M1PO CC02	INORGANIC CHEMISTRY - I	DSC THEORY - II	I	5	3	2	0	4

### CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PS O1	PS O2	PS O3	PS O4	PS O5
CO1	S	M	M	M	M	S	M	M	S	M
CO2	S	M	S	M	L	S	M	S	S	M
CO3	S	M	S	S	M	S	M	M	S	M
CO4	S	S	M	S	S	M	M	M	S	S
CO5	M	S	M	M	S	M	S	M	S	M
Level of Correlation between CO and PO	L-LOW	M-MEDIUM			S-STRONG					

<b>Tutorial Schedule</b>	Unit - IV- Nuclear isomerism-Seminar, Unit - V - Nuclear isomerism- Group discussion.
<b>Teaching and Learning Methods</b>	Chalk and talk, Online courses, Smart class room
<b>Assesment Methods</b>	Unit test, Internal assesment, Semester examination

<b>Designed By</b>	<b>Verified By</b>	<b>Approved By</b>
Mr.V.SANTHOSHKUMAR	Dr. P. SUMATHI	<i>A. h. om</i>

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*P. Sumathi*



**M.Sc-Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1POCC03	PHYSICAL CHEMISTRY - I	DSC THEORY - III	I	5	3	2	0	4
<b>Objective</b>	To study in detail the basic concepts and applications of classical and statistical thermodynamics, chemical kinetics, quantum chemistry and group theory.							
Unit	Course Content	Knowledge Levels	Sessions					
<b>I</b>	<b>Classical Thermodynamics – I:</b> Concept of chemical Potential - Determination of chemical potential - Direct Method and Method of Intercepts – variation of chemical potential with temperature and pressure - Fugacity – Methods of determination of fugacity – Variation of fugacity with temperature and pressure. Standard states for gases, liquids, solids and components of solutions. Solution of electrolytes – Concept of ionic strength - mean ionic activity and mean ionic activity coefficient – determination of activity coefficient from freezing point, EMF and solubility measurements	K1,K2	12					
<b>II</b>	<b>Statistical and Irreversible Thermodynamics:</b> Concept of thermodynamical and mathematical probabilities – Distribution of distinguishable and non – distinguishable particles - microstates and macrostates. Ensembles - Maxwell’s distribution law of molecular velocities - Evaluation of average velocity, root mean square velocity and most probable velocity from distribution law of molecular velocities - Maxwell–Boltzmann, Bose-Einstein and Fermi- Dirac statistics - comparisons Partition functions – rotational, vibrational, translational and electronic partition functions - Expression of thermodynamic properties in terms of partition function – Einstein and Debye theory of heat capacities of solids.	K2, K3	12					
<b>III</b>	<b>Chemical Kinetics – I:</b> Theories of reaction rates – Arrhenius theory, Hard sphere collision theory and transition state theory of reaction rates – Comparison of collision theory and activated complex theory – Lindemann and Hinshelwood theories of unimolecular reaction rates. Reactions in solutions – comparison between gas phase and solution reactions – influence of solvent, ionic strength and pressure on reactions in solution. Kinetics of complex reactions – reversible reactions, consecutive reactions – Parallel reactions and Chain reactions – Rice–Herzfeld mechanism for hydrogen - bromine, gas phase pyrolysis of methane	K1, K3	12					

	and formation of phosgene reactions - explosion limits. Study of fast reactions: Relaxation methods - temperature and pressure jump methods - Stopped flow technique, flash photolysis and Crossed molecular beam method.		
<b>IV</b>	<b>Quantum Chemistry – I:</b> Planck's theory of black body radiation – Photoelectric effect; de – Broglie equation – Heisenberg uncertainty principle – Compton effect - quantum mechanical postulates – Schrodinger equation and its solution to the problem of a particle in one and three dimensional boxes – the harmonic oscillator-Application of Schrödinger equation to rigid rotator and hydrogen atom – origin of quantum numbers – probability distribution of electrons. Approximation methods –Perturbation and Variation methods – Slater determinant - application to hydrogen and helium atom — Spin-orbit interaction – LS coupling and JJ coupling – ground state term symbols for simple atoms.	K3, K4	12
<b>V</b>	<b>Group Theory – I:</b> Symmetry elements and symmetry operations – Point groups – identification and representation of groups – comparison of molecular and crystallographic symmetry – Reducible and irreducible representation – Direct product representation - Great Orthogonality Theorem and its consequences – Character table and its uses.	K4, K5	12
<b>Course Outcome</b>	<b>CO1:</b> To Learn the various thermodynamic concepts pertaining to chemical reactions	K1	
	<b>CO2:</b> Understand the concepts of statistical thermodynamics and apply it to various chemical systems	K2	
	<b>CO3:</b> Gain Knowledge about various theories of chemical reactions and apply to study reaction rates in solution and its applicaation in studying complex chemical reactions	K3	
	<b>CO4:</b> Comprehend the various concepts require to explain the origin of quantum mechanics and apply it to chemical system	K4	
	<b>CO5:</b> Correlate the concept of group theory	K5	
<b>Learning Resources</b>			
<b>Text Books</b>	1. S. Glasstone, Thermodynamics for chemists, Affiliated East West press, New Delhi, 1960 2. K. J. Laidler, Chemical Kinetics, Harper and Row, Newyork, 1987 3. J. Rajaram and J. C. Kuriacose, Kinetics and mechanism of chemical transformation, Macmillan India Ltd., 1993		

<b>Reference Books</b>	1. W. J. Moore, Physical Chemistry, Orient Longman, London, 1972 2. J. W. Moore and R. G. Pearson, Kinetics and Mechanism, 1981 3. I.N. Levine, Quantum Chemistry, Allyn and Bacon, Boston, 1983
<b>Website Link</b>	1. <a href="https://www.youtube.com/channel/UCFT8FrUgKXdoYA1hrcVeX8Q/videos">https://www.youtube.com/channel/UCFT8FrUgKXdoYA1hrcVeX8Q/videos</a> 2. <a href="https://nptel.ac.in/courses/104108057">https://nptel.ac.in/courses/104108057</a> 3. <a href="https://nptel.ac.in/courses/104104081">https://nptel.ac.in/courses/104104081</a>

L-Lecture T-Tutorial P-Practical C-Credit

M.Sc-Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1POCC03	PHYSICAL CHEMISTRY - I	DSC THEORY - III	I	5	3	2	0	4

#### CO-PO Mapping

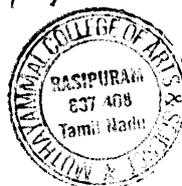
CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	M	S	M	M
CO2	S	M	S	L	S	S	S	S	M	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	M	M	L	M	S	S	M	M	M
CO5	S	S	S	M	S	S	M	S	M	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

<b>Tutorial Schedule</b>	Unit III Arrhenius theory - Group discussions, Unit V- Point groups - Seminar
<b>Teaching and Learning Methods</b>	Smart-Classroom, Google meet, Demo classes
<b>Assesment Methods</b>	Unit test, Internal examinations, Semester examinations

<b>Designed By</b>	<b>Verified By</b>	<b>Approved By</b>
Dr. N. NITHIYA	Dr.P.SUMATHI	<i>A. h. Somy</i>

*N. Nithiya*

*P. Sumathi*



**M.Sc-Organicchemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1POCE01	POLYMER CHEMISTRY	DSE - I	I	5	3	2	0	4
<b>Objective</b>	To study the basic concepts in Polymers, molecular weight determination, polymer process and applications of commercial and conducting polymers.							
Unit	Course Content	Knowledge Levels	Sessions					
<b>I</b>	<b>Basic Concepts:</b> Monomers, repeat units, degree of polymerization, Linear, branched and network polymers, Addition polymerization, Condensation polymerization, Mechanism of free radical, cationic and anionic polymerization and co-ordination polymerization. Ziegler-Natta catalyst. Kinetics of free radical, cationic, anionic and co-polymerisation. Determination of Reactivity ratio, Reactivity ratio and co-polymerisation behaviour.	K1, K2 & K3	12					
<b>II</b>	<b>Molecular Weight and Physical Properties:</b> Concept of Average molecular weight, number- average, weight- average molecular weight and viscosity- average molecular weights. Determination of molecular weight - viscosity, light scattering, osmotic and ultra centrifugation methods. Physical properties- crystalline melting point, glass transition temperature, relationship between T <sub>m</sub> and T <sub>g</sub> and Determination of T <sub>g</sub> .	K2, K4	12					
<b>III</b>	<b>Polymer Processing and Polymerization Techniques:</b> Polymers processing- Plastics, elastomers and fibres. Compounding, Processing techniques- calendering, die casting, injection molding, thermofoaming and fibre spinning. Polymerization techniques- Bulk polymerization, solution polymerization, suspension polymerization, emulsion polymerization and melt polycondensation.	K2	12					
<b>IV</b>	<b>Commercial Polymers:</b> Synthesis and applications of polyethylene, polyvinyl chloride, polyamide, polyester, phenol resins, epoxy resins, silicone polymers, polybenoxazoles, polyimidazole, polyurethane, polymethylmethacrylate, poly (tetrafluoro ethylene) and polyacrylonitrile.	K2, K3	12					

V	<b>Conducting Polymers:</b> Conducting polymers- Introduction, Electrochemical doping, Electrochemical synthesis and applications of polypyrrole, polythiophene, polyindole, polyaniline, polyacetylene and poly(p-phenylene).	K3, K4	12
<b>Course Outcome</b>	CO1: Get basic ideas about the monomer, polymers and polymerization.	K1	
	CO2: Understand the principles of molecular weight determination methods and apply them in determining the molecular weight of polymers	K2	
	CO3: Knowledge about polymer processing and polymer techniques	K3	
	CO4: Comprehend the various methods of preparing commercial polymers and it's applications	K4	
	CO5: Understand the synthesis and applications of conducting polymers	K4	
<b>Learning Resources</b>			
<b>Text Books</b>	1. L. Gupta, Polymer Science, Pragathi Prakashan, 2019 2. R. Gowariker, N. V. Viswanathan, J. Sreedhar, Polymer Science, New Age International Private Limited, 1986. 3. K. Ahluwalia and Anuradha Mishra, A Text Book: Polymer Science, Ane Books, First Edition, 2008.		
<b>Reference Books</b>	1. F. N. Billmeyer, Text Book of Polymer Science, Wiley-Interscience Publication, Third edition, 2007 2. P. J. Flory, Principles of Polymer Chemistry, Asian Books, First Edition, 2006. 3. George Odian, Principles of Polymerization, John Wiley, Fourth Edition, 2007.		
<b>Website Link</b>	1. <a href="https://www.youtube.com/watch?v=k_RErdKwaAg">https://www.youtube.com/watch?v=k_RErdKwaAg</a> 2. <a href="https://nptel.ac.in/courses/104105124">https://nptel.ac.in/courses/104105124</a> 3. <a href="https://nptel.ac.in/courses/105106205">https://nptel.ac.in/courses/105106205</a>		

L-Lecture T-Tutorial P-Practical C-Credit

**M.Sc-Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M1POCE01	POLYMER CHEMISTRY	DSE - I	I	5	3	2	0	4

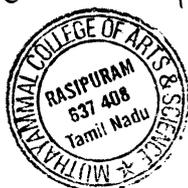
**CO-PO Mapping**

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	S	S	M	S	M	S
CO2	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	M
CO4	S	M	S	S	S	S	M	S	S	S
CO5	S	S	M	M	S	S	S	M	M	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

<b>Tutorial Schedule</b>	Unit-III - Polymers processing - Seminar, Unit - II- Determination of molecular weight- Group discussion & Quiz.
<b>Teaching and Learning Methods</b>	Smart board classes, Google meet, Demo class, Online courses
<b>Assesment Methods</b>	Unit test, Internal test, Assignment, university examination

Designed By	Verified By	Approved By
Dr. N. SUDHA	Dr.P.SUMATHI	<i>A. h. Sanyal</i>

*N. Sudha*      *P. Sumathi*



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2POCC04	ORGANIC CHEMISTRY - II	DSC THEORY - IV	II	5	5	0	0	5
<b>Objective</b>	To understand the basic concepts of aromaticity, Elimination reaction, Aromatic electrophilic and Nucleophilic substitution reactions and Organic pericyclic reactions							
Unit	Course Content						Knowl edge Levels	Sessions
I	<p><b>Aromaticity:</b> Aromaticity - Aromaticity in benzenoid, non-benzenoid, (2, 6, 10 &amp; 18 electrons systems) and hetero cyclic compounds. NMR concept of Aromaticity and non-aromaticity, systems of 10 electrons and more than 10 electrons (14, 18) annulenes, concept of anti-aromaticity and homoaromaticity, anti-aromaticity in (12, 14) annulenes, non-aromaticity, alternate and non-alternant hydrocarbons, Aromaticity in fullerenes, Mobius Aromaticity.</p>						K1, K2, K4	12
II	<p><b>Elimination and Free radicals:</b> The E1, E2, E1CB mechanisms, orientation of the double bond - Hofmann, Saytzeff and Bredt rules, competition between Elimination and substitution, mechanism of pyrolytic elimination, Chugaev and Cope Elimination reactions. Reactions of free radicals - polymerization, addition, halogenation, aromatic substitution and rearrangement. Reactivity - reactivity on aliphatic, aromatic substrate, reactivity in the attacking radical and effect of solvents.</p>						K2, K3	12
III	<p><b>Aromatic electrophilic and nucleophilic substitution:</b> The arenium ion mechanism, orientation and reactivity in monosubstituted benzene ring - o, m, p- directing groups, ortho, para ratio, ipso attack, Vilsmeier-Haack, Jacobson and Scholl's reactions. The S<sub>N</sub>Ar, S<sub>N</sub>1 and benzene mechanisms, Reactivity - effect of substrate structure, leaving group and attacking nucleophiles.</p>						K1, K3	12
IV	<p><b>Organic Photo chemistry:</b> The fate of excited molecules, Jablonski diagram, Norrish type I and type II reactions, photo reduction of ketones, Paterno-Buchi reactions, photo chemistry of arenes, photo oxidation, (formation of peroxy compounds), photo isomerisation (cis-trans), photo addition of olefin and amines to aromatic compounds. Fries, di-pi methane rearrangements, rearrangement of 4, 4- diphenyl cyclohexadienone.</p>						K2, K3	12

<b>V</b>	<b>Pericyclic reactions:</b> Classification, basic concept of orbital symmetry, Woodward-Hofmann rules. Electrocyclic reactions - concept of con- and dis- rotation, cyclisation of butadiene and 1,3,5 - hexatriene - correlation diagram and FMO approach. Cycloaddition reactions - supra-facial and antara-facial addition, theory of (2+2) and (4+2) cycloaddition reactions - correlation diagram and FMO approach. Sigmatropic migration of hydrogen and carbon, Sommelet-Hauser, Cope and Claisen rearrangements.	K3 &K4	12
<b>Course Outcome</b>	<b>CO1:</b> Learn about the aromaticity of organic compounds and analyze the organic structures	K1	
	<b>CO2:</b> Comprehend the organic reaction mechanisms of elimination reactions and free radicals	K2	
	<b>CO3:</b> Knowledge about the aromatic electrophilic and nucleophilic substitution reactions	K3	
	<b>CO4:</b> An exposure about Organic Photochemistry and the various concepts	K3	
	<b>CO5:</b> Analyze the electrocyclic & cycloaddition reactions in Pericyclic reactions	K4	
<b>Learning Resources</b>			
<b>Text Books</b>	1. Jerry March, Advanced Organic Chemistry - Reactions, Mechanisms and Structure, Fourth Edition, John Wiley and Sons, 1992. 2. Francis A. Carey, Organic Chemistry, Third Edition, The McGraw Hill Companies, Inc., 1996. 3. P. S. Kalsi, Organic Reactions and Mechanisms, Second Edition, New Age International Publishers, 2002.		
<b>Reference Books</b>	1. S. H. Pine, J. B. Hendrickson, D. J. Cram and G. S. Hammond, Organic Chemistry, Fourth Edition., McGraw Hill Company, 1980. 2. R. O. C. Norman, Principles of Organic Synthesis, Second Edition, Chapman and Hall, 1978. 3. L. F. Fieser and M. Fieser, Organic Chemistry, Asia Publishing House, Bombay, 2000.		
<b>Website Link</b>	1. <a href="https://nptel.ac.in/courses/104106077">https://nptel.ac.in/courses/104106077</a> 2. <a href="https://nptel.ac.in/courses/104101005">https://nptel.ac.in/courses/104101005</a> 3. <a href="https://nptel.ac.in/courses/122106029">https://nptel.ac.in/courses/122106029</a>		

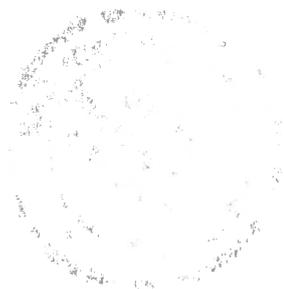
L-Lecture

T-Tutorial

P-Practical

C-

Credit



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2POCC04	ORGANIC CHEMISTRY - II	DSC THEORY - IV	II	5	5	0	0	5

**CO-PO Mapping**

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	L	M	S	S	M	M	M	S
CO2	S	M	M	M	S	S	M	M	M	S
CO3	S	S	M	M	S	S	S	M	M	S
CO4	S	S	M	M	S	S	S	M	M	S
CO5	S	M	M	L	S	S	M	M	M	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRO NG						

<b>Tutorial Schedule</b>	Seminars, Group discussion
<b>Teaching and Learning Methods</b>	Smart board classes, Google meet, Demo class, Online courses
<b>Assesment Methods</b>	Unit test, Internal test, Assignment, university examination

Designed By	Verified By	Approved By
Dr. P. SUMATHI	Dr. P. SUMATHI	<i>A. h. 5000</i>

*P. Sumathi P. Sumathi*



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2POCC05	INORGANIC CHEMISTRY - II	DSC THEORY - V	II	5	5	0	0	5
<b>Objective</b>	To learn the various theories of coordination compounds							
Unit	Course Content					Knowledge Levels	Sessions	
I	<p><b>Theories of coordination compounds:</b> VB theory - CFT - Splitting of d orbital in ligand field and different symmetries - CFSE - Factors affecting the magnitude of <math>10 Dq</math> - Evidence for crystal field stabilization (Structural and thermodynamic effects) - Spectrochemical series - Site selection in spinels - tetragonal distortion from octahedral symmetry - Jahn-Teller distortion - Nephelauxetic effect - MO theory octahedral - tetrahedral and Square planar complexes - pi-bonding and molecular orbital theory - experimental evidence for pi-bonding.</p>					K1, K2	12	
II	<p><b>Stability and Stereochemical Aspects:</b> Stability of complexes - thermodynamic aspects of complex formation - factors affecting stability stability correlations - statistical and chelate effects - Determination of stability constants - polarographic, photometric and potentiometric methods. Stereochemical aspects - stereoisomerism in inorganic complexes, isomerism arising out of ligand distribution and ligand conformation, chirality. Macrocyclic ligand types - porphyrins, corrins, Schiff bases, crown ethers, cryptates and catenands (simple complexes).</p>					K2, K3 & K4	12	
III	<p><b>Reaction Mechanism of transition metal complexes:</b> Energy profile of a reaction - reactivity of metal complexes - inert and labile complexes - kinetic application of valence bond and crystal field theories - kinetics of octahedral substitutions - acid hydrolysis - factors affecting acid hydrolysis - base hydrolysis - conjugate base mechanism - direct and indirect evidences in favour of conjugate mechanism - anation reactions - reactions without metal ligand bond cleavage. Substitution reactions in square planar complexes - the trans effect- mechanism of the substitution reactions. Redox reactions- electron transfer reactions - mechanism of one electron transfer reactions - outer sphere type reactions - cross reactions and Marcus- Hush theory - inner sphere type reactions.</p>					K3, K4	12	

IV	<b>Electronic Spectra of Complexes:</b> Spectroscopic Term symbols for dn ions - derivation of term symbols and ground state term symbol - Hund's rule; Selection rules - break down of selection rules, spin-orbit coupling - band intensities - weak and strong field limits - correlation diagram; Energy level diagrams; Orgel and Tanabe-Sugano diagrams; effect of distortion and spin orbit coupling on spectra; Evaluation of Dq and B values for octahedral complexes of Nickel; Charge transfer spectra. Spectral properties of Lanthanides and Actinides.	K3, K4	12
V	<b>Bonding in Organometallic Complexes and metal carbonyls:</b> Definition of organometallic compound - 18 electron rule - effective atomic number rule - classification of organometallic compounds - the metal carbon bond types - ionic bond - sigma covalent bond - electron deficient bond - delocalised bond - dative bond - metal carbonyl complexes - synthesis - structure and reactions of metal carbonyls - the nature of M-CO bonding- binding mode of CO and IR spectra of metal carbonyl- metal carbonyl anions - metal carbonyl hydrides - metal carbonyl halides - metal carbonyl clusters - Wades rule and isolobal relationship.	K3	12
Course Outcome	CO1: Understand the splitting of d-orbitals and MO diagram of Inorganic complexes	K1	
	CO2: Learn the stability of various complexes and determine the isomerism in various complexes	K2	
	CO3: Predict the kinetics and reaction mechanisms of Inorganic complexes	K3	
	CO4: Impart knowledge about Electronic Spectra of Complexes and evaluate the spectral properties	K4	
	CO5: Provide the knowledge about the Bonding in Organometallic Complexes and metal carbonyls.	K5	
<b>Learning Resources</b>			
Text Books	1. J. E. Huheey, E. A. Keiter and R. L. Keiter, Inorganic Chemistry - Principles of structure and reactivity, Fourth Edition, Pearson Education, 2002 2. S. F. A. Kettle, Coordination compounds, ELBS, 1973 3. J. Haiduc and J. J. Zuckerman, Basic organometallic chemistry, Walter de Gruyter, Berlin, 1985		
Reference Books	1. Organometallics 1, complexes with transition metal - carbon - bonds, Bockmann, Oxford science publications, Oxford, 1996 2. Organometallics 2, complexes with transition metal - carbon - bonds, Bockmann, Oxford science publications, Oxford, 1996 3. G. W. King, Spectroscopy and Molecular Structure, Holt Rinehart and Winston, 1964.		
Website Link	1. <a href="https://nptel.ac.in/courses/104108062">https://nptel.ac.in/courses/104108062</a> 2. <a href="https://nptel.ac.in/courses/104105085">https://nptel.ac.in/courses/104105085</a> 3. <a href="https://nptel.ac.in/courses/104106064">https://nptel.ac.in/courses/104106064</a>		

L-Lecture      T-Tutorial    P-Practical                      C-Credit

**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2POCC05	INORGANIC CHEMISTRY - II	DSC THEORY - V	II	5	5	0	0	5

**CO-PO Mapping**

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	L	S	S	M	M	M	S
CO2	S	M	M	M	S	S	M	M	M	S
CO3	S	S	M	M	S	S	S	M	M	S
CO4	S	M	M	M	S	S	M	M	M	S
CO5	S	M	L	M	S	S	M	M	M	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

<b>Tutorial Schedule</b>	Seminars, Group discussion
<b>Teaching and Learning Methods</b>	Smart board classes, Google meet, Demo class, Online courses
<b>Assesment Methods</b>	Unit test, Internal test, Assignment, university examination

Designed By	Verified By	Approved By
Mrs. M. SARANYA	Dr. P. SUMATHI	<i>A. h. bany</i>

*M. Saranya*

*P. Sumathi*



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2POCC06	PHYSICAL CHEMISTRY - II	DSC THEORY - VI	II	5	4	1	0	4
<b>Objective</b>	Comprehend the various concepts of quantum chemistry, group theory and spectroscopy and apply the concepts in real life using electrochemistry							
Unit	Course Content						Knowledge Levels	Sessions
<b>I</b>	<b>Quantum Chemistry - II:</b> Theory of chemical bonding - Born-Oppenheimer approximation - LCAO-MO approximation for hydrogen molecule ion and hydrogen molecule - Valence Bond theory of hydrogen molecule - Concept of hybridisation - sp, sp <sup>2</sup> and sp <sup>3</sup> - hybridisation - Huckel Molecular Orbital (HMO) theory for conjugated π- systems application to ethylene, butadiene and benzene - Self consistent field approximation - Hartree and Hartree-Fock self consistent field theory.						K1,K3	12
<b>II</b>	<b>Group Theory - II:</b> Symmetry selection rules for vibrational, Electronic and Raman Spectra - determination of vibrational modes in non-linear molecules such as H <sub>2</sub> O, NH <sub>3</sub> , CH <sub>4</sub> , XeF <sub>4</sub> , - symmetry of hybrid orbitals in non- linear molecules (H <sub>2</sub> O, NH <sub>3</sub> , CH <sub>4</sub> , XeF <sub>4</sub> , PCl <sub>5</sub> ) -Electronic spectra of formaldehyde. <b>Spectroscopy:</b> Rotational spectroscopy - Rigid Rotor - Intensity of spectral lines - Effect of isotopic substitution on the rotation spectra. Vibrational spectroscopy - harmonic oscillator - anharmonic oscillator - Hot bands - selection rules - Overtones and combination frequencies - Fermi Resonance. Raman spectroscopy - Raman Effect (quantum theory) - Rotational and Vibrational Raman Spectra - Mutual Exclusion Rule. Electronic spectroscopy - Electronic spectra of diatomic molecules - vibrational coarse structure - Franck - Condon Principle						K2, K4	12
<b>III</b>	<b>Surface Chemistry and Catalysis: Adsorption:</b> Physical and chemical adsorption - adsorption isotherms - Langmuir, Freundlich and B.E.T adsorption isotherms - measurement of surface area from B.E.T - Catalysis - acid-base catalysis - heterogeneous catalysis - Enzyme catalysis - effect of substrate concentration - Michaelis - Menten equation - effect of pH and temperature.						K3,K4	12

IV	<b>Electrochemistry - I:</b> Ions in solutions - Debye - Huckel theory of strong electrolytes - Debye-Huckel-Onsager equation - verification and limitation - Debye - Huckel limiting law and its extension. Electrode - Electrolyte interface - adsorption at electrified interface - electrokinetic phenomena - Tiselius method of separation of proteins - Membrane potential - Lippmann capillary equation - Electrical double layers - Helmholtz Perrin, Gouy- Chapman and Stern models.	K4, K5	12
V	<b>Electrochemistry - II:</b> Polarisation and over voltage - Butler-Volmer equation - diffusion current - exchange and equilibrium current density - Hydrogen and oxygen evolution reactions. Corrosion and passivation of metals - Pourbaix and Evans diagrams - Prevention of corrosion - Electrochemical energy systems - Primary and secondary batteries - (dry cells, Lead-Acid storage batteries, Silver-Zinc cell and Nickel-Cadmium battery) - Fuel cells - Electrodeposition - principles and applications.	K4, K5	12
Course Outcome	CO1: Apply and evaluate the bonding energy of molecules using the principles of Quantum Chemistry	K1	
	CO2: Analyze the structure of molecules by using Group theory and understand the basics of molecular spectroscopy	K2	
	CO3: Apply the concepts of chemistry in studying the reactions occurring on surfaces and with catalysts	K3	
	CO4: Analyse about the electrical double layer and evaluate its implications in real life	K4	
	CO5: Evaluate the reactions occurring at electrode surfaces and the various electrochemical energy systems	K5	
<b>Learning Resources</b>			
Text Books	1. R. K. Prasad, Quantum Chemistry, Wiley Eastern, New Delhi, 1992 2. S.C. N. Banwell, Fundamentals of Molecular Spectroscopy, McGraw Hill, New York, 1966 3. K. V. Raman, Group theory and its application to chemistry, Tata McGraw Hill Publishing Co., 1990		
Reference Books	1. S.J. O. M. Bockris and A. K. N. Reddy, Electrochemistry, Vols I and II, Plenum, New York, 1977 2. P. W. Atkins, Molecular Quantum Mechanics, Oxford University Press, Oxford, 1983 3. Raymond Chang, Basic Principles of Spectroscopy, McGraw Hill Ltd., New York, 1971		
Website Link	1. <a href="https://nptel.ac.in/courses/104106132">https://nptel.ac.in/courses/104106132</a> 2. <a href="https://nptel.ac.in/courses/104106083">https://nptel.ac.in/courses/104106083</a> 3. <a href="https://www.youtube.com/channel/UCFT8FrUgKXdoYA1hrcVeX8Q/videos">https://www.youtube.com/channel/UCFT8FrUgKXdoYA1hrcVeX8Q/videos</a>		

L-Lecture

T-  
Tutorial

P-Practical

C-  
Credit

**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2POCC06	PHYSICAL CHEMISTRY - II	DSC THEORY - VI	II	5	4	1	0	4

**CO-PO Mapping**

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	L	S	S	M	M	M	S
CO2	S	S	M	L	S	S	S	M	M	S
CO3	S	S	M	M	S	S	S	M	M	S
CO4	S	M	M	M	M	S	M	M	M	M
CO5	S	M	M	M	S	S	M	M	M	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

<b>Tutorial Schedule</b>	Unit- II Spectroscopy- Seminars, Group discussion
<b>Teaching and Learning Methods</b>	Smart board classes, Google meet, Demo class, Online courses
<b>Assesment Methods</b>	Unit test, Internal test, Assignment, university examination

Designed By	Verified By	Approved By
Dr. N. NITHIYA	Dr. P. SUMATHI	<i>A. V. Sanyal</i>

*N. Nithiya*

*P. Sumathi*



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2POCP01	ORGANIC CHEMISTRY - I	DSC PRACTICAL - I	II	3	0	0	3	3
<b>Objective</b>	To learn the separation techniques and systematic analysis of organic mixtures and how to distinguish between aromatic-aliphatic, saturated-unsaturated compounds and to find out elements present and functional groups and develop the skill for the preparation of organic compounds involving the following reactions: hydrolysis, acetylation, bromination, nitration, benzylation and oxidation motivate the students to understand the basic principles.							
S.No.	List of Experiments / Programmes						Knowledge Levels	Sessions
1	Identification of components in a two component mixture and preparation of their derivatives Determination of boiling point/melting point for components and melting point for their derivatives.						K1, K3	15
2	Preparations: 1. Beta naphthyl methyl ether from beta-naphthol 2. s-Benzyl isothiuronium chloride from benzylchloride 3. Beta glucose penta acetate from glucose 4. ortho-Benzoyl benzoic acid from phthalicanhydride 5. Resacetophenone from resorcinol 6. Para - nitrobenzoic acid from para nitrotoluene 7. Meta - nitroaniline from meta dinitrobenzene 8. Methyl orange from sulphanilic acid 9. Anthraquinone from anthracene 10. Benzhydrol from benzophenone.						K1, K3	15
<b>Course Outcome</b>	CO1: Get an insight into compound mixture separation and analysis of compounds and apply it for future applications						K2	
	CO2: To understand the separation techniques and systematic analysis of organic mixtures						K2	
	CO3: To distinguish between aromatic-aliphatic, saturated-unsaturated compounds and to find out elements present and functional groups						K3	
	CO4: To develop skill for the preparation of organic compounds involving the following reactions: hydrolysis, acetylation, bromination, nitration, benzylation and oxidation						K4	
	CO5: To evaluate the idea about separation and recrystallisation.						K5	
<b>Learning Resources</b>								

<b>Text Books</b>	1. Raj K. Bansal, Laboratory manual of Organic Chemistry, Third Edition., New Age International (P) Ltd, 1996. 2. Gnanapragasam, Ramamurthy, Organic lab Manual, Viswanathan. S Publishers Pvt Ltd, 2009.
<b>Reference Books</b>	B. S. Furniss, A. J. Hannaford, P. W. G. Smith and A. R. Tatchell, Vogel's Practical Organic Chemistry, Fifth Edition., ELBS, 1989.
<b>Website Link</b>	1. <a href="https://nptel.ac.in/content/storage2/courses/105101010/downloads/Lecture27.pdf">https://nptel.ac.in/content/storage2/courses/105101010/downloads/Lecture27.pdf</a> 2. <a href="https://www.toppr.com/guides/chemistry/organic-chemistry/qualitative-analysis-of-organiccompounds/">https://www.toppr.com/guides/chemistry/organic-chemistry/qualitative-analysis-of-organiccompounds/</a> 3. <a href="https://www.youtube.com/watch?v=7bmQkQW8bbs">https://www.youtube.com/watch?v=7bmQkQW8bbs</a> 4. <a href="https://www.youtube.com/watch?v=wRAo-M8xBHM">https://www.youtube.com/watch?v=wRAo-M8xBHM</a>

L-Lecture

T-Tutorial

P-  
Practical

C-  
Credit

**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Se m	Hour s	L	T	P	C
21M2POCP01	ORGANIC CHEMISTRY - I	DSC PRACTICAL - I	II	3	0	0	3	3

**CO-PO Mapping**

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	M	S	M	M	M	M
CO2	M	S	M	L	M	M	S	M	L	M
CO3	M	S	M	M	S	M	S	M	M	S
CO4	M	M	M	S	L	M	M	M	S	S
CO5	M	S	M	M	M	M	S	M	M	M
Level of Correlation between CO and PO	L- LOW	M-MEDIUM		S- STRONG						

Tutorial Schedule	Nil
Teaching and Learning Methods	Demo classes
Assesment Methods	Observation, Record, Class Praticals, University model practicals

Designed By	Verified By	Approved By
Mr. S. RAMKUMAR	Dr. P. SUMATHI	<i>A. h. Sanyal</i>



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2POCP02	INORGANIC CHEMISTRY - I	DSC PRACTICAL - II	II	3	0	0	3	3
<b>Objective</b>	To improve the skill in the qualitative analysis of mixture of four cations containing two common and two rare. To impart the skill in estimation of metal ions by colorimetric method.							
S.No.	List of Experiments / Programmes						Knowledge Levels	Sessions
1	Part I Semimicro qualitative analysis of mixtures containing the following cations to be tested W, Tl, Pb, Se, Te, Mo, Cu, Bi, Cd, Tl, Ce, Th, Zr, V, Cr, Fe, Ti, Zn, Ni, Co, Mn, Ca, Ba, Sr, Li and Mg.						K1, K4	15
2	Part II Colorimetric analysis Visual and Photometric determination of Iron, Nickel, Manganese and Copper						K3, K4	15
<b>Course Outcome</b>	CO1: Get an insight into salt mixture and analyze the common and rare cations						K2	
	CO2: To understand the principles behind of mixture of cations						K2	
	CO3: Know about the methods involved in preparing few inorganic complexes						K3	
	CO4: To analysis of mixture of cations each consisting of two familiar metal cations and two less familiar metal cations						K5	
	CO5: To evaluate the estimation of metal ions colorimetry						K6	
<b>Learning Resources</b>								
<b>Text Books</b>	V. Ramanujam, Inorganic Semimicro Qualitative analysis, National Publishing Co., 1971.							
<b>Reference Books</b>	G. Svehla, Vogel's qualitative Inorganic analysis, Sixth Edition, Orient Longman, 1987.							
<b>Website Link</b>	1. <a href="https://youtu.be/bo7UMCTRNI4">https://youtu.be/bo7UMCTRNI4</a> 2. <a href="https://youtu.be/8JuX8IJrcr8">https://youtu.be/8JuX8IJrcr8</a>							

L-Lecture

T-Tutorial P-

C-Credit

Practical

**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2POCP02	INORGANIC CHEMISTRY - I	DSC PRACTICAL - II	II	3	0	0	3	3

**CO-PO Mapping**

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	S	L	M	M	M	S	S
CO2	M	M	M	S	S	M	M	M	S	S
CO3	M	S	M	M	S	M	S	M	M	S
CO4	M	M	M	M	S	M	M	M	M	S
CO5	M	M	L	S	M	M	M	S	S	M
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Nil
Teaching and Learning Methods	Demo classes
Assesment Methods	Observation, Record, Class Praticals, University model practicals

Designed By	Verified By	Approved By
Mrs. M. SATHYA	Dr. P. SUMATHI	<i>A. h. Bann</i>

*Sathya*

*P. Sumathi*



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2POCP03	PHYSICAL CHEMISTRY - I	DSC PRACTICAL - III	II	3	0	0	3	3
<b>Objective</b>	To perform experiments in potentiometry, Conductometry, Electrochemistry and Chemical kinetics.							
S.No.	List of Experiments / Programmes						Knowledge Levels	Sessions
1	<b>Viscosity:</b> 1. Viscosity Variation of viscosity of liquids with temperature 2. Determination of the partial molar volume of glycine /methanol/ formic acid /sulphuric acid by graphical method and by determining the densities of the solutions of different compositions. 3. Study the surface tension-concentration relationship of solutions (Gibb's equation)						K1, K3	5
2	<b>Electromotive Force:</b> 1. Determination of Standard Potentials ( Cu, Ag and Zn) 2. Determination of pH and pKa values using Quinhydrone electrodes 3. Determination of dissociation constant of acetic acid by titrating it with sodium hydroxide using quinhydrone as an indicator electrode and calomel as a reference electrode.						K2, K1	5
3	<b>Potentiometric Titrations:</b> 1. Titration of mixture of acids against strong base 2. Titration of Ferrous ammonium sulphate against potassium permanganate. 3. Titration of mixture of halides Vs AgNO <sub>3</sub>						K3	5
4	<b>Chemical Kinetics:</b> 1. Determination of rate constant and order of reaction between potassium persulphate and potassium iodide and determine the temperature coefficient and energy of activation of the reaction. 2. Study the primary salt effect on the kinetics of ionic reactions and test the bronsted relationship (iodide ion is oxidised by persulphate ion) 3. Study the kinetics of acid hydrolysis of the ethyl						K4	5

	acetate determine the activation energy and temperature coefficient of the reaction. 4. Study the kinetics of the reaction between acetone and iodine in acidic medium and determine the order with respect to iodine and acetone.		
5	<b>Phase diagram:</b> Construction of phase diagram for a simple binary system (naphthalene - phenanthrene or benzophenone - diphenylamine).	K5	5
6	<b>Conductivity Experiments:</b> 1. Determination of equivalent conductance of a weak acid at different concentrations and verify Oswald's dilution law and calculation of the dissociation constant of the acid. 2. Determination of equivalent conductance of a strong electrolyte at different concentrations and examine the validity of the Onsager's equation. 3. Titration of a mixture of HCl and CH <sub>3</sub> COOH against NaOH	K6	5
Course Outcome	CO1: To study kinetics of simple reactions.	K1	
	CO2: Get an insight into applications of conductometric methods.	K2	
	CO3: To distinguish between strong acid and weak acid.	K3	
	CO4: Construct the phase diagram for a simple binary system.	K4	
	CO5: To Evaluate partial molar volume of viscosity methods.	K5	
<b>Learning Resources</b>			
Text Books	B. Viswanathan, P.S. Raghavan, Practical Physical Chemistry, Third Edition.		
Reference Books	A.J. Findlay, Kitchener, Practical Physical Chemistry, Ninth Edition.		
Website Link	1. <a href="http://youtu.be/-GS6uoFf3qQ">http://youtu.be/-GS6uoFf3qQ</a> 2. <a href="http://youtu.be/6CC9byzWszk">http://youtu.be/6CC9byzWszk</a> 3. <a href="http://youtu.be/SGXNLKGEv_g">http://youtu.be/SGXNLKGEv_g</a>		

L-Lecture

T-Tutorial P-

Practical

C-Credit



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2POCP03	PHYSICAL CHEMISTRY - I	DSC PRACTICAL - III	II	3	0	0	3	3

**CO-PO Mapping**

CO Number	PO 1	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	S	S	L	M	M	S	S	S
CO2	S	S	M	S	S	S	S	M	S	S
CO3	S	M	M	M	S	S	M	M	M	S
CO4	M	M	S	S	L	M	M	S	S	M
CO5	M	S	S	M	M	M	S	S	M	M
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

<b>Tutorial Schedule</b>	Viva-voce preparation
<b>Teaching and Learning Methods</b>	Demo classes
<b>Assesment Methods</b>	Observation, Record, Class Praticals, University model practicals

Designed By	Verified By	Approved By
Mr.V.SANTHOSHKUMAR	Dr.P.SUMATHI	<i>A. h. Sankar</i>



**M.Sc- Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3POCC07	ORGANIC CHEMISTRY - III	DSC THEORY - VI	III	5	4	1	0	5
<b>Objective</b>	To study and understand the addition reactions, organic synthesis, oxidation-reduction reactions and rearrangements and their applications in structural elucidation of steroids.							
Unit	Course Content	Knowledge Levels	Sessions					
<b>I</b>	<p><b>Oxidation and Reduction Reactions: Oxidation Reactions:</b> Dehydrogenation by quinones, selenium dioxides, ferricyanide, manganese dioxide, permanganate, mercuric acetate, lead tetra acetate, and OsO<sub>4</sub> oxidation of saturated hydrocarbons, alkyl groups, alcohols, halides and amines</p> <p><b>Reactions involving cleavage of C-C bonds: cleavage of double bonds;</b> oxidative decarboxylation, allylic oxidation, Oxidation by chromium trioxide - pyridine, Dimethyl sulphoxide – Di cyclohexyl carbodiimide (DMSO-DCC).</p> <p><b>Reduction Reactions:</b> Replacement of oxygen by hydrogen - Wolff Kishner and Clemmenson and Rosenmund reductions with mechanism; Electrochemical and photochemical reduction, Trialkyl and triphenyl tin hydrides.</p> <p>McFadyen-Stevens reduction, Homogeneous hydrogenation, Reduction by metal hydrides and alkoxides with stereochemistry, Hydroboration with cyclic systems, Removal of Oxygen from substrate; Reduction with cleavage; MPV, Bouveault-Blanc reduction, reduction involving anionic attack.</p>	K1, K2 & K3	12					
<b>II</b>	<p><b>Reagents in Organic Synthesis:</b> Synthesis of simple organic molecules using standard reactions like acylation and alkylation of enamines and active methylene compounds. Sulphur ylides. Robinson annulations</p> <p>Protection and deprotection of functional groups (R-OH, R-CHO, RCOR, R- NH<sub>2</sub> and R-COOH) Reagents and their uses: DCC, trimethyl silyl chloride, 1,3 - dithiane (umpolung), diisobutylaluminium hydride (DIBAL), 9BBN, Baker's yeast, Gilman's reagent Wilkinson's catalyst and Polyphosphoric acid.</p>	K2, K3 & K4	12					
<b>III</b>	<p><b>Addition to Carbon – Carbon and Carbon – Hetero atom multiple bonds:</b> Addition of halogen and nitrosyl chloride to olefins, hydration of olefins and acetylenes, hydroboration, hydroxylation – cis-hydroxylation (OsO<sub>4</sub> &amp; KMnO<sub>4</sub>), trans-hydroxylation (Prevost reaction and Woodward modification), epoxidation, Michael addition, 1,3-dipolar addition, carbenes and their additions, Diels - Alder reaction.</p> <p>Mechanism and applications of Mannich, Stobbe, Darzen Glycidic ester condensation. Benzoin condensation, Peterson olefination (Silyl Wittig reaction), Strecker synthesis, Wittig, Wittig - Horner, Perkin, Thorpe, Ritter and Prins reactions.</p>	K3, K4	12					

IV	<b>Molecular rearrangements:</b> Study of the following rearrangements with mechanism Wagner-Meerwin, Demjanov, Dienone-phenol, Favorski, Baeyer-Villiger, Wolff, Stevens, Von-Richter, Beckmann, Smiles, Neber and Hofmann – Martius rearrangements.	K3,K5	12
V	<b>Steroids and steroid hormones:</b> Structural elucidation of cholesterol, ergosterol and oestrone. Conversion of cholesterol into oestrone, testosterone and progesterone. Artificial hormones – synthesis and properties of stilboestrol and hexoestrol.	K3,K5& K6	12
<b>Course Outcome</b>	CO1: Understand the mechanism of oxidation and reduction reactions.	K1	
	CO2: To interpret the mechanisms and applications of various reagents used in organic conversions	K3	
	CO3: Gain in depth knowledge in reactions involving addition to carbon-carbon and carbon-heteroatom multiple bonds	K4	
	CO4: Comprehend the mechanism in molecular rearrangements and its applications.	K5	
	CO5: To acquire depth knowledge about Steroids and steroid hormones and their structural elucidation	K6	
<b>Learning Resources</b>			
<b>Text Books</b>	<ol style="list-style-type: none"> <li>1. Jerry March, Advanced Organic Chemistry -Reactions, Mechanisms and Structure, Fourth Edition, John Wiley and Sons, 1992</li> <li>2. Francis A. Carey, Organic Chemistry, Third Edition, The McGraw Hill Companies, Inc.,1996</li> <li>3. P. S. Kalsi, Organic Reactions and Mechanisms, Second Edition, New Age International Publishers, 2002</li> </ol>		
<b>Reference Books</b>	<ol style="list-style-type: none"> <li>1. S. H. Pine, J. B. Hendrickson, D. J. Cram and G. S. Hammond, Organic Chemistry, Fourth Edition., McGraw Hill Company, 1980</li> <li>2. S. M. Mukherji and S. P. Singh, Reaction Mechanism in Organic Chemistry, Macmillan, 1984</li> <li>3. Neil Issac, Physical Organic Chemistry, J. Wiley, NewYork, 1987</li> </ol>		
<b>Website Link</b>	<ol style="list-style-type: none"> <li>1. <a href="https://nptel.ac.in/courses/104103023">https://nptel.ac.in/courses/104103023</a></li> <li>2. <a href="https://nptel.ac.in/courses/104103111">https://nptel.ac.in/courses/104103111</a></li> <li>3. <a href="https://nptel.ac.in/courses/104101127">https://nptel.ac.in/courses/104101127</a></li> </ol>		

L-Lecture

T-Tutorial

P-Practical

C-Credit

**M.Sc- Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3POCC07	ORGANIC CHEMISTRY - III	DSC THEORY - VI	III	5	4	1	0	5

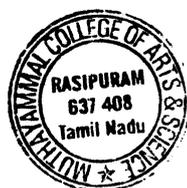
**CO-PO Mapping**

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	M	M	S	S	S	M	S	S	S
CO4	S	S	S	M	S	S	S	S	M	S
CO5	M	S	M	S	L	M	S	M	S	M
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

<b>Tutorial Schedule</b>	Unit-III-Naming reaction, Seminar& Group discussion
<b>Teaching and Learning Methods</b>	Chalk andTalk,Smart class & Demo class
<b>Assesment Methods</b>	Unit test, Internal test, Assignment ,Semester examination

Designed By	Verified By	Approved By
Mrs.M.SATHYA	Dr.P.SUMATHI	<i>A. h. Sanyal</i>

*(Signature of Mrs. M. Sathya)*      *(Signature of Dr. P. Sumathi)*



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3P OCC08	BIO-ORGANIC CHEMISTRY	DSCTHEOR Y-VIII	III	5	5	0	0	5
<b>Objective</b>	To learn about the structure and biological applications of carbohydrates, vitamins, terpenoids, nuclei acids and proteins.							
Unit	Course Content	Knowledge Levels	Sessions					
<b>I</b>	<b>Carbohydrates:</b> Introduction,Classification,Determination of configuration and ring size of D-glucose and D-fructose, Ferrier, Hanesian reactions and Ferrier rearrangement, Determination of structure and ring size of sucrose and maltose,Structure and biological functions of starch and cellulose.Structure and properties of Cyclodextrin	K1, K2	12					
<b>II</b>	<b>Vitamins:</b> Vitamins-Structural elucidation of Ascorbicacid, Cyanocobalamine,Retinol,Thiamine,Riboflavin and Pyridoxin. Structure and applications of Pantothenicacid, Tocopherols and Vitamin K,	K2, K3 & K4	12					
<b>III</b>	<b>TerpenoidsandCarotenoids:</b> Terpenoids–Structural elucidation of Menthol, Abieticacid, Squalene and Phytol. Carotenoids–Synthesis of Alpha Carotene, Beta Carotene and VitaminA2	K4, K5	12					
<b>IV</b>	<b>NucleicacidandLipids:</b> Nucleicacid–Structure of Nucleosides, Nucleotides- DNA,Types of RNA and their structures- Replication,Transcription,Translation,Genetic code and Fingerprinting. Lipids–Introduction, Classification and structures of Phospholipids and Glycolipids–Liposomes–lipidbilayers–Structure and applications.	K1, K3	12					
<b>V</b>	<b>Proteins,EnzymesandCoenzymes:</b> Proteins-Biological importance, Peptide synthesis by solid phase and solution phase methods.Enzymes-Classification,Mechanism of enzyme action-lock	K3, K4						

	and key model, induced Fit theory and substrate strain theory and Mechanism of enzyme catalysis. Coenzymes-Introduction, Classification, Structure and biological functions of Coenzyme A, Thiamine pyrophosphate (TPP), Pyridoxal phosphate (PLP), Flavin adenine nucleotide FAD, FADH <sub>2</sub> and Adenosinetriphosphate (ATP).		12
<b>Course Outcome</b>	CO1: To remember the fundamentals of carbohydrate and its classification	K1	
	CO2: Understand the structure of vitamins using the concepts of organic chemistry	K2	
	CO3: Apply the concepts of GOC for structural elucidation of terpenoids and synthesis of carotenoids	K3	
	CO4: Comprehend about the structure and biological functions of proteins and enzymes	K4	
	CO5: Analyze the structure and biological applications of nucleic acids and lipids	K5	
<b>Learning Resources</b>			
<b>Text Books</b>	<p>1. Jerry March, Advanced Organic Chemistry - Reactions, Mechanisms and Structure, Fourth Edition, John Wiley and Sons, 1992</p> <p>2. Francis A. Carey, Organic Chemistry, Third Edition, The McGraw Hill Companies, Inc., 1996</p> <p>3. P. S. Kalsi, Organic Reactions and Mechanisms, Second Edition, New Age International Publishers, 2002</p>		
<b>Reference Books</b>	<p>1. S. H. Pine, J. B. Hendrickson, D. J. Cram and G. S. Hammond, Organic Chemistry, Fourth Edition, McGraw Hill Company, 1980</p> <p>2. S. M. Mukherji and S. P. Singh, Reaction Mechanism in Organic Chemistry, Macmillan, 1984</p> <p>3. Neil Issac, Physical Organic Chemistry, J. Wiley, New York, 1987</p>		
<b>Website Link</b>	<p>1. <a href="https://nptel.ac.in/courses/104105040">https://nptel.ac.in/courses/104105040</a></p> <p>2. <a href="https://nptel.ac.in/courses/102105089">https://nptel.ac.in/courses/102105089</a></p> <p>3. <a href="https://youtu.be/rlH1ym916Fo">https://youtu.be/rlH1ym916Fo</a></p>		

L-Lecture T-Tutorial P-Practical C-Credit

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3POCC08	BIO-ORGANIC CHEMISTRY	DSC THEORY - VIII	III	5	5	0	0	5

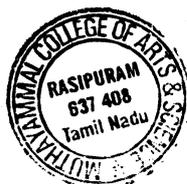
### CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	S	M	M	S	M	S	S
CO2	S	M	M	L	M	S	M	M	M	M
CO3	M	M	S	S	M	M	M	S	S	S
CO4	S	M	M	S	M	S	S	M	S	M
CO5	M	S	S	L	M	M	S	S	M	M
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

<b>Tutorial Schedule</b>	Nil
<b>Teaching and Learning Methods</b>	Chalk and talk, Smart class, Demo class
<b>Assesment Methods</b>	Unit test, Internal test, Assignments, Seminar & University examination

Designed By	Verified By	Approved By
Mr. S. RAMKUMAR	Dr.P.SUMATHI	<i>A. h. bany</i>

*J.R.K.* *P. Sumathi*



**M. Sc., - Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3POCE03	ORGANIC SPECTROSCOPY	DSE - II	III	5	3	2	0	4
<b>Objective</b>	To understand the basic concepts of spectroscopic techniques and to solve the structures from the spectra							
Unit	Course Content	Knowledge Levels	Session					
I	<p><b>UV-VIS and IR Spectroscopy:</b> UV-VIS: Electronic transitions - intensity shifts - absorption bands of dienes, polyenes and enones - Woodward-Fieser rules for dienes, polyenes, carbonyls, enones and aromatic compounds - calculation of <math>\lambda_{max}</math> for organic molecules - instrumentation and applications of UV spectroscopy.</p> <p><b>IR:</b> IR absorption process, Fundamentals of vibrations - modes of stretching and bending vibrations, bond properties and their relations to absorption frequencies, Characteristic group frequencies of aliphatic and aromatic organic molecules, carbonyl, carboxylic acid, ester, alcohol, phenol and amides. Factors influencing vibrational frequencies – overtones, combinations bands, difference bands and Fermi resonance, interpretation of IR spectra of organic molecules - instrumentation and applications of IR spectroscopy.</p>	K1,K2,K3 & K4	12					
II	<p><b><sup>1</sup>H NMR Spectroscopy:</b> <sup>1</sup>H NMR – theory and principle Shielding and deshielding - chemical shift, factors influencing chemical shift – magnetic anisotropy- Spin – spin splitting - (2nI+1) rule, Coupling constant – Pascal's triangle – Calculation of coupling constants, mechanism of coupling (one bond, germinal, vicinal and long range coupling) - Chemical &amp; magnetic equivalence Shift reagents, NMR instrumentation – Applications.</p>	K2,K3, K4	12					
III	<p><b><sup>13</sup>C NMR Spectroscopy:</b> <sup>13</sup>C NMR - The <sup>13</sup>C nucleus – Comparison of <sup>1</sup>H and <sup>13</sup>C NMR - Chemical shifts – intensity of signals, Chemical shift equivalence, equivalent carbons, chemical shifts of <sup>13</sup>C nuclei - Modes of couplings and multiplicity - proton coupled <sup>13</sup>C spectra, Homonuclear and heteronuclear decoupling – Broad-band decoupling – Off resonance decoupling - NOE, NOESY, ROESY and DEPT technique. 2D NMR - COSY and HETCOR techniques - simple molecules and applications of <sup>13</sup>C NMR.</p>	K2,K3&K4	12					

IV	<p><b>EPR and Mossbauer Spectroscopy:</b>  <b>EPR:</b> Introduction, factors affecting the g-value and A-value, limitations, instrumentation, electron nucleus interaction, hyperfine interactions – Zero-field splitting and Kramer’s degeneracy - isotropic and anisotropic coupling constants – spin Hamiltonian – instrumentation and applications  <b>Mossbauer spectroscopy:</b> Principle, Instrumentation, Doppler shift, Isomer shift, Quadrupole splitting, Magnetic interaction, Magnetic hyperfine splitting and selection rules. Applications - Mossbauer spectra of high and low spin Fe and Sn compounds.</p>	K2, K3 & K4	12
V	<p><b>MASS Spectrometry and Spectroscopic applications:</b> Mass spectra - Basic principle, molecular ion peak, base peak, meta stable ion peak, isotopic peaks, Nitrogen rule, ring rule, Mc-Lafferty rearrangement, rules for fragmentation pattern, Examples of mass spectral fragmentation of organic compounds - alkanes, aromatic hydrocarbons, alkyl halides, aldehydes and ketones, alcohols, acids and esters – instrumentation and applications.  <b>Spectroscopic applications:</b> Structural elucidation of simple organic molecules using UV-VIS, IR, <sup>1</sup>H NMR. spectroscopy and Mass spectrometry.</p>	K3, K4 & K5 K6	12
<b>Course Outcome</b>	CO1: Comperhend and apply the principles, instrumentation and application of UV-visible and IR spectroscopy.	K1	
	CO2: Understand the principle, concepts, instrumentation and applications of <sup>1</sup> H NMR spectroscopy.	K3	
	CO3: Gain an in-depth knowledge about <sup>13</sup> C NMR and its applications.	K4	
	CO4: Acquire knowledge about EPR and Mossbauer spectroscopy and its applications.	K4	
	CO5: Apply the concepts and applications of Mass spectrometry and applications of spectroscopic techniques in identifying a structure of organic compound.	K5	

#### Learning Resources

<b>Text Books</b>	<ol style="list-style-type: none"> <li>1. William Kemp, Organic Spectroscopy, Third Edition, ELBS Publications, 1975.</li> <li>2. Jag Mohan, Organic Spectroscopy, Narosa Publishing House, Second Edition, 2009.</li> <li>3. B. K. Sharma, Spectroscopy, Goel Publishing House, 2011</li> </ol>
<b>Reference Books</b>	<ol style="list-style-type: none"> <li>1. G. W. Ewing, Instrumental methods of chemical analysis, McGraw Hill pub, 1975</li> <li>2. R. S. Drago, Physical Methods in Inorganic Chemistry, Reinhold Saunders College Publishing, 1977.</li> <li>3. R. M. Silverstein, F. X. Webster, Spectrometric Identification of Organic Compounds, Sixth Edition, John Wiley Publications, 2009.</li> </ol>
<b>Website Link</b>	<ol style="list-style-type: none"> <li>1. <a href="https://nptel.ac.in/courses/104/103/104103110/">https://nptel.ac.in/courses/104/103/104103110/</a></li> <li>2. <a href="http://www.nptel.ac.in/courses/104/105/104105086/">http://www.nptel.ac.in/courses/104/105/104105086/</a></li> <li>3. <a href="http://www.nptel.ac.in/courses/104/105/104105040/">http://www.nptel.ac.in/courses/104/105/104105040/</a></li> </ol>

L-Lecture    T-Tutorial P-Practical    C-Credit

**M. Sc. - Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3POCE03	ORGANIC SPECTROSCOPY	DSE - II	I	5	3	2	0	4

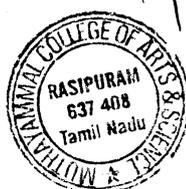
**CO-PO Mapping**

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	S	L	S	M	M	S	M
CO2	M	S	M	M	M	S	M	M	S	M
CO3	M	L	M	M	M	M	M	S	S	S
CO4	S	M	M	M	M	S	M	S	M	S
CO5	S	M	L	M	S	S	S	L	S	S
Level of Correlation between CO and PO	L - LOW		M - MEDIUM		S - STRONG					

<b>Tutorial Schedule</b>	Unit I-V- Solving questions from competitive exam question papers, Unit V- Group discussion
<b>Teaching and Learning Methods</b>	Smart-Classroom, Google meet, Demo classes
<b>Assesment Methods</b>	Unit test, Internal examinations, Semester examinations

Designed By	Verified By	Approved By
Dr. N. NITHIYA	Dr. P. SUMATHI	<i>A. h. Sanyal</i>

*N. Nithiya*



*P. Sumathi*

**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3POCE05	INSTRUMENTAL METHODS OF ANALYSIS	DSE - III	III	5	3	2	0	4
<b>Objective</b>	To understand the key role of Absorption, Emission and Reflection Spectroscopy, thermal and nanoscale analysis and analytical techniques like Chromatography, Polarography and Amperometry.							
Unit	Course Content	Knowledge Levels	Sessions					
I	<b>Absorption, Emission and Reflection Spectroscopy:</b> Absorption spectrometry – Beer Lamberts law; Principles of UV visible spectroscopy – photometric titrations Principles, Instrumentation and applications of Fluorescence -Principles and applications of XPES, UPES and ESCA.	K1,K2	12					
II	<b>Thermal and Magnetic Methods of Analysis:</b> DTA/DSC – Principle and instrumentation, Different techniques. Application to organic and inorganic compounds. TGA – Principle, instrumentation of TGA curves, Application to organic and inorganic compounds. Magneto chemical Analysis – Magnetic susceptibility and its measurements – Vibrating sample magnetometry - Application to simple compounds and ranking's transition metal complexes, Lanthanides and Actinides.	K3,K4	12					
III	<b>Characterisation of Nanoscale Materials:</b> Principles and instrumentation of Atomic Force Microscopy (AFM) – Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM) – Scanning Tunneling Microscopy (STM).	K3,K5	12					
IV	<b>Polarography and Amperometry:</b> Polarography – Theory, apparatus, DME, diffusion kinetic and catalytic currents, current voltage curves for reversible and irreversible system, qualitative and quantitative application to inorganic systems. Amperometric titrations – Theory, apparatus, types of titration curves, successive titrations and two indicator electrodes – applications.	K3	12					
V	<b>Chromatography:</b> Principle, method and applications of column and thin layer chromatographies; Gas liquid chromatography – principle, retention time values, instrumentation, carrier gas, column, detectors – thermal conductivity, flame ionization and electron capture; few applications of GLC; HPLC – theory, instrumentation and applications.	K2,K3	12					
<b>Course Outcome</b>	CO1: Understand the different organic molecular spectroscopic and spectrophotometric methods	K2						
	CO2: Interpret the thermal methods to characterise minerals	K3						

	CO3: Elaborate the concept, instrumentation and applications of polarography and amperometry	K4	
	CO4: Apply the characterisation techniques to study the morphology of nanomaterials	K5	
	CO5: Comprehend the principles, instrumentation and applications of chromatographic techniques	K6	
<b>Learning Resources</b>			
<b>Text Books</b>	1. Williard, Merit, Dean and Settle, Instrumental Methods of Analysis, CBS Publishers and Distributors, Fourth Edition, 1986 2. Skoog, Holler, Nieman, Principles of Instrumental Analysis, Thomson Asia Pvt Ltd., Singapore. 2004. 3. D. A. Skoog, Principles of Instrumental Analysis, Saunders College Pub. Co, Third Edition, 1985.		
<b>Reference Books</b>	1. Albert Paul Malvino, Electronic Principles, PMH Publishers, Third Edition, 1984 2. J. G. Dick, Analytical Chemistry, McGraw Hill Publishers, 1974 3. G. W. Ewing, Instrumental Methods of Chemical Analysis, McGraw Hill Pub, 1975		
<b>Website Link</b>	1. <a href="https://nptel.ac.in/courses/104104130">https://nptel.ac.in/courses/104104130</a> 2. <a href="https://nptel.ac.in/courses/104105084">https://nptel.ac.in/courses/104105084</a> 3. <a href="https://nptel.ac.in/courses/104106121">https://nptel.ac.in/courses/104106121</a>		

L-Lecture    T-Tutorial P-Practical    C-Credit

**M. Sc- Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

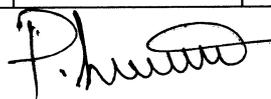
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3POCE05	INSTRUMENTAL METHODS OF ANALYSIS	DSE - III	III	5	3	2	0	4

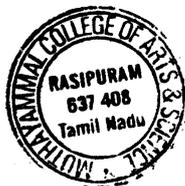
**CO-PO Mapping**

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	S	S	M	M	M	S
CO2	S	M	M	M	S	S	M	M	M	S
CO3	S	M	M	M	S	S	M	M	M	S
CO4	S	M	M	M	M	S	M	M	M	M
CO5	S	S	S	M	S	S	S	S	M	S
Level of Correlation between CO and PO	L-LOW		M-MEDIUM		S-STRONG					

<b>Tutorial Schedule</b>	Unit-I- UV- Spectroscopy- Seminar, Unit-V- TLC - Demo class
<b>Teaching and Learning Methods</b>	Smart class, Demo class, Online courses
<b>Assesment Methods</b>	Unit test, Internal test, Assignment, Semester examination

Designed By	Verified By	Approved By
Mrs. M. SARANYA	Dr. P. SUMATHI	A. h. Suresh



M. Sc. - Organic Chemistry LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3POCIS1	INTERNSHIP TRAINING	INTERNSHIP	III	90	0	0	90	2
<b>Objective</b>	To Learn academic credit and develop new skills, work habits and attitudes necessary for job success. Internship must take place outside college viz., Research Institute, Chemical industries.							
Guidelines for internship training programme						Knowledge Levels	Sessions	
I.	The students are expected to have a practical training in any industry or Research institute to enable them to acquaint him / her with the procedure, practice and working of companies.					<b>K3-K5</b>		
II.	Each student should undergo industrial training for a minimum period of two weeks at the end of the Second semester vacation.							
III.	He / She shall undergo the above training in the institutions like other Institutes, R&D Lab, private limited and public limited companies, CLRI, CECRI,NIT,IIT, Molecular connexions, Milk, Water & soil testing labs, Microlabs, Biocon, Biosis, Golbal calcium & Sandmar.							
IV.	Students may make their own arrangements in fixing the companies for candidates should submit a report in not less than 25 type written pages.							
V.	Candidates should submit the attendance certificate from the institution for having attended the training for two weeks.							
VI.	Industrial training reports shall be prepared by the students under the supervision of the faculty of the department.							
VII.	Industrial training report must contain the following: Cover page Copy of training certificate Profile of the industry, Objectives, work diary, Acknowledgement, content, Aim & scope, Report about the work undertaken by them during the tenure of training Observation and conclusion about the concern Findings							
VIII.	Internship viva – voce examination will be conducted with internal & external examiners at the end of the third semester and the credits will be awarded							
<b>Course Outcome</b>	<b>CO1:</b> Upgrade the learning in a professional environment					<b>K3</b>		
	<b>CO2:</b> Gaining experience with current science & technology					<b>K4</b>		
	<b>CO3:</b> Contributing to significant projects					<b>K4</b>		
	<b>CO4:</b> Building personal skills, Developing a resume that highlights desirable skills					<b>K4</b>		
	<b>CO5:</b> Networking with people working in the science community					<b>K5</b>		
<b>Learning Resources : Hands on training</b>								

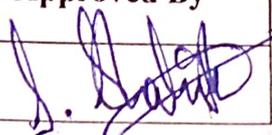
M. Sc. - Organic Chemistry LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M3POCIS1	INTERNSHIP TRAINING	INTERNSHIP	III	90	0	0	90	2

CO-PO Mapping

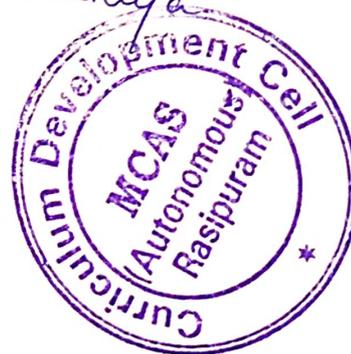
CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	M	M	S	M	S	S	S
CO2	M	S	M	S	M	S	S	M	S	S
CO3	S	S	S	S	S	S	M	S	S	S
CO4	S	M	S	S	S	S	S	S	M	M
CO5	S	S	S	S	S	S	S	S	S	S
Level of Correlation between CO and PO	L-LOW			M-MEDIUM			S-STRONG			

Tutorial Schedule	Preparation of Work diary & Internship report preparation
Teaching and Learning Methods	Training in industries, PT Classes, Smart classroom
Assesment Methods	Attendance, Internal & external viva-voce exams

Designed By	Verified By	Approved By
Dr. N. Nithiya	Dr. N. Nithiya	

N. Nithiya

N. Nithiya



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4POCC09	SYNTHETIC AND INDUSTRIAL ORGANIC CHEMISTRY	DSC THEORY - IX	IV	5	5	0	0	5
<b>Objective</b>	To understand the versatile knowledge about heterocyclic compounds, Retero synthesis, synthetically important name reactions and petrochemicals							
Unit	Course Content	Knowledge Levels	Sessions					
I	<b>Heterocyclic Compounds:</b> 5-Membered heterocyclic with 2-heteroatoms -Synthesis and reactivity of Pyrazole, Imidazole, Oxazole, Thiazole, Isoxazole and Isothiazole. 6-Membered heterocyclic with 2 or more atoms- Synthesis and reactions of Diazines (Pyridazine, Pyrimidine and Pyrazine), Synthesis and reactions of Purines and Pteridines, Synthesis of Caffeine, Theobromine and Theophylline.	K1, K2 & K3	12					
II	<b>Retrosynthesis:</b> Retro synthetic analysis - synthon approach - synthetic equivalent, reagent, functional group interconversions; Linear and convergent method in organic synthesis Disconnection approach - one group disconnection Retro synthesis of alcohols; retro Diels - Alder reaction; retro synthesis of olefins, aliphatic and aromatic ketones; protective groups in organic synthesis.	K5	12					
III	<b>Named reactions and applications in organic chemistry:</b> Dieckmann cyclization, Shapiro, Stork enamine, Sharpless asymmetric epoxidation, Robinson annulation, Duff, Simmons-Smith, Hoffman - Loffler- Freytag, Bamford-Stevens, Henry, Ugi, Wadsworth-Emmons, Barton and ene reactions.	K3, K4	12					
IV	<b>Petrochemicals:</b> Origin of petroleum, Products from fractional distillation, classification, composition of petroleum, fuel gases, knocking, octane number, cetane number, lubricating oils, greases and waxes. Cracking, types of cracking, hydrocarbons from petroleum and LPG. Manufacturer and uses of acetaldehyde, acetic acid, formaldehyde, ethylene glycol, 1,3 - butadiene and styrene. Chemical processing of aromatic hydrocarbons.	K4	12					
V	<b>Paints and Dyes:</b> Paints - composition, pigments, binders, extenders, thinners and surface- active agents, functions of the ingredients, paint formulations. Importance of PVC, alkyds, epoxy and polyurethane resins. Dyes - Color and chemical constitution, Classification, brightening agents, cyanine dyes, chemistry of color developer, instant color processes, synthesis and applications of congo red, crystal violet, malachite green and Rhodamine - Indocyanin dyes.	K3	12					

<b>Course Outcome</b>	<b>CO1:</b> To remember about Heterocyclic Compounds.	K1
	<b>CO2:</b> To understand the chemistry of paints, pigments and synthetic applications of dyes.	K2
	<b>CO3:</b> Comprehend about Named reactions and applications in organic chemistry.	K3
	<b>CO4:</b> Apply the chemistry of fuel petroleum and chemical processing of aromatic hydrocarbons.	K4
	<b>CO5:</b> Evaluate the synthetic applications of Retro synthesis.	K5
<b>Learning Resources</b>		
<b>Text Books</b>	1.V. K. Ahluwalia, Organic Reaction Mechanism, Narosa Publishing House, Fourth Edition, 2013 2.B. K. Sharma, Industrial Chemistry, Goel Publishing House, Fourteenth Edition, 2008 3.P. C. Jain and Monika Jain, Engineering Chemistry, Dhanpat Rai Publishing Co, Private Ltd, Sixteenth Edition, 2016	
<b>Reference Books</b>	1.G. Chatwal, Organic Chemistry of Natural Products, Vol I and II, Himalaya Publishing House, 1988 2.T. L. Gilchrist, Heterocyclic Chemistry, Thirty third Edition, Prentice Hall, New Jersey, 1997 3.R.K. Bansal, Heterocyclic Chemistry, Third Edition, Wiley Eastern Limited, 1999.	
<b>Website Link</b>	1. <a href="https://youtu.be/uqF5JoU-YRQ">https://youtu.be/uqF5JoU-YRQ</a> 2. <a href="https://youtu.be/LG7ZzMNBqCA">https://youtu.be/LG7ZzMNBqCA</a>	

L-Lecture

T-Tutorial

P-Practical

C-Credit

M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4POCC09	SYNTHETIC AND INDUSTRIAL ORGANIC CHEMISTRY	DSC THEORY - IX	IV	5	5	0	0	5

#### CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	S	M	M	S	M	S	M
CO2	S	S	M	S	M	S	S	M	M	M
CO3	M	M	S	M	S	M	M	S	M	S
CO4	S	M	M	M	M	S	M	M	M	M
CO5	S	S	S	M	M	S	S	S	M	M
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Nil
Teaching and Learning Methods	Chalk and talk, smart-Class, Demo classes
Assesment Methods	Unit test, Internal test, Assignments, university examination

Designed By	Verified By	Approved By
Mr. S. RAMKUMAR	Dr. P. SUMATHI	<i>A. h. Sanyal</i>

*SR* *P. Sumathi*



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4POCE07	MEDICINAL CHEMISTRY	DSE - IV	IV	5	4	1	0	4
<b>Objective</b>	The student will understand the mechanism of drug action and various phases of drug development and exposed to ideas about target-based drug design and clinical trial of drugs							
Unit	Course Content					Knowledge Levels	Sessions	
<b>I</b>	<b>Basic Concepts of Drugs:</b> Drug design- analogues and pro-analogues, factors governing drug design, rational approach, method of variation and tailoring of drugs. Classification of drugs, mechanism of action of drugs, metabolism of drugs, absorption of drugs, factors affecting adsorption of drugs and SAR relationships.					K1, K3	12	
<b>II</b>	<b>Drugs Acting on CNS:</b> Anaesthetics -Classification, synthesis and mode of action of Halothane, Thiopental sodium, Methohexitone, Procaine hydrochloride and Lignocaine hydrochloride. Analgesics - Classification, mode of action and SAR of Morphine. Synthesis and mode of action of Pethidine and Fentanyl citrate. Sedatives and Hypnotics- Classification, synthesis and mode of action of Barbiturates and Diazepam. Antipsychotics drugs- Classification, synthesis and mode of action of Chlorpromazine hydrochloride and Thioridazine. Anticonvulsants- Classification, synthesis and mode of action of Phenytoin and Ethosuximide.					K3	12	
<b>III</b>	<b>Drugs Affecting the Cardiovascular System:</b> Antiarrhythmic drugs - Classification, synthesis and mode of action of Quinidine sulphate and Procainamide hydrochloride. Vasodilator- Classification, synthesis and mode of action of Hydralazine hydrochloride and sodium nitroprusside. Coagulants- Mode of action of Vitamin K and Protamine Anticoagulants- Mode of action of Thromboplastin and Prothrombin. Antihypertensive agents- Classification, synthesis and mode of action of Methyl dopate hydrochloride and Clonidine. Diuretics- Classification, synthesis and mode of action of Acetazolamide and Chlorthiazide.					K3	12	

IV	<p><b>Drugs Affecting the Hormonal System and Immune System:</b>  Drugs affecting the Hormonal systems and immune systems. Drugs affecting hormonal systems Hypoglycemic drugs - Causes of diabetes, classification, synthesis and mode of action of Insulin, Tolbutamide and Glipizide. Thyroid drugs- Mode of action of thyroid hormones, Synthesis and uses of Thyroxine and Propyl thiouracil. Drugs affecting the immune systems. Non - steroidal anti inflammatory drugs - Classification, synthesis and mode of action of Flurbiprofen and Indomethacin. Antihistamics ( Antiallergic agents) - Histamine, Classification, SAR amongst H1-receptor blockers, prevention of histamine release, synthesis and mode of action of Diphenhydramine hydrochloride and Promethazine hydrochloride. Antiulcers- Histamine H2 Receptor Antagonists,SAR, synthesis and Characteristic features of Cimetidine andRanitidine.</p>	K4	12
V	<p><b>Chemotherapeutic Agents:</b> Antibiotics- Classification, synthesis and mode of action of Penicillins, Chloramphenicol and Azithromycin. Sulpha drugs- Classification, SAR and mode of action of sulphonamides. Synthesis and uses of Sulfacetamide and sulpha guanidine. Antiviral drugs- Classification, synthesis and mode of action of Acyclovir and Methiazone. Antimycobacterial drugs- Classification, synthesis and mode of action of Pyrazinamide and Ciprofloxacin hydrochloride. Anthelmintics- Types of warm parasites, classification, synthesis and mode of action of Albendazole and Mebendazole. Antineoplastic drugs- Causes of cancer, classification, synthesis and mode of action of Melphalan and Methotrexate.</p>	K4 & K6	12
Course Outcome	CO1: Remember the basic terminology involved in Medicinal Chemistry	K1	
	CO2: Understand on drug targets and solubility	K2	
	CO3: Gain knowledge the classification of Antiarrhythmic drugs and Diuretics	K3	
	CO4: Comprehend and understand the clinical testing of drugs	K4	
	CO5: Gain knowledge about the new drugs to be synthesised and develop methodologies for drug design and preparation	K6	
<b>Learning Resources</b>			
Text Books	1. David A. Williams, William O. Foye, Thomas L. Lemke; Foye's Principles of Medicinal Chemistry, Fifth Edition; Lippincott Williams and Wilkins: Philadelphia, 2002. 2. Delgado and Remers, Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry, Eleventh Edition; Lippincott Williams and Wilkins: Philadelphia, 2004		
Reference Books	1. D. J. Abraham, Ed., Burger's Medicinal Chemistry, Sixth Edition, Vol 1-6. 2. Daniel Lednicer and Lester A. Mitscher Organic Chemistry of Drug Synthesis, Vol.1- 6. 3. Joel G. Hardman and Lee L. Limbird, Edition; Goodman and Gilman's the Pharmacological Basis of Therapeutics, Tenth edition, Alfred Gilman, 200.		

Website Link	1. <a href="https://nptel.ac.in/courses/104/106/104106106/">https://nptel.ac.in/courses/104/106/104106106/</a>
	2. <a href="https://youtu.be/ewERE8gpqBU">https://youtu.be/ewERE8gpqBU</a>
	3. <a href="https://youtu.be/K3ig3WKmVAM">https://youtu.be/K3ig3WKmVAM</a>

L-Lecture      T-Tutorial    P-Practical                      C-  
Credit

M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4POCE07	MEDICINAL CHEMISTRY	DSE - IV	IV	5	4	1	0	4

#### CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	M	S	S	M	M	M
CO2	M	M	S	L	S	M	M	S	S	S
CO3	M	S	S	M	M	M	S	S	M	M
CO4	S	M	M	M	S	S	M	M	M	S
CO5	M	M	L	S	M	M	M	M	S	M
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Seminars, Group discussion
Teaching and Learning Methods	Smart board classes, Google meet, Demo class, Online courses
Assesment Methods	Unit test, Internal test, Assignments, university examination

Designed By	Verified By	Approved By
Mrs. M. SATHYA	Dr. P. SUMATHI	<i>A. K. Sanyal</i>

*M. Sathya*

*P. Sumathi*



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4POCE08	CHEMICAL APPROACH TO NANOMATERIALS	DSE - IV	IV	5	4	1	0	4
<b>Objective</b>	To impart knowledge on Origin and the basics of nanoscience and technology with relevance to chemistry and medicine.							
Unit	Course Content	Knowledge Levels	Sessions					
I	<b>History of nanotechnology and fundamental concepts:</b> Conceptual origins of bottom up approach: role of Eric Drexler and Maxwell - experimental advances - unusual property change at the nanoscale: influence of size and shape - brief explanation on bottom-up approaches - disciplines of nanochemistry and nanomedicine.	K1,K2	12					
II	<b>Bottom-up techniques:</b> Supramolecular chemistry and self-assembly - Allotropes of carbon, Introduction to fullerenes, CNT, and graphene - their unusual properties - luminescent carbon dots - present and future applications in chemistry and medicine.	K2, K3	12					
III	<b>Gold and silver nanomaterials; Plasmonics:</b> Common synthesis methods of gold nanoparticles - Common synthesis methods of silver nanoparticles - mechanism of growth - relationship between color, optical property and size - surface plasmon resonance - observation in UV-visible spectroscopy - application in self-assembled monolayers - application in photothermal therapy - application in imaging.	K2, K3	12					
IV	<b>Oxide and ferrite nanomaterials; Magnetism and applications:</b> Iron oxide - structure and types - ferrites (MFe <sub>2</sub> O <sub>4</sub> ) and perovskites - magnetism and its change at the nanosize scale - preparation of magnetite and ferrite by sol-gel, combustion, co-precipitation, and hydrothermal methods - applications in chemistry and medicine (elementary treatment).	K3,K4	12					
V	<b>Quantum dots; polymers; Optical properties and luminescence:</b> Cadmium selenide, cadmium sulfide, tungsten sulfide - common preparation methods - properties - concept of quantum confinement - optical and luminescence properties - applications in biology and medicine - a brief discussion on surfactants and polymers - ethical challenges in nanotechnology - nanotechnology products in the market related to chemistry, biology and medicine - visions of nanotechnology.	K3, K4	12					
<b>Course Outcome</b>	CO1: To remember the various methods of processing nanoparticles.	K1						
	CO2: Understand the various Bottom-up techniques.	K2						

	CO3: Identify the applications of gold and silver nanoparticles and plasmonics	K3	
	CO4: Analyze the magnetic properties of nanomaterials.	K4	
	CO5: Interpret the properties and applications of quantum dots	K5	

**Learning Resources**

<b>Text Books</b>	1. M. Kohler, W. Fritzsche, Nanotechnology: An Introduction to Nano structuring Techniques, WILEY-VCH Verlag GmbH and Co., 2004.
<b>Reference Books</b>	1. L. E. Foster, Nanotechnology: Science, Innovation, and Opportunity, Prentice Hall, 2005 2. M. Ratner, D. Ratner, Nanotechnology: A Gentle Introduction to the Next Big Idea, Prentice Hall, 2002
<b>Website Link</b>	1. <a href="https://nptel.ac.in/courses/113104102">https://nptel.ac.in/courses/113104102</a> 2. <a href="https://nptel.ac.in/courses/118104008">https://nptel.ac.in/courses/118104008</a> 3. <a href="https://nptel.ac.in/courses/112107283">https://nptel.ac.in/courses/112107283</a>

L-Lecture

T-

Tutorial

P-

Practical

C-

Credit

l

**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4POCE08	CHEMICAL APPROACH TO NANOMATERIALS	DSE - IV	IV	5	4	1	0	4

**CO-PO Mapping**

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	L	M	M	M	S	M	M	M	M
CO2	S	S	M	M	M	S	S	M	M	M
CO3	S	S	M	M	M	S	S	M	M	M
CO4	S	S	S	M	M	S	S	S	M	M
CO5	S	L	M	M	M	S	S	M	M	M
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

<b>Tutorial Schedule</b>	Seminars, Group discussion
<b>Teaching and Learning Methods</b>	Smart board classes, Google meet, Demo class, Online courses
<b>Assesment Methods</b>	Unit test, Internal test, Assignments, university examination

Designed By	Verified By	Approved By
Dr. N. NITHIYA	Dr. P. SUMATHI	

*N. Nithiya*

*P. Sumathi*



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4POCP04	ORGANIC CHEMISTRY - II	DSC PRACTICAL - IV	IV	4	0	0	4	3
<b>Objective</b>	1.To know about the estimation of phenol, methyl ketone, glucose, nitro and methoxy groups. 2. To understand the preparation of organic compounds.							
S.No.	List of Experiments / Programmes						Knowledge Levels	Sessions
1	<b>I Organic Estimations:</b> 1.Phenol 2.Aniline 3.Methyl Ketone 4.Glucose 5.Iodine value of an oil 6.Saponification value of oil						K1, K3, K5	15
2	<b>II Organic Preparation, Involving Two stages:</b> 1.Sym-tribromobenzene from aniline. 2.m- Nitrobenzoic acid from methyl benzoate. 3.para - Nitroaniline from acetanilide. 4.Benzanilide from benzophenone. 5.Aspirin from methyl salicylate 6.Anthraquinone from phthalic anhydride. 7.EDC coupling reaction- Synthesis of Amide. 8.Fischer-Indole synthesis						K4	15
<b>Course Outcome</b>	CO1: To know the protocol for the preparation of organic compounds by double stage which means the industrial standards.						K1	
	CO2: To understand the basic reaction conditions such as solubility hydrolysis, acetylation, bromination, nitration.						K2	
	CO3:To execute the idea about recrystallisation.						K3	
	CO4: Study the operation and performance liquid-liquid extractions column with different packings.						K4	
	CO5:To apply the separation skills to extract various compounds from the natural source.						K5	
<b>Learning Resources</b>								
<b>Text Books</b>	1.Vogel"s Text book of practical organic chemistry, 5th edition, Prentice Hall, 2008							

<b>Reference Books</b>	1. B. S. Furniss, A. J. Hannaford, P. W. G. Smith and A. R. Tatchell, Vogel's Practical Organic Chemistry, Fifth edition. ELBS. 1989. 2. Raj K. Bansal, Laboratory manual of Organic Chemistry, Third Edition, New Age International (P) Ltd, 1996.
<b>Website Link</b>	1. <a href="https://youtu.be/5K1t4-1TDdo">https://youtu.be/5K1t4-1TDdo</a> 2. <a href="https://youtu.be/qdmKGskCyh8">https://youtu.be/qdmKGskCyh8</a> 3. <a href="https://youtu.be/IU1m_4_49sE">https://youtu.be/IU1m_4_49sE</a>

L-Lecture

T-Tutorial

P-  
Practical

C-Credit



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4POCP04	ORGANIC CHEMISTRY - II	DSC PRACTICAL - IV	IV	4	0	0	4	3

**CO-PO Mapping**

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	L	M	S	M	M	M	M
CO2	M	S	S	M	L	M	S	S	M	S
CO3	S	M	M	S	S	S	M	M	S	S
CO4	M	S	S	M	M	M	S	S	M	M
CO5	M	M	S	M	M	M	M	S	M	M
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

<b>Tutorial Schedule</b>	Viva-voce preparation
<b>Teaching and Learning Methods</b>	Demo classes
<b>Assesment Methods</b>	Observation, Record, Class Praticals, University model practicals

Designed By	Verified By	Approved By
Mrs. M. SATHYA	Dr. P. SUMATHI	<i>A. L. Sany</i>

*M. Sathya*

*P. Sumathi*



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4POCP05	ORGANIC CHEMISTRY - III	DSC PRACTICAL - V	IV	4	0	0	4	3
<b>Objective</b>	To develop analytical skill in estimation of functional group and preparation of organic compounds							
S.No.	List of Experiments / Programmes						Knowledge Levels	Sessions
<b>1</b>	<b>ESTIMATION OF THE FOLLOWING :</b> 1. Hydroxyl group 2. Amino group 3. Amide group 4. Glycine 5. Ascorbic acid						K1, K2, K4	30
<b>2</b>	<b>MULTI STAGE PREPARATION INVOLVING OXIDATIONS AND REDUCTIONS:</b> 1. Preparation of cyclohexanone (Oxidation) 2. Preparation of adipic acid (Oxidation) 3. Preparation of trimethyl acetic acid (Oxidation) 4. Preparation of ethyl benzene (Wolff- Kishner reduction) 5. Preparation of benzhydrol (Reduction) 6. Preparation and stereochemistry of azobenzene (Reduction).						K5, K6	30
<b>Course Outcome</b>	<b>CO1:</b> Comprehend about the mechanisms of reactions of some selected functional groups in organic compounds						<b>K1</b>	
	<b>CO2:</b> Understand the Oxidation and Reduction mechanism through Organic preparations						<b>K2</b>	
	<b>CO3:</b> Apply the purity checking by Recrystallisation						<b>K3</b>	
	<b>CO4:</b> Analyze the prepared organic compound using melting point determination						<b>K4</b>	
	<b>CO5:</b> To execute the ideas about distillation						<b>K5</b>	

### Learning Resources

<b>Text Books</b>	Gnanapragasam, Ramamurthy, Organic lab Manual, Viswanathan. S Publishers Pvt Ltd, 2009.
<b>Reference Books</b>	1.Raj K. Bansal, Laboratory manual of Organic Chemistry, Third Edition, New Age International (P) Ltd., 1996. 2.B. S. Furniss, A. J. Hannaford., P. W. G. Smith and A. R. Tatchell, Vogel's Practical Organic Chemistry, Fifth Edition, ELBS, 1989.
<b>Website Link</b>	1. <a href="https://www.youtube.com/watch?v=3Wl7byXWWBY">https://www.youtube.com/watch?v=3Wl7byXWWBY</a> 2. <a href="https://www.youtube.com/watch?v=-WDQ1wX3pdo">https://www.youtube.com/watch?v=-WDQ1wX3pdo</a> 3. <a href="https://www.youtube.com/watch?v=PKsWgJdvLec">https://www.youtube.com/watch?v=PKsWgJdvLec</a>

L-Lecture

T-Tutorial P-Practical C-Credit



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4POCP05	ORGANIC CHEMISTRY - III	DSC PRACTICAL - V	IV	4	0	0	4	3

**CO-PO Mapping**

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	S	M	S	S	S	S
CO2	M	S	S	S	S	M	S	S	S	S
CO3	M	S	S	M	S	M	S	S	M	S
CO4	M	S	S	M	S	M	S	S	M	S
CO5	M	S	S	M	S	M	S	S	M	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	Viva-voce preparation
Teaching and Learning Methods	Demo classes
Assesment Methods	Observation, Record, Class Praticals, University model practicals

Designed By	Verified By	Approved By
Mrs. M. SARANYA	Dr. P. SUMATHI	<i>A. K. Saranya</i>

*(Signature of Mrs. M. Saranya)*

*(Signature of Dr. P. Sumathi)*



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4POCP06	ORGANIC CHEMISTRY - IV	DSC PRACTICAL - VI	IV	4	0	0	4	3
<b>Objective</b>	To understand the techniques involved in extraction of natural products, separation and identification of structure of organic compounds							
S.No.	List of Experiments / Programmes					Knowledge Levels	Sessions	
1	Extraction of natural products such as caffeine, embelin, piperine, stigmasterol and $\beta$ -carotene, lycopene. stigmasterol					K1, K3		
2	Separation and identification of amino acids and sugars by paper and thin layer chromatography.					K2, K4		
3	Column chromatographic separation of mixture of organic compounds 1.Purification of anthracene 2.Separation of amino acids 3.Separation of benzoic acid from benzaldehyde.					K3, K4		
4	Elucidation of the structure of an organic compound from the spectra provided.					K5, K6		
<b>Course Outcome</b>	<b>CO1:</b> To Remember the extraction process and to extract compounds from natural products					K1		
	<b>CO2:</b> Understand the Separation technique and identify the various components using TLC & Paper Chromatography					K2		
	<b>CO3:</b> Separation of various organic components from a mixture using Column Chromatography					K3		
	<b>CO4:</b> Analyse the organic compounds using spectral data					K4		
	<b>CO5:</b> Arrive at the structure of an organic compound using spectral data					K6		

**Learning Resources**

<b>Text Books</b>	1. Raj K. Bansal, Laboratory manual of Organic Chemistry, Third Edition., NewAge International (P)Ltd., 1996 2. Arun Sethi, Lab experiments in organic chemistry, New Age International Publishers
<b>Reference Books</b>	B. S. Furniss, A. J. Hannaford., P.W.G. Smith and A. R. Tatchell, Vogel's Practical Organic Chemistry, Fifth Edition, ELBS, 1989.
<b>Website Link</b>	1. <a href="https://www.youtube.com/watch?v=JrkHsly2unE">https://www.youtube.com/watch?v=JrkHsly2unE</a> 2. <a href="https://www.youtube.com/watch?v=2O8h9utwKA4">https://www.youtube.com/watch?v=2O8h9utwKA4</a> 3. <a href="https://www.youtube.com/watch?v=oNsajCyQ7Lc">https://www.youtube.com/watch?v=oNsajCyQ7Lc</a>

L-Lecture

T-Tutorial P-

Practical

C-Credit

**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4POCP06	ORGANIC CHEMISTRY - IV	DSC PRACTICAL - VI	IV	4	0	0	4	3

**CO-PO Mapping**

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	S	M	M	S	M	S	M
CO2	M	S	S	M	M	M	S	S	M	M
CO3	M	S	S	M	M	M	S	S	M	M
CO4	M	S	S	M	M	M	S	S	M	M
CO5	M	S	S	S	M	M	S	S	S	M
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

<b>Tutorial Schedule</b>	Viva-voce preparation
<b>Teaching and Learning Methods</b>	Demo classes & Extraction-Online vedios
<b>Assesment Methods</b>	Observation, Record, Class Praticals, University model practicals

Designed By	Verified By	Approved By
Dr. P. SUMATHI	Dr. P. SUMATHI	<i>A. h. Sanyal</i>

*P. Sumathi P. Sumathi*



**M. Sc., Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4POCPR1	PROJECT WORK	PROJECT WORK	IV	8	0	0	8	5
<b>Objective</b>	To Identify Problem related to their area of interest in Chemistry and Chemical industry and enhance problem solving skills and research knowledge.							
<b>Details</b>	<b>Course Content</b>			<b>Knowledge Levels</b>			<b>Sessions</b>	
<b>PROJECT PREPARATION FORMAT</b>								
<b>Cover Page &amp; Title Page</b>	<b>Cover Page &amp; Title Page:</b> The fonts and locations of various items on this page should be exactly as shown in a specimen copy.							
<b>Inside cover page</b>	Inside cover page Same as cover page.							
<b>Bonafide Certificate</b>	<b>Bonafide Certificate:</b> The Bonafide Certificate shall be in double line spacing using Font Style Times New Roman and Font Size 14.							
<b>Acknowledgement</b>	<b>Acknowledgement:</b> This should not exceed one page. The candidate should convey his appreciation to all whom have played a role for completion of his M.Sc Project work.							
<b>Abstract</b>	<b>Abstract:</b> An abstract should provide a concise summary of your research project. It should include the principal objectives of the study, methods employed, a summary of the results and primary conclusions. It should contain approximately 250 words written in the past tense and should not include references.							
<b>Contents</b>	<b>Table of Contents:</b> The table of contents should list all headings, sub headings after the table of contents page, as well as any titles preceding it. The title page and Bonafide Certificate will not find a place among the items listed in the Table of Contents. One and a half spacing should be adopted for typing the matter under this head.							
<b>Tables</b>	<b>List of Tables:</b> The list should use exactly the same captions as they appear above the tables in the text. 1.5 spacing should be adopted for typing the matter under this head.							
<b>Figures</b>	<b>List of Figures:</b> The list should use exactly the same captions as they appear below the figures in the body of the text. One and a half spacing should be adopted for typing the matter under this head. All charts, graphs, maps, photographs and diagrams should be designated as figures. X and Y axes titles are mandatory for all the graphs.							

<b>Symbols</b>	<b>List of Symbols, Abbreviations and Nomenclature:</b> 1.5 spacing should be adopted or typing the matter under this head. Standard symbols, abbreviations etc. should be used.		
<b>Chapters</b>	<b>Chapter I - Introduction:</b> Statement of the Problem, Significance, Need for the study, Objectives		
	<b>Chapter II-</b> Aim & Scope		
	<b>Chapter III- Experimental methods:</b> Procedures, Hypothesis.		
	<b>Chapter IV- Results and Discussion:</b> Tables and Figures, Statistical Presentations, Hypothesis Testing.		
	<b>Chapter V- Conclusion</b>		
	<b>Chapter VI- References</b>		
	<b>References</b>		
<b>GUIDELINES FOR PROJECT PREPARATION</b>			
<b>Numbering</b>	<ul style="list-style-type: none"> <li>• Every page in the project report, except the project report title page, must be accounted for and numbered.</li> <li>• The page numbering, starting from acknowledgements and till the beginning of the introductory chapter, should be printed in small Roman numbers, i.e, i, ii, iii, iv.....</li> <li>• The page number of the first page of each chapter should not be printed (but must be accounted for). All page numbers from the second page of each chapter should be printed using Arabic numerals, i.e. 2,3,4,5...</li> <li>• All printed page numbers should be located at the right corner at the bottom of the page.</li> </ul>	K4- K6	
<b>Chapters</b>	<ul style="list-style-type: none"> <li>• Use only Arabic numerals. Chapter numbering should be centered on the top of the page using large bold print. &lt;Size 14&gt;&lt;Times New Roman&gt;</li> </ul>	K4- K6	
<b>TEXT</b>			
<b>Regular Text</b>	<b>Regular Text:</b> Times Roman 12 pts and normal print.	K4- K6	
<b>Chapter Heading</b>	<b>Chapter Heading</b> - Times Roman 14 pts. Bold and capital.	K4- K6	
<b>Section Headings</b>	<b>Section Headings</b> - Times roman 12 pts. Bold and capital.	K4- K6	
<b>Subsection Headings</b>	<b>Subsection Headings</b> - times roman 12 pts. bold print and Leading capitals i.e, only first letter in each word should be in capital.	K4- K6	
<b>Special Text</b>	<b>Special Text-</b> Italics/Superscript /Subscript/Special symbols, etc., as per necessity. Special text may include footnotes, endnotes, physical or chemical symbols, mathematical notations, etc.	K4- K6	
<b>Sections</b>	<b>Sections:</b> Use only Arabic numerals with decimals. Section numbering should be left justified using bold print. Example: 1.1, 1.2, 1.3, etc.	K4- K6	
<b>Sub Sections</b>	<b>Sub Sections:</b> Use only Arabic numerals with two decimals.	K4-	

	Subsection numbering should be left Justified using bold print. Example: 1.1.1, 1.1.2, 1.1.3, etc.	K6	
<b>References</b>	<p>Use only Arabic numerals. Serial numbering should be carried out based on Alphabetical order of surname or last name of first author.</p> <p>The format is written like, author name followed by year followed by title of the work followed by details of the journal. Same font as regular text, serial number and all authors names to be in bold print.</p> <p>Title and Journal names should be in italic.</p> <p>1. <b>Alvarez LH and Cervantes FJ</b>, 2011. “(Bio) nanotechnologies to enhance environmental quality and energy production”. <i>J ChemTechnolBiot</i>86 (1354–1363).</p> <p>2. <b>Banjong B, Rattanai B, Zongporn J, Naratip V</b>, 2010. “Grass blade-like microparticle MnPO<sub>4</sub>·H<sub>2</sub>O prepared by a simple precipitation at room temperature”. <i>Power Techno.</i> 203 (310 - 314).</p>	K4- K6	
<b>Typing Instructions</b>	<b>Typing Instructions:</b> The impression on the typed copies should be black in color. One and a half spacing should be used for typing the general text. The general text shall be typed in the Font style ‘Times New Roman’ and Font size 12. Use A4 (210 mm X 297 mm) bond un-ruled paper (80 gsm) for all copies submitted. Use one side of the paper for all printed/typed matter.	K4- K6	
<b>Justification</b>	<b>Justification:</b> The text should be fully justified	K4- K6	
<b>Margins</b>	<b>Margins:</b> The margins for the regular text are as follows LEFT - 1.5” RIGHT - 1” TOP - 1” BOTTOM - 1”	K4- K6	
<b>Paragraph Spacing</b>	<p>Use 6 pts before &amp; 6 pts after paragraphs. All paragraphs in the seminar/project report should be left justified completely, from the first line to the last line.</p> <p>Use 1.5 spacing between the regular text and quotations.</p> <p>Provide double spaces between:</p> <p>(a) From top of page to chapter title,</p> <p>(a) Chapter title and first sentence of a chapter,</p> <p>Use single spacing</p> <p>(a) In footnotes and endnotes for text.</p> <p>(b) In explanatory notes for tables and figures.</p> <p>(c) In text corresponding to bullets, listings, and quotations in the main body of seminar/project report.</p> <p>Use single space in references and double space between references.</p>	K4- K6	
<b>Tables</b>	All tables should have sharp lines, drawn in black ink, to separate rows/columns as and when necessary.	K4- K6	

	<p>Tables should follow immediately after they are referred to for the first time in the text. Splitting of paragraphs, for including tables on a page, should be avoided.</p> <p>Provide double spaces on the top and the bottom of all tables to separate them from the regular text, wherever applicable. The title of the table etc. should be placed on the top of the table. The title should be centered with respect to the table. The titles must be in the same font as the regular text and should be single spaced.</p>		
<b>Figures</b>	<p>All figures, drawings, and graphs should be drawn in black ink with sharp lines and adequate contrast between different plots if more than one plot is present in the same graph. The title of the figure etc. should be placed on the bottom of the figure.</p> <p>Figures should follow immediately after they are referred to for the first time in the text. Splitting of paragraphs, for including figures on a page, should be avoided. Provide double spaces on the top and the bottom of all figures to separate them from the regular text, wherever applicable. Figures should be centered with respect to the figure. The titles must be in the same font as the regular text and should be single spaced. The title format is given below:</p> <p>Fig. &lt;blank&gt;&lt;chapter number&gt;.&lt;serial number&gt;&lt;left indent&gt;&lt;figure</p>	K4- K6	
<b>Page Dimension &amp; Binding Specifications</b>	The project report should be prepared in A4 size. The dissertation shall be properly bound; The bound front cover should indicate in Silver and embossed letter.		
<b>Course Outcome</b>	<b>CO1:</b> Identification of research idea	K2	
	<b>CO2:</b> Analyze of problem solving skills	K4	
	<b>CO3:</b> Analyze sources for conduct of Research	K4	
	<b>CO4:</b> Evaluate the research report	K5	
	<b>CO5:</b> Create the research report	K6	
<b>Learning Resources</b>			
<b>Text Books</b>	1. Research Methodology: Methods and Techniques, by C.R. Kothari, New Age Publications, 2009.		
<b>Reference Books</b>	1. Research Methodology: Methods and Techniques by C.R. Kothari, New Age Publications, 1985. 2. Essentials of Research Design and Methodology by: Geoffrey R. Marczyk, David DeMatteo, David Festinger, 2005.		
<b>Website Link</b>	1. <a href="http://gen.lib.rus.ec/">http://gen.lib.rus.ec/</a>		

M. Sc. – Organic Chemistry LOCF-CBCS with effect from 2021-2022 Onwards

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
1M4POCPRI	PROJECT WORK	PROJECT WORK	IV	8	0	0	8	5

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	M	S	M	M	S	S	S
CO2	S	S	S	S	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	M	M
CO4	S	S	S	M	S	S	S	S	M	M
CO5	M	M	M	S	S	M	M	S	M	S
Level of Correlation between CO and PO	L-LOW			M-MEDIUM		S-STRONG				

Tutorial Schedule	-
Teaching and Learning Methods	-
Assessment Methods	<p>EA - 100%</p> <p>1. Project Report - 150 Marks</p> <p>2. Viva-Voce - 50 Marks</p> <p>3. Total - 200 Marks</p>

Designed By	Verified By	Approved By
Dr. N. Nithiya	Dr. N. Nithiya	

N. Nithiya

N. Nithiya



M. Sc., Organic Chemistry – Chemistry for Competitive Examination Syllabus - LOCF - CBCS - Pattern with effect from 2021-2022 Onwards								
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4POCOE1	Organic Chemistry for Competitive Examination	Self study Online -Competitive Examination	IV	-	-	4	0	2
<b>Objective</b>	To Identify Problem related to their area of interest in Chemistry and Chemical industry and enhance problem solving skills and research knowledge.							
<b>Details</b>	<b>Course Content</b>			<b>Knowledge Levels</b>		<b>Sessions</b>		
	<p>Assemblage of different topics related to Chemistry in particular, Organic, Inorganic, Physical, Pharmaceutical, Spectroscopy, Analytical, Forensic, Food Chemistry etc. Major emphasis has been put forth to include recent developments in the subjects. This course aims to give a holistic view of all the topics which comprised of some factual text points, multiple choice questions (MCQ), it is extremely suitable for students pursuing their higher degree in University/institute for their entrance exams, students preparing for various national and state level competitive entrance exams such as ICAR-JRF/SRF/NET/ARS, IARI/NDRIPh.D., SAUs; CSIR/UGC-NET/JRF/SRF; ICMR, DBT, GATE, BARC, IISc, JNU, BHU, etc. to get admission in Ph.D., in Chemistry. In addition, it is also useful for UPSC and states PSC.</p> <p><b>Rules for creating MCQ pattern.</b></p> <p>1. Objective type online examination will be conducted at the end of 4<sup>th</sup> semester.</p> <p>2. Questions must be taken from all previous question papers of CSIR-NET, SET, NEET, UPSC, IBPS and Common Entrance Test for Ph.D.</p> <p>3. <b>Test critical thinking.</b></p> <p>Multiple choice questions to test the superficial knowledge. Learners to interpret facts, evaluate situations, explain cause and effect, make inferences, and predict results.</p> <p>4. <b>Emphasize Higher-Level Thinking</b></p> <p>Use memory-plus application oriented questions. These</p>							

questions require students to recall principles, rules or facts in a real life context.

Eg.1

Ability to Justify Methods and Procedures

In the synthesis of polydimethylsiloxane, the chain forming , branching and terminating agent respectively , are

- a. 20 , 28 , 50 and 126
- b. 24 , 28 , 82 and 126
- c. 20 , 50 , 80 and 184
- d. 28 , 50 , 82 and 180

Eg.2

Ability to Interpret Cause-and-Effect Relationships

The chemical potential ( $\mu$ ) of 2 molar  $\text{Na}_2\text{SO}_4$  solution is expressed in terms of mean ionic activity co-efficient

( $\gamma_{\pm}$ ) as

- a.  $\mu_0 + 5 RT \ln 2 + 3 RT \ln \gamma_{\pm}$
- b.  $\mu_0 + 3 RT \ln 2 + 3 RT \ln \gamma_{\pm}$
- c.  $\mu_0 + 5 RT \ln \gamma_{\pm}$
- d.  $\mu_0 + 4 RT \ln \gamma_{\pm}$

5. Mix up the order of the correct answers

Keep correct answers in random positions and don't let them fall into a pattern that can be detected

**6. Use a Question Format**

Multiple-choice items to be prepared as questions (rather than

incomplete statements)

	<p>Incomplete Statement Format:</p> <p>The capital of California is in Direct Question Format----- Less effective.</p> <p>In which of the following cities is the capital of California? - This is Best format.</p> <p><b>7. Keep Option Lengths Similar</b></p> <p>Avoid making your correct answer the long or short answer</p> <p><b>8. Avoid the “All the Above” and “None of the Above” Options</b></p> <p>Students merely need to recognize two correct options to get the answer correct</p> <p>9. HOD’s instruct to the faculty to prepare minimum 500 questions booklet (cumulatively for each programme) with solutions and circulate among the students.</p> <p>10. Each Department to prepare the Questions (MCQ pattern with four answers) and submit to ICT.</p>		
<b>Course Outcome</b>	<b>CO1:</b> Identification of pattern of questions asked in competitive exams	K2	
	<b>CO2:</b> Analyze the topics that are repeated in competitive exams	K4	
	<b>CO3:</b> Able to categorize the topics and select the topics of their interest	K4	
	<b>CO4:</b> Ability to solve problems related to each topic	K5	
	<b>CO5:</b> Get confidence about appearing for competitive exams	K6	
<b>Learning Resources</b>			
<b>Text Books</b>	1. Trueman's UGC NET Chemical Sciences - 2023 Edition Paperback – 1, M. Gagan, January 2023		
<b>Reference Books</b>	1. Csir-Ugc Net/Jrf/Set Chemical Sciences Paperback, Hemant Kulshrestha, Ajay Taneja, 2010.		
<b>Website Link</b>	1. <a href="https://ifasonline.com/">https://ifasonline.com/</a>		

**M. Sc. – Organic Chemistry LOCF - CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M4POCOE1	Organic Chemistry for Competitive Examination	Self study Online - Competitive Examination	IV	-	-	4	0	2

**CO-PO Mapping**

CO Number	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	M	S	L	S	S	S
CO2	S	S	M	M	M	S	L	M	S	S
CO3	S	M	S	S	S	S	M	M	S	S
CO4	S	M	M	S	M	S	L	S	S	S
CO5	S	S	M	S	S	S	M	S	M	S
Level of Correlation between CO and PO	L-LOW			M-MEDIUM		S-STRONG				

<b>Tutorial Schedule</b>	NET / SET / GATE / CET / TRB / NEET Old question papers – solutions – online mock test
<b>Teaching and Learning Methods</b>	Self study, Group discussion, Chalk and Talk, Audio-Video Learning, learning through mock test
<b>Assessment Methods</b>	100 multiple choice questions through computer based online examinations passing minimum is 50%

Designed By	Verified By	Approved By
Mrs. M. Saranya	Dr. N. Nithiya	



**List of Extra Disciplinary (GEC) Course  
SYLLABUS - LOCF-CBCS PATTERN  
EFFECTIVE FROM THE ACADEMIC YEAR 2021-2022 Onwards**

S. No.	SEM	COURSE_CODE	TITLE OF THE COURSE
1	II	21M2POCED1	INDUSTRIAL CHEMISTRY
2	II	21M2POCED2	CHEMISTRY IN HEALTH SCIENCE
3	II	21M2POCED3	CHEMISTRY IN DAY-TO-DAY LIFE

**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2POCED1	INDUSTRIAL CHEMISTRY	GEC - EDC - I	II	4	4	0	0	4
<b>Objective</b>	To learn the fundamentals of Glass, Ceramics and Cement and its manufacturing technique and Dyes, Paints, Synthetic fibers, Plastics, Oils, Fats and Waxes and their applications.							
Unit	Course Content				Knowledge Levels	Sessions		
I	<b>Glass and Ceramics: Glass:</b> Introduction- Raw materials, manufacture and applications. Some special glasses - fused silica glass, optical glass, glass wool, photosensitive glass-composition and uses. <b>Ceramics:</b> Definition, Manufacture and applications.				K1,K2	9		
II	<b>Cement:</b> Introduction, Types of cement - High alumina cement, Slag cement, Acid resisting cement, White cement, Types of Portland cement, Raw materials, Manufacture of cement, Setting of cement, factors affecting quality of cement, Cement industries in Tamilnadu.				K3	9		
III	<b>Dyes and Paints:</b> <b>Dyes:</b> Classifications of dyes, application of dyes in other areas-medicine, chemical analysis, cosmetics, colouring agents, Food and beverages. <b>Paints:</b> Constituents of paints, Manufacture of paints, Setting of paints, requirement of a good paint.				K3	9		
IV	<b>Synthetic fibres and Plastics:</b> <b>Synthetic fibres:</b> Difference between natural and synthetic fibres, Synthesis and applications of Rayon, Terylene, Nylon and Teflon. <b>Plastics:</b> Classification, properties and applications of plastics - demerits of plastics.				K4	9		
V	<b>Oils, Fats and Waxes:</b> Classification of oils, fats and waxes, distinction between oils, fats and waxes, Uses of essential oils and fats. Soap and its manufacture - toilet and transparent soaps, cleansing action of soap. Detergent - classification and uses.				K4,K5	9		
<b>Course Outcome</b>	CO1: To remember the manufacturing process of glass and ceramics.				K1			
	CO2: To understand the types and manufacturing of cement.				K2			
	CO3: Learn about dyes, paints and pigments and their applications.				K3			
	CO4: Analyze the importance and preparations of synthetic fibres and plastics.				K4			
	CO5: Illustrate knowledge about oils, fats and waxes.				K5			

### Learning Resources

<b>Text Books</b>	1. B. K. Sharma, Industrial Chemistry, Goel Publishing House Pvt Ltd., 1999 2. M. G. Arora and M. Sing, Industrial Chemistry. Anmol Publications, First Edition, 1994 3. G. N. Pandey, A Textbook of Chemical Technology. Vol. I and II, Vikas Publishing House Pvt Ltd., 1997
<b>Reference Books</b>	1. B. K. Chakrabarty, Industrial Chemistry, Oxford and IBM Publishing Co. Pvt Ltd., 1991 2. V. Subrahmanian, S. Renganathan, K. Ganesan, S. Ganesh, Applied Chemistry, Scitech Publications, 1998 3. J. E. KuriaCose and J. Rajaram, Chemistry in Engineering and Technology, Vol I and II, Tata McGraw Hill, 1984
<b>Website Link</b>	1. <a href="https://www.youtube.com/watch?v=zdmEaXnB-5Q">https://www.youtube.com/watch?v=zdmEaXnB-5Q</a> 2. <a href="https://www.britannica.com/science/band-theory">https://www.britannica.com/science/band-theory</a>

L-Lecture

T-

P-

C-

Tutorial

Practical

Credit

M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

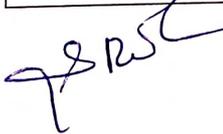
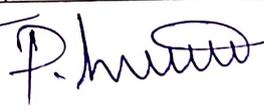
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2POCED1	INDUSTRIAL CHEMISTRY	GEC - EDC - I	II	4	4	0	0	4

CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	L	S	S	M	M	M	S
CO2	M	S	M	M	S	M	S	M	M	S
CO3	M	S	S	M	L	M	S	S	M	S
CO4	M	M	S	S	M	M	M	S	S	M
CO5	S	M	M	S	M	S	M	M	S	M
Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG							

Tutorial Schedule	Seminars, Group discussions
Teaching and Learning Methods	Smart-Classroom, Google meet, Demo classes
Assesment Methods	Unit test, Internal examinations, University examinations

Designed By	Verified By	Approved By
Mr.S.RAMKUMAR	Dr.P.SUMATHI	



**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2POCED2	CHEMISTRY IN HEALTH SCIENCE	GEC - EDC - II	II	4	4	0	0	4
<b>Objective</b>	To acquire knowledge about good physique fitness, skin care, hair care, clinical chemistry and diagnostic tools.							
Unit	Course Content						Knowledge Levels	Sessions
I	<b>Health Maintenance:</b> Health maintenance - Height, Weight and Body Mass Index - causes and hazardness of obesity. Healthy bones - Role of enzymes and hormones in health. Chemistry of maintaining body structure and appearance - food habits and diets.						K1, K3	9
II	<b>Skin protection</b> - Structure and functions of skin - Skin care products - raw materials - its characterisation and formulation - SPF - toner, cleanser, moisturizer, face mask - Herbal extracts and essential oils in skin care.						K3	9
III	<b>Hair Care</b> - Structure - Types and functions - characterization and formulation of shampoo and anti-dandruff shampoos - classification and formulation of hair colorants - herbal hair care products						K3	9
IV	<b>Clinical Chemistry:</b> Determination of sugar in serum and urine - detection of cholesterol - estimation of red cell count, Na, K, Ca, bicarbonates and phosphates in serum and their significance. Reason for abnormal value of sugar, cholesterol, urea, creatinine - control measures.						K4	9
V	<b>Diagnostic Tools:</b> Principle and uses of Microscopy, Endoscopy, Differential cell counter, X-Ray, ECG, Scanning, Ultrasound, Echo, CT and MRI.						K4	9
<b>Course Outcome</b>	CO1: Get an in-depth understanding about general health maintenance.						K1	
	CO2: Understand the basics of skin care and the various products used for maintenance.						K2	
	CO3: Apply the methods for hair care technology.						K3	
	CO4: Analyze practical knowledge about the tests involved in identification of essential elements in human body.						K4	
	CO5: Evaluate the various diagnostic tools involved to study human anatomy.						K5	
<b>Learning Resources</b>								

<b>Text Books</b>	1. B. M. Mithal and R. N. Saha, A handbook of cosmetics, Vallabh Prakashan publication, New Delhi, 2000. 2. John V. Simmons, Science of Cosmetics, Science and the beauty business, Vol-I Macmillan education, 1989. 3. G. L. David krupadanam, D. Vijaya Prasad, K. Varaprasad Rao, K. L. N. Reddy, C. Sudhakar, Drugs, University Press (India) Ltd, Orient Longman, First Edition, 2001.
<b>Reference Books</b>	1. Ramnik Sood, Medical Laboratory Technology: Methods and Interpretation, Third Edition, Jaypee Brothers medical publishers, 1995. 2. Evelyn C Pearce, General Text Book of Nursing ECBS 1990. 3. Jayashree Ghosh, Applied Chemistry, First Edition, S. Chand and company pvt Ltd, 2016.
<b>Website Link</b>	1. <a href="http://www.hsc.edu.kw/vpo/cgo/resources/Chemistry%20%20for%20Health%20Sciences.pdf">http://www.hsc.edu.kw/vpo/cgo/resources/Chemistry%20%20for%20Health%20Sciences.pdf</a> 2. <a href="https://pubs.acs.org/doi/10.1021/acs.jchemed.0c00887">https://pubs.acs.org/doi/10.1021/acs.jchemed.0c00887</a> 3. <a href="https://www.nigms.nih.gov/education/Booklets/the-chemistry-of-health/Pages/Home.aspx">https://www.nigms.nih.gov/education/Booklets/the-chemistry-of-health/Pages/Home.aspx</a>

L-Lecture

T-Tutorial

P-Practical

C-

Credit

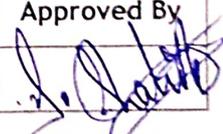
M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

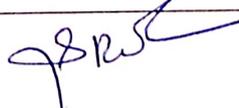
Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C
21M2POCED2	CHEMISTRY IN HEALTH SCIENCE	GEC - EDC - II	II	4	4	0	0	4

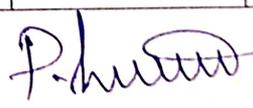
CO-PO Mapping

CO Number	P01	P02	P03	P04	P05	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	M	S	M	S	M	M	S
CO2	M	M	S	M	S	M	M	S	M	S
CO3	S	M	M	L	S	S	M	M	M	S
CO4	M	S	M	M	S	M	S	M	M	S
CO5	M	M	S	L	S	M	M	S	S	S
Level of Correlation between CO and PO	L-LOW	M-MEDIUM		S-STRONG						

Tutorial Schedule	Seminars, Group discussions
Teaching and Learning Methods	Smart-Classroom, Google meet, Demo classes
Assesment Methods	Unit test, Internal examinations, University examinations

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Mr. S. RAMKUMAR	Dr.P.SUMATHI	







**M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards**

Course Code	Course Title	Course Type	Sem	Hours	L	T	P	C	
21M2POCED3	CHEMISTRY IN DAY TO DAY LIFE	GEC - EDC - III	II	4	4	4	0	0	
<b>Objective</b>	To acquire knowledge about good physique fitness, skin care, hair care, clinical chemistry and diagnostic tools.								
Unit	Course Content							Knowledge Levels	Sessions
I	<b>Essential Nutrients:</b> Carbohydrates - Proteins - Lipids - Nucleic acids and Vitamins - Definition, Sources, Classification, Applications and Diseases due to deficiency							K1,K3	9
II	<b>Soil Nutrients and Food Additives:</b> Fertilizers - Pesticides - Insecticides - Definition, Classification, Characteristics and Uses. Additives -Definition, Characteristics, Uses and Abuse of additives in foods and beverages							K3	9
III	<b>Dyes, Paints and Pigments:</b> Dyes - Definition, Classification based on mode of application and structure, Applications. Paints - Definition, Ingredients, Characteristics, uses and drying process. Pigments -Varnishes - Definition, Characteristics, Types and Uses.							K3	9
IV	<b>Soaps, Detergents and Disinfectants:</b> Soaps and Detergents - Definition, Ingredients, Classification, Characteristics and Uses. Disinfectants - Definition, Characteristics and Uses. Characteristics, Raw materials used in soaps preparation							K4	9
V	<b>Miscellaneous products:</b> Toothpaste - mouth wash - perfumes and deodorants - mosquito repellents - talcum powder - face scrubber - sanitizers - room freshners - compositions and uses.							K4	9
<b>Course Outcome</b>	<b>CO1:</b> Gain insight into the essential micronutrients required by human beings.							K1	
	<b>CO2:</b> To understand the soil nutrients and food additives.							K2	
	<b>CO3:</b> Apply the synthectic applications of dyes, paints and pigments.							K3	
	<b>CO4:</b> Analyze the importance and preparations of soaps, detergents and disinfectants.							K4	
	<b>CO5:</b> Evaluate the applications of chemistry in day-to-day life.							K5	
<b>Learning Resources</b>									
<b>Text Books</b>	1. Dr. M Swaminathan, Advanced Text Book on Food and Nutrition - Vol I, 2018. 2. Mahendra Sharma, Textbook of soil Fertility and Nutrient Management, 2016. 3. Subramanian Senthilkannan Muthu, Sustainable Innovations in Textile Chemistry and Dyes (Textile Science and Clothing Technology), 2018.								

<b>Reference Books</b>	1.K. Bagavathi Sundari, Applied Chemistry, MJP Publishers, 2006. 2.Singh. K, Chemistry in Daily Life: Third Edition, 2012. 3.Ley E. Manahan, Fundamentals of Environmental Chemistry, Third Edition, CRC Press, Taylor and Francis Group, 2009.
<b>Website Link</b>	1. <a href="https://www.worldofchemicals.com/455/chemistry-articles/chemistry-in-everyday-life.html">https://www.worldofchemicals.com/455/chemistry-articles/chemistry-in-everyday-life.html</a> 2. <a href="https://www.geeksforgeeks.org/importance-of-chemistry-in-everyday-life/">https://www.geeksforgeeks.org/importance-of-chemistry-in-everyday-life/</a> 3. <a href="https://ncert.nic.in/ncerts/l/lech207.pdf">https://ncert.nic.in/ncerts/l/lech207.pdf</a>

L-Lecture

T-Tutorial P-

Practical

C-

Credit

M.Sc-Organic Chemistry Syllabus LOCF-CBCS with effect from 2021-2022 Onwards

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21M2POCED3	CHEMISTRY IN DAY TO DAY LIFE	GEC - EDC - III	II	4	4	0	0	4

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CO2	M	S	M	M	S	M	S	M	M	S
CO3	M	S	S	M	L	M	S	S	M	M
CO4	M	M	S	S	M	M	M	S	S	M
CO5	S	M	M	S	M	S	M	M	S	M

Level of Correlation between CO and PO	L-LOW	M-MEDIUM	S-STRONG

Tutorial Schedule	Seminars, Group discussions
Teaching and Learning Methods	Smart-Classroom, Google meet, Demo classes
Assesment Methods	Unit test, Internal examinations, University examinations

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