B.Sc., CHEMISTRY

Syllabus

Program Code: UCH



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

Re-accredited with "A" Grade by NAAC PASUMALAI, MADURAI – 625 004

Qualification for Admission

Candidate should have passed the Higher Secondary Examination conducted by the Board of Higher Secondary Education, Government of Tamil Nadu, CBSE Board with Chemistry as one of the subjects in Higher Secondary Education.

Duration of the Course

The students shall undergo the prescribed B.Sc(Chemistry) course of study for a period of three academic years (six semesters).

Subject of Study

Part I: Tamil

Part II: English

Part III:

- 1. Core Subjects
- 2. Allied Subjects
- 3. Electives

Part IV:

- 1. Non Major Electives
- 2. Skill Based Subjects
- 3. Environmental Studies
- 4. Value Education

Part V

Extension activities

The scheme of Examination

The components for continuous internal assessment are:

Two tests and their average --15 marks

Seminar /Group discussion -- 5 marks

Assignment --5 marks

Total 25 Marks

Pattern of the questions paper for the continuous Internal Assessment

(For Part I, Part II, Part III, NME & Skilled Paper in Part IV)

The components for continuous internal assessment are:

Part -A

Four multiple choice questions (answer all) $4 \times 01 = 04$ Marks

Part -B

Three short answers questions (answer all) $3 \times 02 = 06$ Marks

Part -C

Two questions ('either or 'type) 2 x 05=10 Marks

Part -D

Two questions out of three $2 \times 10 = 20 \text{ Marks}$

Total 40 Marks

Pattern of the question paper for the Summative Examinations:

Note: Duration- 3 hours

Part -A

Ten multiple choice questions $10 \times 01 = 10$ Marks

No Unit shall be omitted: not more than two questions from each unit.)

Part -B

Short answer questions (one question from each unit) $5 \times 02 = 10$ Marks

Part -C

Five Paragraph questions ('either or 'type) $5 \times 05 = 25$ Marks

(One question from each Unit)

Part -D

Three Essay questions out of five 3 x 10 =30 Marks

(One question from each Unit)

Total 75 Marks

The Scheme of Examination (Environmental Studies and Value Education)

Two tests and their average --15 marks

Project Report --10 marks*

Total --25 marks

^{**} The students as Individual or Group must visit a local area to document environmental assets – river / forest / grassland / hill / mountain – visit a local polluted site – urban / rural / industrial / agricultural – study of common plants, insects, birds – study of simple ecosystem – pond, river, hill slopes, etc.

Question Paper Pattern

(Internal Assessment)

Pattern of the Question Paper for Environmental Studies & Value Education only) (Internal) 45 MCQs will be asked for two internal assessment tests ($45 \times 1=45 \text{ Marks}$) and converted for 15 marks

Two tests and their average -- 15 marks*
Project -- 10 marks

Total 25 Marks

Summative Examination Pattern

Pattern of the Question Paper for Environmental Studies & Value Education only) (External)

75 Multiple choice questions will be asked from five units ($75 \times 1=75$ Marks)

(15MCQ's from each unit)

Minimum Marks for a Pass

40% of the aggregate (Internal +Summative Examinations).

No separate pass minimum for the Internal Examinations.

27 marks out of 75 is the pass minimum for the Summative Examinations.



VISION

Department of Chemistry undertakes to aspires young adult to excel in Chemical Education, Research and Services to contribute to a chemically literate society through teaching, scholarship and service.

MISSION

To produce employable graduates in various areas and demonstrate science as a human endeavor and as a way to understand the natural world

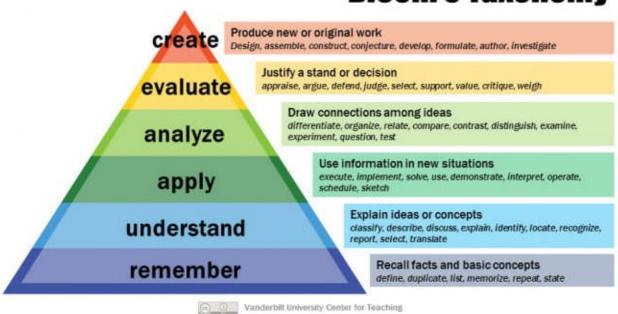
The 12 Graduate Attributes*:

- 1. (KB) A knowledge base for engineering: Demonstrated competence in university level mathematics, natural sciences, engineering fundamentals, and specialized engineering knowledge appropriate to the program.
- 2. (PA) Problem analysis: An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex engineering problems in order to reach substantiated conclusions
- 3. (Inv.) Investigation: An ability to conduct investigations of complex problems by methods that include appropriate experiments, analysis and interpretation of information in order to reach valid conclusions.
- 4. (Des.) Design: An ability to design solutions for complex, open-ended engineering problems and to design systems, components or processes that meet specified needs with appropriate attention to health and safety risks, applicable standards, and economic, environmental, cultural and societal considerations.
- 5. (Tools) Use of engineering tools: An ability to create, select, apply, adapt, and extend appropriate techniques, resources, and modern engineering tools to a range of engineering activities, from simple to complex, with an understanding of the associated limitations.
- 6. (Team) Individual and teamwork: An ability to work effectively as a member and leader in teams, preferably in a multi-disciplinary setting.
- 7. (Comm.) Communication skills: An ability to communicate complex engineering concepts within the profession and with society at large. Such ability includes reading, writing, speaking and listening, and the ability to comprehend and write effective reports and design documentation, and to give and effectively respond to clear instructions.
- 8. (Prof.) Professionalism: An understanding of the roles and responsibilities of the professional engineer in society, especially the primary role of protection of the public and the public interest
- 9. (Impacts) Impact of engineering on society and the environment: An ability to analyze social and environmental aspects of engineering activities. Such ability includes an understanding of the interactions that engineering has with the economic, social, health, safety, legal, and

- cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship.
- 10. (Ethics) Ethics and equity: An ability to apply professional ethics, accountability, and equity.
- 11. (Econ.) Economics and project management: An ability to appropriately incorporate economics and business practices including project, risk, and change management into the practice of engineering and to understand their limitations.
- 12. (LL) Life-long learning: An ability to identify and to address their own educational needs in a changing world in ways sufficient to maintain their competence and to allow them to contribute to the advancement of knowledge

WA	Graduate Attributes	Caption as
1	Disciplinary Knowledge	KB
2, 3	Problem Analysis & Investigation	PA & Inv.
7, 4	Communication Skills & Design	Comm. & Des.
6	Individual and Team Work	Team
8, 10	Professionalism, Ethics and Equity	Prof. & Ethics
12	Digital Literacy & Life-long Learning	LL

Bloom's Taxonomy



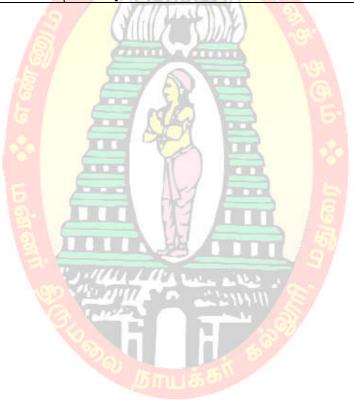
PROGE	RAM EDUCATIONAL OBJECTIVES (PEOs)					
On com	pletion of the Programme, the Student will be able to					
PEO1:	Enhance the students to nurture the requirements of industries/laboratories related to					
	chemistry including pharmaceutical/analytical chemistry.					
PEO2:	Enable the students to demonstrate information literacy skills for acquiring					
	knowledge of chemistry, as a chemist/researcher and also as a life-long learner.					
PEO3:	Develop the students to communicate effectively the scientific and research information					
	in both written and oral formats, to both professional scientists and to the public.					
PEO4:	Collaborate with Industry and Alumni to explore the new avenues in respective domains					
	and raise the employability ratio.					
PEO5:	Adhere towards the ethical and environmental sustainability to create morally upright and					
	empowered citizens to face industry/ institution.					
PEO6:	Nurture environmental awareness and develop communal harmony in respective of					
	national integration.					

B.Sc., PROGRAMME OUTCOMES

At the end of the programme, the students will be able to

S.No	PROGRAMME OUTCOMES (POs)	Graduate Attributes
PO1:	Demonstrate about the knowledge and understanding of Science concepts and its relevant fields.	Disciplinary Knowledge
PO2:	Communicate the known concepts effectively within the profession and with any forum	Communication Skills
PO3:	Use ICT tools in various learning situations, related information sources, suitable software to analyze data and furthermore participating in learning activities throughout life to meet the demands of work place through knowledge /up-skilling / re-skilling	Digital Literacy & Life-long Learning
PO4:	Employ critical and analytical thinking in understanding the concepts and apply them in various problems appearing in different branches of Science and in competitive examinations in various sectors.	Analytical Reasoning & Critical Thinking
PO5:	Identify, formulate, analyse complex problems and reach valid conclusions using the methodologies of Science.	Problem Solving
PO6:	Function successfully as a member/leader in any team and to apply ethics, accountability and equity in their life.	Team Work and Moral/Ethical Awareness

S.No.	Graduate	PROGRAM SPECIFIC OUTCOME (PSOs)
	Attributes	
PSO1:	Knowledge Base	Learn various concepts of organic, inorganic, physical chemistry,
		their biological aspects and their application in day-to-day life.
PSO2:	Problem Analysis &	Design towards executing experiments and confident handling of
	Investigation	equipment's in Chemistry for industries.
PSO3:	Communication	Execute new ideas in the field of research and development using
	Skills & Design	principles and techniques of science learned through activities
		such as expert lecturers, workshops, seminars and field projects.
PSO4:	Professionalism,	Aspire the knowledge of green environment learned through green
	Ethics and Equity	chemistry and pollution free scenario
PSO5:	Individual & Team	Work effectively with a set of teams using modern technical skills
	Work	and innovative research ideas in Chemistry areas
PSO6:	Lifelong learning	Develop employability and entrepreneurship skills learned through
		industry-based curriculum



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous), Pasumalai B.Sc., CHEMISTRY Curriculum

(For the student admitted during the academic year 2021-2022 onwards)

Course Code	Title of the Course	Hrs	Credits	Maxi	mum M	<u>larks</u>
				Int	Ext	Total
	FIRST SEMEST	ER				
Part – I	Tamil / Alternative Course					
21UTAG11	இக்காலக் கவிதையும் நாடகமும்	6	3	25	75	100
Part – II	English					
21UENG11	Communicative English - I	6	3	25	75	100
Part - III	Core Courses	4				
21UCHC11	Inorganic Chemistry -I	4	4	25	75	100
21UCHCP1	Major Chemistry Practical – I	2	-	-	-	
	(Inorganic Semi Micro-Qualitative		9			
	analysis)	VA	3			
Part III	Allied Course	10	12031			
21UPHA11	Allied Physics – I	4	4	25	75	100
21UPHAP1	Allied Physics Practical – I	2	1.001	V -	-	-
Part IV	Skill Based Course	N. A.	10	4		
21UCHS11	Cosmetic Chemistry	2	2	25	75	100
21UCHS12	Green Chemistry	2	2	25	75	100
Part IV	Mandatory Course	THE REAL PROPERTY.		X		
21UEVG11	Environmental Studies	2	2	25	75	100
	Total	30	20	175	525	700
	SECOND SEMES	TER		31	1	•
Part – I	Tamil / Alternative Course			200		
21UTAG21	இடை <mark>க்கா</mark> ல இலக்கியமும் சிறுக <mark>தைய</mark> ும்	6	3	25	75	100
Part – II	English			<i>V</i>		
21UENG21	Communicative English -II	6	3	25	75	100
Part - III	Core Courses	2011				
21UCHC21	Organic Chemistry -I	4	4	25	75	100
21UCHCP1	Major Chemistry Practical – I	2	2	40	60	100
	(Inorganic Semi Micro-Qualitative	9				
	analysis)					
Part III	Allied Course					
21UPHA21	Allied Physics – II	4	4	25	75	100
21UPHAP1	Allied Physics Practical – I	2	1	40	60	100
Part IV	Skill Based Course					
21UCHS21	Dairy Chemistry	2	2	25	75	100
21UCHS22	Dye Chemistry	2	2	25	75	100
Part IV	Mandatory Course					
21UVLG21	Value Education	2	2	25	75	100
	Total	30	23	255	645	900

	THIRD SEMEST	ER				
Part – I	Tamil / Alternative Course					
21UTAG31	காப்பிய இலக்கியமும்	6	3	25	75	100
	உரைநடையும்					
Part – II	English					
21UENG31	Communicative English -III	6	3	25	75	100
Part - III	Core Courses					
21UCHC31	Physical Chemistry – I	4	4	25	75	100
21UCHC32	Inorganic Chemistry – II	4	4	25	75	100
21UCHCP2	Major Chemistry Practical – II	2	-	-	=	
	(Volumetric Analysis)					
Part III	Allied Course					
21UMCA31 /	Allied Mathematics – I /	6	4	25	75	100
21UMBA31	Allied Microbiology – I	(0/				
Part IV	Non-Major Elective Course	1	8			
21UCHN31	Chemistry in Everyday Life	2	2	25	75	100
	Total	30	20	150	450	600
	FOURTH SEMES	TER	- Ica		Г	
Part – I	Tamil / Alternative Course	3	1991	0		
21UTAG41	பண் <mark>டைய இலக்கி</mark> யமும் புத <mark>ின</mark> மும்	6	3	25	75	100
Part – II	Engl <mark>ish </mark>					
21UENG41	Communicative English -IV	6	3	25	75	100
Part - III	Core Courses					
21UCHC41	Org <mark>anic Chemist</mark> ry – II	4	4	25	75	100
21UCHC42	Physical Chemistry – II	4	4	25	75	100
21UCHCP2	Major Chemistry Practical – II	2	2	40	60	100
	(Volumetric Analysis)			20		
Part III	Allied Course			7		
21UMCA41 /	Allied Mathematics – II /	6	4	25	75	100
21UMBA41	Allied Microbiology – II	7		2.		
Part IV	Non-M <mark>ajor E</mark> lective Course	A CA	100			
21UCHN41	Waste Water Treatment	2	2	25	75	100
Part V	Extension Activities	-a Y	637			
21UEAG40-	NSS, NCC, YRC	- (1	100	-	100
21UEAG49	00					
	Total	30	23	290	510	800
	FIFTH SEMEST	ER	1	Ī	Γ	
Part - III	Core Courses					
21UCHC51	Organic Chemistry – III	6	5	25	75	100
21UCHCP3	Major Chemistry Practical – III	6	5	40	60	100
	(Gravimetric Analysis and Organic					
	Preparation)					
21UCHCP4	Major Chemistry Practical - IV	3	_	_	-	-
	(Physical Chemistry experiments)					
21UCHCP5	Major Chemistry Practical – V	3	-		-	-
	(Organic Analysis and Estimation)					
Part III	Core Elective					

21UCHE51	Inorganic and Analytical Chemistry	5	5	25	75	100
21UCHE52	Bioinorganic Chemistry	5	5	25	75	100
Part IV	Skill Based Course					
21UCHS51	Drug Chemistry	2	2	25	75	100
	Total	30	22	140	360	500
	SIXTH SEMEST	ER				
Part - III	Core Courses					
21UCHC61	Physical Chemistry – III	6	5	25	75	100
21UCHCP4	Physical Chemistry experiments	3	5	40	60	100
	(Practical)					
21UCHCP5	Organic Analysis and Estimation	3	5	40	60	100
	(Practical)					
21UCHCPR1	PROJECT	6	5	40	60	100
Part III	Core Elective Courses	18				
21UCHE61	Industrial Chemistry	5	5	25	75	100
21UCHE62	Nano Chemistry	5	5	25	75	100
Part IV	Skill Based Course	U	Len			
21UCHS61	Polymer Chemistry	2	2	25	75	100
	Total	30	32	220	480	700
	Grand Total	180	140	1230	2970	4200

Semester	Sub Code	List of Elective Courses
SEM V	21UCHE51	Inorganic and Analytical Chemistry
SEM V	21UCHE52	Bioinorganic Chemistry
SEM V	21UCHE53	Forensic Chemistry
SEM VI	21UCHE61	Industrial Chemistry
SEM VI	21UCHE62	Nano Chemistry
SEM VI	21UCHE63	Pharmaceutical Chemistry





MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF CHEMISTRY

(For those who joined in 2021-2022 and after)

Course Name	INORGANIC CHEMISTRY – I					
Course Code	21UCHC11			L	P	C
Category	Core			4	-	4
Nature of cours	e: EMPLOYABILITY ✓ SKILL ORIENT	ED	ENTREPREN	URSI	HIP	√
Course Object	ves:					
To Recall the	e structure of atom and also know the variou	s model	of an atom for t	he str	uctur	e of
the atoms.	5 00000					
• To Rememb	er the basic <mark>s of periodic</mark> table and atomic pro	operties t	o relate their pri	inciple	es	
• To Compare	e the types <mark>of bonds to r</mark> elate their relations be	etween t	<mark>he</mark> m.			
• To Perform	the chemical bonding and VSEPR theory and	d their a	oplications to fir	nd the		
geometry of	molecu <mark>les. / </mark>					
• To Determi	ne the v <mark>arious concept</mark> s on Acid <mark>s a</mark> nd Bases a	nd also	<mark>know t</mark> he positio	ons of		
hydrogen ar	id its p <mark>roperties.</mark>	2	C.			
Unit: I ST	RUCT <mark>URE OF ATOM</mark>	9			1:	2
An outline of co	onstitu <mark>ents of atom (elementary idea) – Ruthe</mark>	rford mo	odel of an atom -	- Mos	ley's	
determination o	f atom <mark>ic number –</mark> mass number. Quantum th	eory: B	ack body radiati	ion –	photo)
	Compton effect – Bohr model of atom: postu		•			
	ons – Heisenberg's uncertainty principle – Q					on
	pau pri <mark>nciple – H</mark> und's rule – electronic confi					
	RIODIC TABLE AND ATOMIC PROPE	-	Ave a		1:	2
The long form	of periodic table- periodic law and electronic	configu	ration of elemen	nts- H	lorizo	onta
•	ationship. Atomic properties- Size of atom-					
	y- Electr <mark>onegat</mark> ivity- Different scales- Dia					
	basis of their electronic configuration- (furth					
	EMICAL BONDING	(43)	7	,	1:	2
	cal bonding – octet rule – ionic bond – coval	lent bon	d – valence bon	d ann		
	jan's rule – VSEPR theory and its limitations					
	elecules (NH ₃ and H_2O) – hybridization – sp					
	lecular Orbital theory – LCAO method – MC					
/	•	_				
	c molecules $-$ H ₂ , He ₂ , Li ₂ , Be ₂ , C ₂ , N ₂ , O rty and bond order	J_2 , Γ_2 , C	o and mr – de	term	пано	11 0
	IDS AND BASES				1:	<u> </u>
		r Floor	1 androme areato	*** 0.5		
	cept-Lowry Bronsted –Lewis concepts-Lu		•		_	
	cept. Factors influencing the acidic and base offeat and electron getivity offeat). Over an				⊦ı an	u –
	e effect and electronegativity effect). Oxo aci			cius.	1.	<u> </u>
	DROGEN, OZONE AND HYDROGEN P			o11==1*	1:	
	ition of hydrogen in periodic table – resemb					
resembiance Wi	th halogens – special position of hydrogen –	resembl	ance with carboi	u – pr	epara	เนอเ

– manufacture – pure hydrogen – ortho and para hydrogen – occluded hydrogen – uses – Isotopes

of hydrogen – Isotopic effect – hydrides – classification – examples. **Ozone**: Commercial preparation, properties, uses, structure. **Hydrogen peroxide**: Manufacture – properties – structure and uses – estimation by permanganometric and iodimetric method – strength of hydrogen peroxide.

Total Lecture Hours | 60 Hrs

Books for Study:

1. B.R. Puri, L.R.Sharma & K.C. Kalia, **Principles of Inorganic Chemistry** Milestone Publisher 31st edition, New Delhi 2013

Books for References:

- 1. Puri, Sharma & Kalia, **Principles of Inorganic Chemistry** Milestone publisher & distributor, New Delhi 2009.
- 2. R. D Madan S.Chand, Modern Inorganic Chemistry band Co.Ltd, New Delhi 2012.
- 3. J D.Lee, Wiley India, Concise Inorganic Chemistry 5th Edition, New Delhi 2009.

Web Resources:

- 1. https://bit.ly/3tu7P32
- 2. https://bit.ly/2Qev0Ac
- 3. https://bit.ly/3bRnjs6
- 4. https://bit.ly/30R8dww

	Section of the last of the las	
Course	e Outcomes (San Carlotte Control Contr	K Level
On the	e completion of <mark>the course th</mark> e student will be able to	
CO1:	Recall the general characteristics of sub atomic particles of an atom and	[Up to K2]
	periodicity	
CO2:	Discuss the long form periodic table, types of chemical bonds and concept of	[Up to K3]
	Acids and Bases.	
CO3:	Prepare the hydrogen, ozone and hydrogen peroxide and compute the	[Up to K3]
	properties with alkali metals	
CO4:	Examine the Quantum model of an atom and VSEPR theory to find the	[Up to K4]
	geometry of molecules	
CO5 :	Apply various types of bonds and quantum model of atom for the geometry	[Up to K4]
	of molecules	

CO & PO Mapping:

Course Outcomes	Programme Outcomes (POs)						
(COs)	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	
CO 1	3	1 5	2	3	1	2	
CO 2	1	3	1	1	2	3	
CO 3	2	2	3	2	3	3	
CO 4	3	1	2	2	1	2	
CO5	1	3	2	3	2	1	
Weightage	10	10	10	11	9	11	

^{*3 –} Advanced Application; 2 – Intermediate Development; 1 - Introductory Level

LESSON PLAN

Unit	Course Name	Hrs	Pedagogy
I	STRUCTURE OF ATOM An outline of constituents of atom (elementary idea) – Rutherford model of an atom – Mosley's determination of atomic number – mass number. Quantum theory: Black body radiation – photo electric effect – Compton effect – Bohr model of atom: postulate and hydrogen spectrum – de Broglie's equations – Heizenberg's uncertainty principle – Quantum numbers – Pauli's exclusion principle – Aufbau principle – Hund's rule – electronic configuration of atoms.	12	Chalk, Talk & Power point
II	PERIODIC TABLE AND ATOMIC PROPERTIES The long form of periodic table- periodic law and electronic configuration of elements- Horizontal and vertical relationship. Atomic properties- Size of atom- Atomic Volumes - Ionisation energy- electron affinity- Electronegativity- Different scales- Diagonal relationship-Classification of elements on the basis of their electronic configuration - (further extension of periodic table).	12	Chalk, Talk & Power point
III	CHEMICAL BONDING Cause of chemical bonding – octet rule – ionic bond – covalent bond – valence bond approach- its limitations – Fajan's rule – VSEPR theory and its limitations – application of VSEPR theory to find geometry of molecules (NH ₃ and H ₂ O) – hybridization – sp, sp², sp³, sp³d² and (BeF ₂ , BCl ₃ , CH ₄ , SF ₆ , H ₂ O)- Molecular Orbital theory – LCAO method – MO diagram for homo nuclear and hetero nuclear diatomic molecules – H ₂ , He ₂ , Li ₂ , Be ₂ , C ₂ , N ₂ , O ₂ , F ₂ , CO and HF – determination of magnetic property and bond order	12	Chalk, Talk & Power point
IV	ACIDS AND BASES Arrhenius concept-Lowry Bronsted –Lewis concepts-Lux Flood solvent system concepts -Usonowich concept. Factors influencing the acidic and basis properties (steric effect, +I and –I effect, resonance effect and electronegativity effect). Oxo acids and strength of oxo acids.	12	Chalk, Talk & Power point
V	HYDROGEN, OZONE AND HYDROGEN PEROXIDE Hydrogen: Position of hydrogen in periodic table – resemblance of hydrogen with alkali metals – resemblance with halogens – special position of hydrogen – resemblance with carbon – preparation – manufacture – pure hydrogen – ortho and para hydrogen – occluded hydrogen – uses – Isotopes of hydrogen – Isotopic effect – hydrides – classification – examples. Ozone: Commercial preparation, properties, uses, structure. Hydrogen peroxide: Manufacture – properties – structure and uses – estimation by permanganometric and iodimetric method – strength of hydrogen peroxide.	12	Chalk, Talk & Power point

Course Designed by: Dr. V. Ramasamy Raja & Dr. J.E. Sangeetha

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print

Articulation Mapping – K Levels with Course Outcomes (COs)

Inte	Cos	K Level	Section		Section		Section C	Section D
rnal			MCQ	s	Short Ans	swers	Either or	Open
			No. of.	K –	No. of.	K -	Choice	Choice
			Questions	Level	Questions	Level		
CI	CO1	Up to K2	2	K1 &	1	K1	2 (K2&K2)	1(K2)
ΑI				K2				
	CO2	Up to K3	2	K1 &	2	K2	2 (K3&K3)	2(K2 &
				K2				K3)
CI	CO3	Up to K2	2	K1 &	1	K2	2 (K2&K2)	1(K2)
AII			(DE)	K2	0001			
	CO4	Up to K4	2	K1 &	2	K2	2 (K3&K3)	2(K3 &K4)
				K2				
Que	stion	No. of	4		3		4	3
Pat	tern	Questions to be	(VIIII	7 (DIN)	CAR		
CIA	I & II	asked	CELLIN.	0.00	TITA			
		No. of	4		3	199	2	2
		Questions to be	1117	EN 1	RILL	100		
		answered		5.4	TOTAL STREET			
		Marks for each		Y MANY	2	The M	5	10
		question						
		Total Marks for	4	65	6	1002	10	20
		each section	ALKE!	M /				

Distribution	of Monley wit	h I/ I ovol	CTAT	Q. CTA II
HICTPINITION	of Wigree Wit	n K LAVAL		

		Dist	Tipution of	wai ks will	I IX Level C	IAIQ		
	K	Section A	Section B	Section C	Section D	Total	% of	Consolidate
	Level	(Multi <mark>ple</mark>	(Short	(Either /	(Open	Marks	(Marks	of %
		Choice	Answer	Or	Choice)	191	without	
		Questions)	Questions)	Choice)	-		choice)	
	K1	2	2	7 %	Truck '	4	6.67	
	K2	2	4	10	20	36	60	67
CIA	К3	-	76	10	10	20	33.33	33
I	K4	-	100		100	-	-	-
	Marks	4	6	20	30	60	100	100
	K1	2	2	வாபல	-	4	6.67	
CIA	K2	2	4	10	10	26	43.33	50
II	К3	-	-	10	10	20	33.33	33
	K4	-	-	-	10	10	16.67	17
	Marks	4	6	20	30	60	100	100

- K1- Remembering and recalling facts with specific answers
- K2- Basic understanding of facts and stating main ideas with general answers
- **K3** Application oriented- Solving Problems
- **K4** Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

S	Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)									
S.No	Cos	K - Level	MC	Qs	Short Answers		Section C	Section D		
			No. of	K –	No. of	K –	(Either /	(Open		
			Question	Level	Question	Level	or	Choice)		
			S				Choice)			
1	CO1	Up to K 2	2	K1,K2	1	K1	2 (K2&K2)	1(K2)		
2	CO2	Upto K 3	2	K1&K2	1	K1	2 (K3&K3)	1(K3)		
3	CO3	Up to K 3	2	K1&K2	1	K2	2 (K3&K3)	1(K3)		
4	CO4	Up to K 4	2	K1&K2	1	K2	2 (K3&K3)	1(K4)		
5	CO5	Up to K 4	2	K1&K2	1	K2	2 (K3&K3)	1(K4)		
No. of	Questions	s to be Asked	10	SULD :	5		10	5		
No	of Questi	ions to be	10		5		5	3		
answered		ALL ST		0/						
Marks for each question		6 1 1	MA	2		5	10			
Total	Marks for	each section	10	make the factories.	10	Ma	25	30		
	Figures	in parenthesi	is denotes, q	uestions s	hould b <mark>e as</mark> l	ked with	the given K	level)		

	Distribution of Marks with K Level								
K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %		
K1	5	4	- 1	1	9	7.5	22		
K2	5	6	10	10	31	25.83	33		
K3	-	9 1	40	20	60	50	50		
K4	-	El C		20	20	16.67	17		
Marks	10	10	50	50	120	100	100		

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

Summative Examinations - Question Paper - Format

			Section A (Multiple Choice Questions)	
	\mathbf{A}	nswer All (Questions (10x1=10 marks)	
Q.No	CO	K Level	Questions	
1	CO1	K1		
2	CO1	K2		
3	CO2	K1		
4	CO2	K2		
5	CO3	K1		
6	CO3	K2		
7	CO4	K1		
8	CO4	K2		

9	CO5	K1	
10	CO5	K2	
_			Section B (Short Answers)
	A	nswer All	· · · · · · · · · · · · · · · · · · ·
Q.No	CO	K Level	Questions
11	CO1	K1	
12	CO2	K1	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	
			Section C (Either/Or Type)
		wer All Qu	
Q.No	CO	K Level	Questions
16) a	CO1	K2	T MAM
16) b	CO1	K2	
17) a	CO2	K3	(S) (V((1445))V(3)
17) b	CO2	K3	
18) a	CO3	K3	CALIFORNIA CALIFORNIA
18) b	CO3	K3	TU
19) a	CO4	K3	
19) b	CO4	K3	
20) a	CO5	K3	
20) b	CO5	К3	
NB: H	ligher l	evel of per	formance of the students is to be assessed by attempting higher level
			of K levels
			Section D (Open Choice)
0.37			Three questions (3x10=30 marks)
Q.No	CO	K Level	Questions
21	CO1	K2	
22	CO2	K3	Julia Library
23	CO ₃	K3	CONTRACTOR CONTRACTOR
24	CO4	K4	
25	CO5	K4	



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF CHEMISTRY

(For those who joined in 2021-2022 and after)

Course Name				RACTICAL – I Ialitative Analysis)					
Course Code	21UCHCP1	eiiii iviici	<u>0 – Qu</u>	iantative Analysis)	,		L	P	С
Category	Core							2	-
Nature of cours	e: EMPLOYA	ABILITY	✓ Sk	KILL ORIENTED	✓	ENTREPRE	NURS	HIP	✓
Course Objecti	ves:		-31	10 45					
To Recall th	ne basic proper	ties of sal	t mixtu	ıres.					
			7 7	species in the salt n					
				nic <mark>species in semi i</mark>					
			100 1 1 1 1 1	nions and cations pr				•	
	ct four radicals f examination		ect pro	ocedure during anal	ysis (of the salt mixt	ures.		
			nina t	wa aniona of which		io on intenfeni	i.		
	od two cations		ming t	wo anions of which	1 One	e is an interferi	ng m	seiiii-	
micro memo	ou two cations	ē	= 7						
Anions:									30
	rbonate sulph:	ate nitrate	fluori	ide, chloride, bromi	ide i	odide ovalate			20
	rate, ph <mark>osphate</mark>			ide, emoride, bronn	iuc, i	odide, Oxarate,			
		4							
Cations: L	ead, bismuth,	copper, ca	dmium	n, <mark>anti</mark> mony, iron (I	I and	III), aluminiu	n,		
				balt, nickel, barium			,		
	Iagnesium and				٥,	97			
) istribi	ution of marks					
		J. Call	May	marks: 100					
Internal	: 40 marks		Max	100		External: 6	0 mai	rks	
Laboratory Performan		: 30 ma	arks	Vivo voce		: 10 mar	ks		
Observatio	n note book	: 10 ma	arks	Record note boo	k	: 10 mar	ks		
				Four radicals wit		: 40 mar	ks		
Total		: 40 ma	arks	Total		: 60 mar	ks		
						Total Lec	ture H	Hours	30

Hr

S

Books for Study:

1. Dr. V. V. Ramanujam, Inorganic Semimicro Qualitative Analysis, National Publishing Company, 3rd edition, Chennai, 1974.

Books for References:

1. Vogel, Text book of Qualitative Analysis including Semi Micro Methods, Longman Sc & Tech, 2008.

Web Resources:

- 1. https://www.youtube.com/watch?v=cEOvj6jkdDw
- 2. https://www.youtube.com/watch?v=T3hi_xEpaDg
- 3. https://www.youtube.com/watch?v=BK7rf4XE4f8
- 4. https://www.youtube.com/watch?v=QQo1e-BUZWs

Cours	e Outcomes:	K Level
On th	e completion of th <mark>e course the s</mark> tudent will be able to	
CO1:	Identify the basic radical and its group in the given salt mixture.	[Up to K2]
CO2:	Understand the qualitative analysis skill of any given inorganic salt mixture.	[Up to K3]
CO3:	Develop the acid radicals present in the given inorganic salt mixture.	[Up to K3]
CO4:	Analyze the basic radical systematically.	[Up to K4]
CO5:	Apply the four radicals with correct procedure during analysis of the salt	[Up to K4]
	mixtures	

CO & PO Mapping:

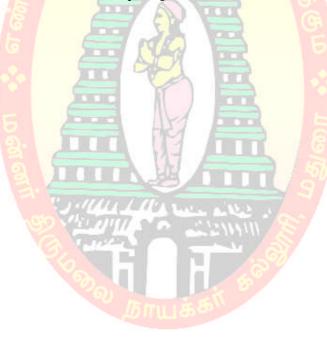
Course Outcomes	Programme Outcomes (POs)								
(COs)	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6			
CO 1	3	441F-	2	3	1	2			
CO 2	1	3	1	0 1	2	3			
CO 3	2	2	3	2	3	3			
CO 4	3	1	2	2	1	2			
CO5	2	3	1	3	2	1			
Weightage	11	10	9	11	9	11			

^{*3 –} Advanced Application; 2 – Intermediate Development; 1 - Introductory Level

LESSON PLAN

UNIT	INORGANIC SEMI MICRO – QUALITATIVE ANALYSIS	Hrs	Mode
Ι	Duration of examination : 3hrs		
	Analysis of a mixture containing two anions of which one is an		
	interfering in semi-micro method two cations		
	Anions:		
	Carbonate, sulphate, nitrate, fluoride, chloride, bromide, iodide,		
	oxalate, Borate, phosphate and chromate.	30	Practical
	#11D #		
	Cations: Lead, bismuth, copper, cadmium, antimony, iron (II and III),		
	aluminium, Chromium, zinc, manganese, cobalt, nickel, barium,		
	calcium, Magnesium and ammonium.		
	S NAPPRONE 3		

Course Designed by: Dr. V. Ramasamy Raja & Dr. R. Satheesh





MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF CHEMISTRY

(For those who joined in 2021-2022 and after)

Course Name	ALLIED PHYSICS-I: Mechanics, Properties of Matter, Heat an	d So	und	
Course Code	21UPHA11	L	P	C
Category	Allied	4	-	4
Nature of cour	se: EMPLOYABILITY ✓ SKILL ORIENTED ✓ ENTREPRENU	IRSF	HIP	
Course Objec	tives:			ı
The learners w	ill be able:			
	llect Newton's law of motion			
	erstand the elasticity property and types of modulus			
	erstand the viscosity and application of Bernoulli's theorem			
	erstand the concepts of S.H.M			
	echanic <mark>s </mark>		1.	
Torque – Ang	ular m <mark>omentum –M</mark> oment o <mark>f Iner</mark> tia –Perpen <mark>dicular and P</mark> arallel ax	tes t	heore	em -
Kepler's law	of plan <mark>etary motion - Newton's laws</mark> of gravit <mark>ation–Mass an</mark> d densit	y of	Ear	th -
Boy's method	for G– <mark>Compound</mark> pendulum-Exp <mark>ress</mark> ion for period-Exp <mark>erime</mark> nt to find	"g"		
	asticity		12	
Stress and Str	ain - El <mark>asticity-</mark> Different modu <mark>li o</mark> f Elasticity-Po <mark>isson's rat</mark> io-Bendir	ng o	f bea	ms-
Expression for	bending moment-Determination of Young's modulus by uniform and	l non	unif	orn
bending-Torsi	on–Expres <mark>sion f</mark> or couple per unit twist–Work <mark>done</mark> in twisting	- '	Гorsi	ona
oscillations of	a body - Wor <mark>kdone</mark> in twisting– Rigidity modulus <mark>by tor</mark> sion pendulum			
Unit: III Vi	scosity		1	1
coefficient of	viscosity -Derivation of Poiseuille's formula - coefficient of viscosity	of a	liqui	d by
Poiseuille's m	ethod – Equation of <mark>continuity-Bernoulli'</mark> s theorem–derivation–A _l	plic	ation	s of
Bernoulli's the	orem (Venturimeter and Pitot tube).			
Unit: IV H	eat		12	2
Kinetic theory	of gases - Mean free path - Transport phenomena - Expression for t	he co	oeffic	cien
of Diffusion,	viscosity and thermal conductivity - Degree of freedom - Boltzr	nan'	s lav	v of
equipartition o	f energy – calculation of Υ for mono atomic and diatomic gases - The	rmo	dyna	mics
– First and se	cond laws of thermodynamics (statement only) - Entropy - change	of e	ntrop	y ir
Carnot's cycle	- Change of entropy in conversion of ice into stream			

Unit: V Sound 12

Simple harmonic motion – Composition of two S.H.M's of equal time periods at right angles – Stationary waves – Properties of stationary waves – Melde's experiment for the frequency of electrically maintained tuning fork (Transverse and Longitudinal modes) - Ultrasonics – Production – Piezoelectric method – Detection – Kundt's tube and Piezoelectric - Properties – Applications

Books for Study:

- 1. R.Murugesan, Mechanics, Properties of Matter and Sound, Madurai, first edition, July 2016. [B.Sc. Ancillary Physics
 - * Unit-I: 1.1, 2.1-2.7, 2.13-2.15, 3.1-3.5
 - * Unit–II: 4.1-4.5, 4.7,4.8,4.10-4.13
 - * Unit-III: 5.2-5.7 -
 - * Unit-V: 6.1, 6.3, 6.4, 6.7-6.9, 6.12
 - * R..Murugeshan, Thermal Physics, Madurai, First edition June 2012
 - * Unit-IV: 6.1, 6.3-6.7, 6.9-6.11, 7.4-7.7

Books for References:

- 1. S.L.Kakani, C.Hemarajani, S.Kakani, Mechanics, IIIedition, VivaBooks Ltd, NewDelhi, 2011.
- 2. HalidayResnic, Jearl Walker, **Principles of Physics**, 9th Edition, Wiley India Pvt. Ltd, New Delhi, 2012.
- 3. D.S.Mathur, Mechanics, S.Chandand Co., New Delhi, 2008
- 4. Brijlaland N.Subramanyam, Propertiesofmatter, S. Chandand Co., New Delhi, 2004
- 5. BrijlalandN.Subramanyam, HeatandThermodynamics, S.Chandand Co, New Delhi, 2004.

Web Resources:

- 1. https://latestcontents.com/bsc-physics-mechanics-notes/
- 2. www.khanacademy.org/science/physics/elasticity/surface tension
- 3. https://www.askiitians.com/revision-notes/physics/kinetic-theory-of-gases/
- **4.** https://www.askiitians.com/revision-notes/physics/thermodynamics/

Course Outcomes						
After	successful completion of the course, the student is expected to					
CO1:	Understand the concepts of Newton's law of Gravitation, different modulus of elasticity, mean free path, degrees of freedom, laws of thermodynamics and stationary waves	K2				
CO2:	Define centripetal and centrifugal force, angular velocity, moment of inertia, elasticity, Poisson's ratio, bending of beams, Bernouli's theorem, Transport Phenomena, mono and diatomic gases, S.H.M, properties of Ultrasonic waves	К3				
CO3:	Apply torque, angular momentum, expression for bending of moment, couple per unit twist, Bernouli's theorem, Boltzmann's law of equipartition of energy, change of entropy in conversion of ice to steam, applications of Ultrasonic	К3				

	waves	
CO4:	Analyze parallel and perpendicular axis theorem, Boy's method for G, determine and analyze uniform and non-uniform bending, Poiseuille's formula to find the coefficient viscosity of liquid	K4
CO5:	Analyze the change of entropy in Carnot's cycle, Kundt's tube and Piezo electric method for the production of Ultrasonic waves, Melde's experiment for the frequency of tuning fork	K4

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	2	2
CO 2	3	2	1	2	2	2
CO 3	3	2	2000	2	2	2
CO 4	3	2	2	1	2	2
CO 5	2	2	(2) 1 A (2)	1	2	2

^{*3 –} Advanced Application; 2 – Intermediate Development; 1 - Introductory Level

LESSON PLAN

Unit	ALLIEDPHYSICS—I Mechanics, Properties of Matter, Heat and Sound	Hrs	Pedagogy
I	Mechanics Torque – Angular momentum –Moment of Inertia –Perpendicular and Parallel axes theorem - Kepler'slawsofplanetarymotion-Newton'slawsofgravitation–Massanddensityof Earth–Boy's method for G–Compound pendulum-Expression for period-Experiment to find "g"	13	Lecture method, PPT, Demonstration
п	Elasticity Different moduli of Elasticity-Poisson's ratio—Bending of beams— Expression for bending moment—Determination of Young's modulus by uniform and non uniform bending — Torsion— Expression for couple per unit twist — Workdone in twisting Torsional oscillations of a body - Workdone in twisting—Rigidity modulus by torsion pendulum	12	Lecture method, PPT, Demonstration
Ш	Viscosity Viscosity - Derivation of Poiseuille's formula - coefficient of viscosity of a liquid by Poiseuille's method - Equation of continuity - Bernoulli's theorem - derivation - Applications of Bernoulli's theorem (Venturimeter and Pitot tube)	11	Lecture method, PPT, Model
IV	Heat Kinetic theory of gases – Mean free path – Transport phenomena – Expression for the coefficient of Diffusion, viscosity and thermal	12	Lecture method, PPT

	conductivity – Degree of freedom – Boltzman's law of equipartition of energy – calculation of Y for mono atomic and diatomic gases - Thermodynamics – First and second laws of thermodynamics (statement only) – Entropy – change of entropy in Carnot's cycle – Change of entropy in conversion of ice into stream		
V	Sound Simple harmonic motion — Composition of two S.H.M's of equal time periods at right angles - Stationary waves — Properties of stationary waves — Melde's experiment for the frequency of electrically maintained tuning fork (Ttransverse and Longitudinal modes) - Ultrasonics — Production — Piezo electric method — Detection — Kundt's tube and Piezo electric — Properties — Applications	12	Lecture method, PPT

Course Designed by: 1. Mrs.A.Lakshmi, 2. Dr.S.S.Jayabalakrishnan

	Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print											
		1	Articul	ation Mappi		/ Val.			(COs)			
Toda	To A.		9	Section		Sectio		Secti (Eith	Section C Section (Either or (Ope Choice) Choic		pen	
Inte rnal	COs	Le	Unit	MCQ	S	Short Ar	nswers	No.		No.		
Illai		vel	Dear	No. of. Questions	K - Level	No. of. Questions	K - Level	of. Ques tions	K - Level	of. Ques tions	K - Level	
CI	CO1	K1 to	I	2	K1 & K2	100	K1	2	K2	1	K2	
AI	AI to CO5	K4	II	2 2	K1 & K2	2	K2	2	К3	2	К3	
CI	CO1	K1	III	2	K1 & K2	1	K2	2	К3	1	К3	
AII	to CO5	to K4	IV	2	K1 & K2	2	K2	2	K4	2	K4	
			o. of estions o be sked	4		3			4		3	
Pattern Que to ans Mar		Que to	o. of estions o be wered	4		3		2		2		
		e	rks for ach estion	1		2			5		0	

Mari	otal ks for ach	6	10	20
sec	etion			

	Distribution of Marks with K Level CIA I & CIA II												
	K (Multip Level Choice		Choice Answer Or (Op		Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidate of %					
	K 1	2	2			4	6.7	50					
	K2	2	4	10	10	26	43.3	30					
CIA	К3		30%	10	20	30	50.0	50					
T	K4			MAA	1 2			=					
1	Marks	4	6	20	30	60	100	100					
	K 1	2	2		ME	4	6.7	16.7					
	K2	2	4			6	10.0	10.7					
CIA	К3	/ 6	// 52	10	10	20	33.3	33.3					
II	K4	18	700	10	20	30	50.0	50					
	Marks	4	6	20	30	60	100	100					

- **K1** Remembering and recalling facts with specific answers
- **K2** Basic understanding of facts and stating main ideas with general answers
- **K3** Application oriented- Solving Problems
- K4- Examining, analyzing, presentation and make inferences with evidences

<u>UNIT-V</u> will be allotted for individual Assignment in <u>CO5 - K4</u> level which carries five marks as part of CIA component.

Si	Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)														
S.No.	COs K	COa	CO-	COa	COs	К-	Unit	MO)Qs		ort wers	(Eith	on C er / or oice)		tion D Choice)
5.110.	COS	Level	Umt	No.of Ques tions	K – Level										
1	CO1 - CO5	K1 to K4	I	2	K1 & K2	1	K1	2	K2 & K2	1	K2				
2	CO1 - CO5	K1 to K4	II	2	K1 & K2	1	K1	2	K3 & K3	1	К3				
3	CO1 - CO5	K1 to K4	III	2	K1 & K2	1	K2	2	K3 & K3	1	К3				
4	CO1	K1	IV	2	K1	1	K2	2	K4 &	1	K4				

	CO5	to K4			&K2				K4		
5	CO1 - CO5	K1 to K4	V	2	K1 & K2	1	K2	2	K4 & K4	1	K4
No. of	Questio	ns to be	Asked	10		5		10		5	
No.	No. of Questions to be answered		10		5			5		3	
Marks for each question		1		2		5		10			
Total N	Marks fo	r each s	ection	10		10		2	5	30	

	Distribution of Marks with K Level											
K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %					
K1	5	4		THE	9	12	47					
K2	5	6	10	10	31	34.66	47					
K3		9	20	20	40	27	27					
K4		S 7	20	20	40	26.66	26					
Marks	10	10	50	50	120	100	100					

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

Summative Examinations - Question Paper - Format

	Summative Examinations - Question 1 april - Format											
			Section A (Mult	riple Choice Ques <mark>tions)</mark>								
	Answer All Que <mark>stions (10x1=10 marks)</mark>											
Q.No	CO	K Level	00	Questions								
1	CO1	K1	TE OF	17. T.								
2	CO1	K2	1	ILLO								
3	CO2	K1										
4	CO2	K2										
5	CO3	K1										
6	CO3	K2										
7	CO4	K1										
8	CO4	K2										
9	CO5	K1										
10	CO5	K2										
	·		Section B	(Short Answers)								
	A	nswer All	Questions	(5x2=10 marks)								

Q.No	CO	K Level	Questions
11	CO1	K1	<u> </u>
12	CO2	K1	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	
			Section C (Either/Or Type)
		wer All Qu	` ,
Q.No	CO	K Level	Questions
16) a	CO1	K2	
16) b	CO1	K2	
17) a	CO2	K3	E(10 & C)
17) b	CO2	K3	88
18) a	CO3	K3	22.44
18) b	CO3	K3	
19) a	CO4	K4	
19) b	CO4	K4	
20) a	CO5	K4	COUNTY OTHER
20) b	CO5	K4	
NB: H	Iigher l	evel of per	<mark>formance o</mark> f the stud <mark>en</mark> ts is to be <mark>assessed by at</mark> tempting higher level
			of K levels
			Section D (Open Choice)
			Three questions (3x10=30 marks)
Q.No	CO	K Level	Questions
21	CO1	K2	
22	CO2	K3	
23	CO3	K3	
24	CO4	K4	
25	CO5	K4	9



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF CHEMISTRY

(For those who joined in 2021-2022 and after)

Course Code	ALLIED PHYSICS PI 21UPHAP1					L	P	C
Category	Allied							
Nature of cour	ese: EMPLOYABILITY	✓ SKILL ORII	ENTED	✓	ENTREPREN	NURS	HIP	
Course Object	tives:	B) D 56	1000	1				<u> </u>
The learners w	ill be able:	20.000	700					
1. To gain know	wledge about t <mark>he experim</mark>	<mark>ents</mark> bas <mark>e</mark> d on O _l	otics, Ele	ectric	city and Electro	onics		
	rate modulus of elasticity		(3)					
	nd the bending of beam, f			ıg, fı	requency respo	once		
	nd current <mark>conduction in e</mark> out transis <mark>tor amplifier,</mark> os			mnl	ifier			
			-0.0		(6)		-	
	ST OF EXPERIMENT	D D L D / W						
1 Uniform be			n & Mic					
2. Torsion Pend	dulum			ion (of Rigidity mod	dulus a	ınd M.	.I
3. Thermal con	iductivi <mark>ty of Bad c</mark> onduct	or Le	e's disc					
4. Sonometer		- Ve	rification	of i	laws			
5. Calibration of	of low ra <mark>nge Vo</mark> ltmeter	- Po	tentiome	ter				
6. Carey Foster	r Bridge	- Re	sistance	& re	<mark>esistiv</mark> ity of a w	vire.		
7. Spectromete	r co	- Re	fractive i	inde	<mark>xof</mark> a Prism			
8Mirror Galva	anometer	- Vo	ltage and	d cui	rent sensitiver	ness		
9.LCR – Series	s resonance	- Det	erminati	on o	f L & Q factor	•		
10.Air wedge		- Thi	ckness o	f a v	vire			
11.Grating N b	y λ Normal incidence	- Spe	ctromete	r				
12.Single stage	e transistor amplifier	- CE	mode					
13.Hartley osci	illator	- Dete	erminatio	on of	frequency			
14.Logic gates	– NAND and NOR	- Usi	ng Discr	ete (Components.			
15.Zener diode	;	- For	ward & F	Reve	rse Characteris	stics		
16.OP AMP		- Add	er and S	ubtra	actor			
				Tot	al Practical H	ours	30 H	Irs

Books for Study:

2. Srinivasan.M.N.,Balasubramanian.S.,Ranganathan.R., **A Text Book of Practical Physics**, 2017 Edition Sultan Chand & Sons

Books for References:

- 1. Ouseph.C., Practical Physics and Electronics, 2013.S. Viswanathan.P.Ltd
- **2.** Practical Physics and Electronics, C.C.Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan Publishers(2007)

Web Resources:

- 1. https://nptel.ac.in/course.html/physics/experimental physics I, II and III
- 2. https://nptel.ac.in/courses/115/105/115105110/
- 3. https://www.youtube.com/playlist?list=PLuiPz6iU5SQ8-rZn_LgLofRX7n8z4tHYK

Course	e Outcomes	K Level				
On successful completion of the course, the learners should be able to						
CO1:	Understand and evaluate the Young's modulus and Rigidity modulus of the given material, the ways to calibrate a low range voltmeter using potentiometer	K4				
CO2:	Acquire the knowledge of the characteristics of an operational amplifier	К3				
CO3:	Apply the basic principles of optics to determine the thickness of a wire	K4				
CO4:	Analyze the electrical parameters like resistance and resistivity using Carrey Foster bridge and characteristics of Zener diode	K4				
CO5:	Construct Amplifier and Oscillator	K4				

CO & PO Mapping:

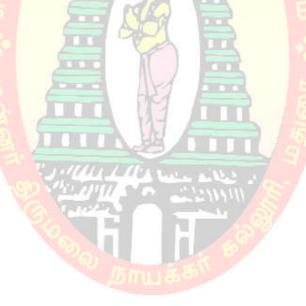
COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	3//	3	3	2
CO 2	2	2	2	2	5	2
CO 3	3	3	3	3	3	3
CO 4	3	3	3 111 8	3	3	2
CO 5	3	2	2	3	3	3

^{*3 –} Advanced Application; 2 – Intermediate Development; 1 - Introductory Level

LESSON PLAN

Semester	Major Physics Practical - I	Hrs	Pedagogy
	1. Uniform bending - Pin & Microscope		
	2. Torsion Pendulum - Determination of Rigidity modulus and		
	M.I		
	3. Thermal conductivity of Bad conductor - Lee's disc		
I	4. Sonometer - Verification of laws	30	Demonstration
	5. Calibration of low range Voltmeter - Potentiometer		
	6. LCR – Series resonance - Determination of L & Q factor		
	7. Logic gates – NAND and NOR - (Discrete Components).		
	8. Zener diode - Forward & Reverse Characteristics		
		1	1

Course Designed by: 1. Mrs.A.Lakshmi, 2. Dr.R.Sangeetha





MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF CHEMISTRY

(For those who joined in 2021-2022 and after)

Course Name	COSMETIC CHEMIS	STRY					
Course Code	21UCHS11			L	P	C	
Category Skill 2 0							
Nature of cours	e: EMPLOYABILITY	✓ SKILL ORIENTED	✓ ENTREPREN	IURS	HIP	√	
Course Objecti	ves:	திம் கண்				II.	
To RemembleTo CompartTo ExecuteTo Determine	per the preparations of have the consumer products the composition and phy	ap and detergents and also air care products. with their compositions. ysical properties of milk p d materials and first aid ar	oroducts.	•	perso	ons. 06	
_	The second secon	edients <mark>, the</mark> ir charac <mark>teris</mark>					
_		ts: Manufacture of Soap a	<mark>ind Deterge</mark> nts. Clo	eansir	ig acti	on o	
	of Det <mark>ergen</mark> ts as waste v SMETICS II	vater in water resources.	-0-			06	
	1.5.1					06	
		nt types and formulations			•		
	ng creams, after snave p NSUMER PRODUCTS	reparations. (Composition	n and applications	for th			
			45			06	
	ıcts: Co <mark>mpos</mark> ition and U lish, Gum <mark>, Ink,</mark> Chalk cı	Jses of Safety Matches, A ayons.	Aga <mark>rbattis</mark> , Naphtha	alene	Balls,	Wax	
	GAR	النظائي والمسا	187			06	
Preparation of b	agasse-use of bagasse f	for the manufacture of pa	per and electricity	y- pre	parati	on o	
=	plasses-preparation of ab	osolute alcohol-manufactu		_	_		
•	OD ADULTERATION	் நாயக்க				06	
	ion - Contamination of	wheat, rice, dhal, milk, b	utter, with clay, sa	and, s	tone,	wate	
Food adulterat							
	icals (e.g., Kasseri dh	al with mentanil yellow). Food poisons:	natu	ral po	oison	
and toxic chem		al with mentanil yellow DT, BHC, Follidol), chen	-		-		
and toxic chem	rotoxins), pesticides (DI	·	-		-		

2. Poucher, W.A. Perfumes, Cosmetics and soaps, Vol. III, Modern Cosmetics. Simons, J.V.

Chemistry and the beauty business, 2018.

- **3.** K.S. Rangappa and K.T Acharya, Indian Dairy products, Asia Publishing House, New Delhi, 1975.
- **4.** Chopra H.K, Panesar, P.S, "Food Chemistry" Narosa Publishing House, New Delhi, 2010.

Books for Reference:

- 1. R.V.Shreve, Industrial Chemical Process, Tata McGraw Hill publishing company, 2005, Mumbai.
- 2. Mohan Malhotra, Latest Cottage Industries, 20th Edition Edn, Vishal publishers, 1980, Meerut.
- 3. Robert Jenness and S. Patom, Principles of dairy chemistry, Wiley, New York.

Web Resources:

1. https://bit.ly/3rVPCex

2. https://bit.ly/38OFFI8

Course	e Outcomes:	K Level							
On th	On the completion of the course the student will be able to								
CO1:	Relate the characteristics of tooth pastes, hair care products.	[Up to K2]							
CO2:	Understand the concepts of manufacture of soaps, detergents, hair care and consumer products.	[Up to K3]							
CO3:	Compare the milk and sugar products on their composition.	[Up to K3]							
CO4:	Correlate the consumer products, sugar and food adulteration.	[Up to K4]							
CO5:	Construct the characteristics and understand the consumer products	[Up to K4]							

CO & PO Mapping:

Course Outcomes	Programme Outcomes (POs)							
(COs)	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6		
CO 1	3	1	2	3	1	2		
CO 2	(c1)	3	1	1-1	2	3		
CO 3	2	2	3	2	3	3		
CO 4	3	1	2	2	1	2		
CO5	2	63	1	3	2	1		
Weightage	11	10	9	11	9	11		

^{*3 –} Advanced Application; 2 – Intermediate Development; 1 - Introductory Level

LESSON PLAN

UNIT	COSMETIC CHEMISTRY	Hrs	Mode
I	COSMETICS I		
	Dental Preparations: Tooth pastes- ingredients, their characteristics	06	Chalk &
	and functions. Mouth washes (Composition only). Soap and		Talk, Power
	Detergents: Manufacture of Soap and Detergents. Cleansing action of		Point
	Soap. Problems of Detergents as waste water in water resources.		
II	COSMETICS II		Chalk &
	Hair care preparations: shampoo; different types and formulations,	06	Talk, Power
	Moisturizing creams, perfumes, Lip sticks, shaving creams, after		Point
	shave preparations. (Composition and applications for the above).		
III	CONSUMER PRODUCTS		Chalk &
	Consumer Products: Composition and Uses of Safety Matches,	06	Talk, Power
	Agarbattis, Naphthalene Balls, Wax candles, shoe polish, Gum, Ink,		Point
	Chalk crayons.		
IV	SUGAR		Chalk &
	Preparation of bagasse-use of bagasse for the manufacture of paper	06	Talk, Power
	and electricity- preparation of alcohol from molasses-preparation of		Point
	absolute alcohol-manufacture of wine, beer, methylated spirit -		
	power alcohol.		
V	FOOD ADULTERATION		Chalk &
	Food adulteration - Contamination of wheat, rice, dhal, milk, butter,	06	Talk, Power
	with clay, sand, stone, water and toxic chemicals (e.g., Kasseri dhal		Point
	with mentanil yellow). Food poisons: natural poisons (alkaloids,		
	nephrotoxins), pesticides (DDT, BHC, Follidol), chemical poisons		
	(KCN). First aid and Antidotes for poisoned persons.		

Course Designed by: Dr. J.E. Sangeetha & Dr. R. Satheesh

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print

Articulation Mapping – K Levels with Course Outcomes (COs)

Inte	Cos	K Level	Section		Section		Section C	Section D
rnal			MC	Qs	Short Ans	swers	Either or	Open
			No. of.	K –	No. of.	K -	Choice	Choice
			Questions	Level	Questions	Level		
CI	CO1	Up to K2	2	K1&K2	1	K1	2 (K2&K2)	1(K2)
ΑI	CO2	Up to K3	2	K1&K2	2	K2	2 (K3&K3)	2(K2 &
								K3)
CI	CO3	Up to K2	2	K1&K2	1	K2	2 (K2&K2)	1(K2)
AII	CO4	Up to K4	2	K1&K2	2	K2	2 (K3&K3)	2(K3
					6/			&K4)
Que	stion	No. of	4 1	MAAA	3		4	3
Pat	tern	Questions to be	137		8			
CIA	I & II	asked	/ (A)III		1/2	A		
		No. of	4		3	200	2	2
		Questions to be	grand.			100		
		answered	111		3111			
		Marks for each	1	ERV	2	CF :	5	10
		question		ME		11572		
		Total Marks for	4	NO.	6	VA	10	20
		each section		Con	B.H.H.	00		

		Dist	ribution of l	Marks with	K Level C	IAI&(CIA II	
	K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either / Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
	K1	2	2	7		4	6.67	67
	K2	2	4	10	20	36	60	
CIA	К3	-	- S	10	10	20	33.33	33
I	K4	-	9	-	500	-	-	-
	Marks	4	6	20	30	60	100	100
	K 1	2	2	மாயக	_	4	6.67	50
CIA	K2	2	4	10	10	26	43.33	
II	К3	-	-	10	10	20	33.33	33
	K4	-	-	-	10	10	16.67	17
	Marks	4	6	20	30	60	100	100

- **K1** Remembering and recalling facts with specific answers
- K2- Basic understanding of facts and stating main ideas with general answers
- **K3** Application oriented- Solving Problems
- **K4** Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)											
S.No	COs	K - Level	MCQs		Short Answers		Section C	Section D			
			No. of	K –	No. of	K –	(Either /	(Open			
			Questions	Level	Question	Level	or	Choice)			
							Choice)				
1	CO1	Up to K2	2	K1,K2	1	K1	2	1(K2)			
		_					(K2&K2)				
2	CO2	Up to K3	2	K1&K	1	K1	2	1(K3)			
		_		2			(K3&K3)				
3	CO3	Up to K3	2	K1&K	1	K2	2	1(K3)			
				2			(K3&K3)				
4	CO4	Up to K4	2	K1&K	1	K2	2	1(K4)			
				2			(K3&K3)				
5	CO5	Up to K4	0 2	K1&K) A	K2	2	1(K4)			
				2	1177	5	(K3&K3)				
No. of Questions to be			10	11/2/1	5	The state of	10	5			
Asked					THE THE PARTY OF T	hone					
No.of Questions to be			10		5	104	5	3			
answered			2011		UKUK	100					
Marks for each question			1	3.0	2	10	5	10			
Total Marks for each section			10	THE	10	l E	25	30			
(Figures in parenthesis denotes, questions should be asked with the given K level)											

Distribution of Marks with K Level										
K	Section A	Section B	Section C	Section D	Total	% of	Consolidated			
Level	(Multiple	(Short	(Either/ or	(Open	Marks	(Marks	%			
	Choice	Answer	Choice)	Choice)	3	without				
	Questions)	Questions)	711/2/	4	100	choice)				
K1	5	4	772/20		9	7.5	33			
K2	5	6	10	10	31	25.83	33			
К3	-	- 0	40	20	60	50	50			
K4	-	-	6U Emu	20	20	16.67	17			
Marks	10	10	50	50	120	100	100			

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

${\bf Summative\ Examinations\ -\ Question\ Paper\ -\ Format}$

			Section A (Multiple Choice Questions)
	\mathbf{A}	nswer All (
Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K2	
3	CO2	K1	
4	CO2	K2	
5	CO3	K1	
6	CO3	K2	
7	CO4	K1	THE STATE OF THE S
8	CO4	K2	5 3 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
9	CO5	K1	
10	CO5	K2	6 D 00 000 1 3
	-	•	Section B (Short Answers)
	A	nswer All	
Q.No	CO	K Level	Questions
11	CO1	K1	100
12	CO2	K1	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	
		10	Section C (Either/Or Type)
	Ans	swer A <mark>ll Q</mark> ı	lestions (5 x 5 = 25 marks)
Q.No	CO	K Level	Questions
16) a	CO1	K2	
16) b	CO1	K2	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO3	K3	The state of the s
18) b	CO3	K3	
19) a	CO4	K3	
19) b	CO4	K3	
20) a	CO5	K3	0
20) b	CO5	K3	ISTULISION.
NB: H	ligher l	evel of per	formance of the students is to be assessed by attempting higher level of K levels
			Section D (Open Choice)
	A ==	SWAP Ans	Three questions (3x10=30 marks)
Q.No	CO	K Level	Questions (3x10=30 marks)
21	CO1	K Level K2	Anconono
22	CO2	K2 K3	
23	CO2	K3	
		K3 K4	
7/1			
24 25	CO4 CO5	K4	



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF CHEMISTRY

(For those who joined in 2021-2022 and after)

	GKEEN	CHEMISTRY						
Course Code	21UCHS	12				L	P	С
Category	Skill					2	-	2
Nature of Cours	se:	EMPLOYABILITY	✓ SKILL ORIENTED	V	ENTRE	PRE	NURS	SHIP
Course Object	ives:		IA F					
To Reco	ollect the gr	reen environment and	d basic definition for gre	en che	mistry.			
 To Rem 	ember the	twelve principles of	green chemistry and exa	mples.				
 To Com 	pare the co	oncept of yield and its	s calculation on atom ec	onomy	.			
 To Exec 	cute the cor	ncept of selectivity, ty	ypes of selectivity and re	action	s using	greei	n solv	vents.
 To Dete 	rmine the b	oas <mark>ic concepts</mark> in desi	igning green sy <mark>nthesis a</mark>	nd cho	ice of s	tartin	g ma	terials.
Unit: I IN	TRODUC'	TION		-10				6
			en Chemistry- Goals of C					
Advantages of	Green cher	<mark>nistr</mark> y, Progress of C	Gre <mark>en</mark> Chemistry <mark>- Twelv</mark>	e princ	iples of	f Gre	en C	hemistry
and Examples.	II.	9		9				
Unit: II YII	ELD AND	ATOM ECONOM	Y	D	<u> </u>			6
Concept of Yie	eld and its	calculation, Atom ed	conomy – Definition, C	alcula	ion of	Aton	n eco	nomy in
rearrangement,	addition, si	<mark>ubstitution</mark> and elimi	nation reactions.		2			
Unit: III SE	LECTI <mark>VI</mark>	<mark>TY IN GREEN</mark> CH	EMISTRY					6
Concept of se	lectivity,	Types of selectivity	-Chemo-, regio-, ena	ntio-	and dia	stere	osele	ctivities
			ical CO ₂ - Cleaner tech					
Friedel-crafts re	eaction, hal	ogenation & Diels- A	Alder reaction, and water	la.				_
		REE REACTIONS						6
	LVENT F	REE REACTIONS	25 41 1					O
Unit: IV SO Organic synthes	sis in solid	state-Thermal reaction	ons, rearrangements &pl					Mode o
Unit: IV SO Organic synthes supplying energ	sis in solid gy-microwa	state-Thermal reaction ave and ultrasonic-A	AL THE SECOND SE					Mode o
Unit: IV SO Organic synthes supplying energy reduction & rea	sis in solid gy-microwa rrangemen	state-Thermal reaction average and ultrasonic-Atts.	ons, rearrangements &place.dvantages of MW techron					Mode o
Unit: IV SO Organic synthes supplying energy reduction & rea Unit: V DE	sis in solid gy-microwa rrangemen SIGNING	state-Thermal reaction of the state of the s	ons, rearrangements &pl dvantages of MW techr THESIS	iques.	Reaction	ons l	ike o	Mode of xidation
Unit: IVSOOrganic synthersupplying energyreduction & reaUnit: VDEBasic concepts	sis in solid gy-microwa rrangemen SIGNING in designir	state-Thermal reaction ave and ultrasonic-A ts. OF GREEN SYNT and Green synthesis -	ons, rearrangements &place of MW techronic of starting mater	iques.	Reaction	ons l	ike o	Mode of xidation
Unit: IVSOOrganic synthersupplying energyreduction & reaUnit: VDEBasic concepts	sis in solid gy-microwa rrangemen SIGNING in designir	state-Thermal reaction of the state of the s	ons, rearrangements &placements dependent of MW technology of MW technolog	iques.	Reaction Rea	cata	lke o	Mode oxidation 6 catalytic
Organic synthes supplying energy reduction & real Unit: V DE Basic concepts approach in gre	sis in solid gy-microwa rrangemen SIGNING in designir en chemist	state-Thermal reaction ave and ultrasonic-A ts. OF GREEN SYNT and Green synthesis -	ons, rearrangements &placements dependent of MW technology of MW technolog	iques.	Reaction	cata	lke o	Mode of xidation
Unit: IV Organic synther supplying energy reduction & rea Unit: V Basic concepts approach in gre Books for Stud	sis in solid gy-microwa rrangemen SIGNING in designir en chemist	state-Thermal reaction ave and ultrasonic-A ts. OF GREEN SYNT and Green synthesis - ry and solvents with	ons, rearrangements &pl. dvantages of MW techr THESIS choice of starting mater suitable examples.	ials, re	Reaction Rea	cata	lysts-	Mode of xidation 6 catalytic 30 Hrs
Unit: IV SO Organic synthes supplying energy reduction & rea Unit: V DE Basic concepts approach in gree Books for Stud 1. V. Kumar, "A	sis in solid gy-microwa rrangemen SIGNING in designir en chemist ly:	state-Thermal reaction ave and ultrasonic-Acts. OF GREEN SYNT and Green synthesis ry and solvents with action to Green Chemical and Solvents with the state of the synthesis of	ons, rearrangements &placture of MW technology of MW tech	iques. ials, re otal L Co. R	Reaction reasons agents, ecture reprint E	cata	lysts-	Mode of xidation 6 catalytic 30 Hrs
Organic synthes supplying energy reduction & read Unit: V DE Basic concepts approach in green Books for Student 1. V. Kumar, "A 2. Rashmi Sang	sis in solid gy-microwa rrangemen SIGNING in designir en chemist y: An Introduc hi, M.M Si	state-Thermal reaction ave and ultrasonic-Acts. OF GREEN SYNT and Green synthesis ry and solvents with action to Green Chemical and Solvents with the state of the synthesis of	ons, rearrangements &pl. dvantages of MW techr THESIS choice of starting mater suitable examples.	iques. ials, re otal L Co. R	Reaction reasons agents, ecture reprint E	cata	lysts-	Mode of xidation 6 catalytic 30 Hrs
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Unit: IV SO Organic synthes supplying energy reduction & rea Unit: V DE Basic concepts approach in gree Books for Stud 1. V. Kumar, "A 2. Rashmi Sang Books for Refer 1. V.K. Ahluv	sis in solid gy-microwa rrangemen SIGNING in designir en chemist y: An Introduc thi, M.M Sorences: walia and N	state-Thermal reaction ave and ultrasonic-Ats. FOF GREEN SYNT and Green synthesis ry and solvents with action to Green Chemical Control of Green Ch	ons, rearrangements &pl. dvantages of MW techr THESIS choice of starting mater suitable examples. T istry" Vishal publishing emistry" Fourth Reprint	ials, re otal L Co. Re - 2009	Reaction reasons reaso	cata Hour dition	lysts- rs n 201	Mode of xidation 6 catalytic 30 Hrs 0 s, 2005.
Unit: IV SO Organic synthes supplying energy reduction & rea Unit: V DE Basic concepts approach in gre Books for Stud 1. V. Kumar, "A 2. Rashmi Sang Books for Refer 1. V.K. Ahluv 2. P.T. Anast	sis in solid gy-microwa rrangemen SIGNING in designir en chemist y: An Introduc thi, M.M Sorences: walia and N	state-Thermal reaction ave and ultrasonic-Ats. FOF GREEN SYNT and Green synthesis ry and solvents with action to Green Chemical Control of Green Ch	ons, rearrangements &pl. dvantages of MW techr THESIS choice of starting mater suitable examples. Tistry" Vishal publishing emistry" Fourth Reprint	ials, re otal L Co. Re - 2009	Reaction reasons reaso	cata Hour dition	lysts- rs n 201	Mode of xidation 6 catalytic 30 Hrs 0 s, 2005.
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Unit: IV Organic synthes supplying energy reduction & rea Unit: V Basic concepts approach in gre Books for Stud 1. V. Kumar, "A 2. Rashmi Sang Books for Refe 1. V.K. Ahluv 2. P.T. Anast 1998. Web Resource	sis in solid gy-microwa rrangemen SIGNING in designir en chemist An Introduc thi, M.M Sorences: walia and Mas, and J.K	state-Thermal reaction ave and ultrasonic-Ats. FOF GREEN SYNT and Green synthesis ry and solvents with a ction to Green Chemical Control of Green C	ons, rearrangements &pl. dvantages of MW techr THESIS choice of starting mater suitable examples. T istry" Vishal publishing emistry" Fourth Reprint rends in Green Chemistremistry - Theory and Pra	ials, re otal L Co. Re - 2009	Reaction reasons reaso	cata Hour dition	lysts- rs n 201	Mode of xidation 6 catalytic 30 Hrs 0 s, 2005.
Unit: IV Organic synthes supplying energy reduction & real Unit: V Basic concepts approach in gree Books for Stud 1. V. Kumar, "A 2. Rashmi Sang Books for Reference Supplying energy reduction & real 1. V. Kumar, "A 2. Rashmi Sang Books for Reference Supplying the supplying reduction of the	sis in solid gy-microwa rrangemen SIGNING in designir en chemist An Introduc thi, M.M So erences: walia and M as, and J.K s: youtube.co	state-Thermal reaction ave and ultrasonic-A tts. FOF GREEN SYNT and Green synthesis ry and solvents with the critical to Green Chemical Company of the comp	ons, rearrangements &placture of MW techronic of Starting mater suitable examples. The suitable examples. The suitable examples of MW techronic of Starting mater suitable examples. The suitable examples of Materials of Starting materials o	ials, re otal L Co. Re - 2009	Reaction reasons reaso	cata Hour dition	lysts- rs n 201	Mode of xidation 6 catalytic 30 Hrs 0 s, 2005.
Unit: IV Organic synthes supplying energy reduction & real Unit: V Basic concepts approach in gree Books for Stud 1. V. Kumar, "A 2. Rashmi Sang Books for Reference Supplying energy reduction & real 1. V. Kumar, "A 2. Rashmi Sang Books for Reference Supplying the supplying reduction of the	sis in solid gy-microwa rrangemen SIGNING in designir en chemist An Introducthi, M.M Sterences: walia and Nas, and J.K s: youtube.co	state-Thermal reaction ave and ultrasonic-Ats. FOF GREEN SYNT and Green synthesis ry and solvents with a ction to Green Chemical Control of Green C	ons, rearrangements &placture of MW techronic of Starting mater suitable examples. The suitable examples. The suitable examples of MW techronic of Starting mater suitable examples. The suitable examples of Materials of Starting materials o	ials, re otal L Co. Re - 2009	Reaction reasons reaso	cata Hour dition	lysts- rs n 201	Mode of xidation 6 catalytic 30 Hrs 0 s, 2005. ty Press

On th	e completion of the course the student will be able to	
CO1:	List out the twelve principles of Green Chemistry.	[Up to K2]
CO2:	Understand the need for green chemistry and goals of Green Chemistry.	[Up to K3]
CO3:	Apply Green Chemistry principles to organic synthesis.	[Up to K3]
CO4:	Analyze the uses of Microwave and ultrasonic radiations to carry our reaction.	[Up to K4]
CO5 :	Construct the basic concepts and twelve principles of Green Chemistry in	[Up to K4]
	designing green synthesis	

CO & PO Mapping:

Course Outcomes	Programme Outcomes (POs)								
(COs)	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6			
CO 1	2	1	2	3	3	2			
CO 2	/ 81/	3	A dinne	1	2	3			
CO 3	2	2	3	2	3	3			
CO 4	3	1.	2	2	1	2			
CO5	2	3	1	3	2	1			
Weightage	10	10	9	11	10	11			

^{*3 –} Advanced Application; 2 – Intermediate Development; 1 - Introductory Level

LESSON PLAN

UNIT	GREEN CHEMISTRY	Hrs	Mode
I	INTRODUCTION Definition for Green Chemistry, Need for Green Chemistry- Goals of Green Chemistry - Obstacles and Advantages of Green chemistry, Progress of Green Chemistry- Twelve principles of Green Chemistry and Examples.	06	Chalk & Talk, Power Point
II	YIELD AND ATOM ECONOMY Concept of Yield and its calculation, Atom economy – Definition, Calculation of Atom economy in rearrangement, addition, substitution and elimination reactions.	06	Chalk & Talk, Power Point
III	SELECTIVITY IN GREEN CHEMISTRY Concept of selectivity, Types of selectivity -Chemo-, regio-, enantio- and diastereoselectivities, Reactions using Green solvents - Super critical CO ₂ - Cleaner technology with CO ₂ . Ionic liquids-Friedel-crafts reaction, halogenation &Diels- Alder reaction. and water.	06	Chalk & Talk, Power Point
IV	SOLVENT FREE REACTIONS Organic synthesis in solid state-Thermal reactions, rearrangements &photochemical reactions. Mode of supplying energy-microwave and	06	Chalk & Talk, Power

	ultrasonic-Advantages of MW techniques. Reactions like oxidation, reduction & rearrangements.		Point
V	DESIGNING OF GREEN SYNTHESIS Basic concepts in designing Green synthesis - choice of starting materials, reagents, catalysts-catalytic approach in green chemistry and solvents with suitable examples.	06	Chalk & Talk, Power Point

Course Designed by: Dr. Ramasamy Raja & Dr. K. Muthupandi

		Learnii Articulation		Examinat	<mark>ion - Blue</mark> Pr	int	,	
Inte	Cos	K Level	Section	n A	Section	ı B	Section	Section
rnal		6	MC	Qs	Short An	swers	Section C	Section D
			No. of.	K –	No. of.	K -	Either or Choice	Open Choice
			Questions	Level	Questions	Level		
CI	CO1	Up to K2	2	K1&K	1	K1	2 (K2&K2)	1(K2)
AI		18		2	R.H.H.	100		
	CO2	Up to K3	2	K1&K 2	2	K2	2 (K3&K3)	2(K2&K3)
CI	CO3	Up to K2	2	K1&K		K2	2 (K2&K2)	1(K2)
AII		201		2	D.M.M.			
	CO4	Up to K4	2	K1&K 2	2	K2	2 (K3&K3)	2(K3 &K4)
Ques	tion	No. of Questions	4	119	3	18	4	3
Patt	ern	to be asked		127				
CIA	I &	No. of Questions	4	A Mary	3	1 344	2	2
I	I	to be answered	1-1644	TALL.	a Us			
	Ī	Marks for each	4200 V U 77		2		5	10
		question	Total Control			7		
		Total Marks for	4		6	6	10	20
		each section	9		400			

		Dist	ribution of 1	Marks with	K Level C	IAI& (CIA II	
	K	Section A	Section B	Section C	Section D	Total	% of	Consolidate
	Level	(Multiple	(Short	(Either /	(Open	Marks	(Marks	of %
		Choice	Answer	Or	Choice)		without	
		Questions)	Questions)	Choice)			choice)	
	K1	2	2	-	-	4	6.67	67
	K2	2	4	10	20	36	60	
CIA	К3	-	-	10	10	20	33.33	33
I	K4	-	-	-	-	-	-	-
	Marks	4	6	20	30	60	100	100
	K1	2	2	स्त्राणि स्त	-	4	6.67	50
CIA	K2	2	4	10	10	26	43.33	
II	К3	-	- 1	10	10	20	33.33	33
	K4	-	0-/ 1	Y COCY	10	10	16.67	17
	Marks	4	6	20	30	60	100	100

- **K1** Remembering and recalling facts with specific answers
- **K2** Basic understanding of facts and stating main ideas with general answers
- **K3** Application oriented-Solving Problems
- **K4** Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

S	ummativ	ve Ex <mark>aminati</mark>		nt Articu utcomes	The second section	ping – K	Level with (Course
S.No	COs	K - Level	MCC		Short An	swers	Section C	Section D
		2-	No. of	K –	No. of	K –	(Either /	(Open
			Questions	Level	Question	Level	or	Choice)
		13	1 616	The same			Choice)	
1	CO1	Up to K 2	2	K1,K2	1	K1	2 (K2&K2)	1(K2)
2	CO2	Upto K 3	2	K1&K	- 41	K1	2 (K3&K3)	1(K3)
			Acoust It !!	2	1111111			
3	CO3	Up to K 3	2	K1&K	Tr.	K2	2 (K3&K3)	1(K3)
				2		201		
4	CO4	Up to K 4	2	K1&K	1 50	K2	2 (K3&K3)	1(K4)
			િશ	2				
5	CO5	Up to K 4	2	K1&K	1	K2	2 (K3&K3)	1(K4)
				2				
No. of	Question	s to be Asked	10		5		10	5
No	o.of Quest	ions to be	10		5		5	3
	answe	red						
Mai	rks for eac	ch question	1		2		5	10
Total	Marks for	each section	10		10		25	30
	(Figures	in parenthesi	is denotes, qu	estions s	hould be as	ked with	the given K	level)

		Dis	tribution of	Marks with	K Leve	1	
K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5	4	-	-	9	7.5	
K2	5	6	10	10	31	25.83	33
К3	-	-	40	20	60	50	50
K4	-	-	-	20	20	16.67	17
Marks	10	10	50	50	120	100	100

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

Summative Examinations - Question Paper - Format

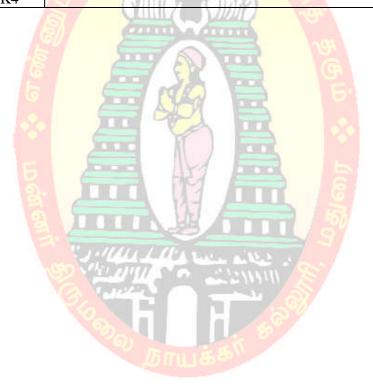
		- 1	ative Examinations	
			Annual Control of the	e Choice Questions)
		nswer All (<u>Questions</u>	(10x1=10 marks)
Q.No	CO	K Level		Questions
1	CO1	K1		/ E
2	CO1	K2		DO DO
3	CO2	K1	ALIEU A	
4	CO2	K2		
5	CO3	K1		
6	CO3	K2		
7	CO4	K1	1 1 1 1	
8	CO4	K2		
9	CO5	K1		الله عالي الم
10	CO5	K2		Samuel Services
			Section B (Sh	nort Answers)
	A	nswer All	Questions	(5x2=10 marks)
Q.No	CO	K Level	00	Questions
11	CO1	K 1	la tru	馬馬(
12	CO2	K 1	2000	
13	CO3	K2		
14	CO4	K2		
15	CO5	K2		
				ther/Or Type)
		wer All Qu	estions	$(5 \times 5 = 25 \text{ marks})$
Q.No	CO	K Level		Questions
16) a	CO1	K2		
16) b	CO1	K2		
17) a	CO2	K3		
17) b	CO2	K3		

18) a	CO3	K3	
18) b	CO3	K3	
19) a	CO4	K3	
19) b	CO4	K3	
20) a	CO5	К3	
20) b	CO5	K3	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)

	Ar	iswer Any	Three questions (3x10=30 marks)
Q.No	CO	K Level	Questions
21	CO1	K2	81 L 00 000
22	CO2	K3	100
23	CO3	K3	5 MAM 1 3
24	CO4	K4	
25	CO5	KΔ	V. C. C. L. C.







MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF CHEMISTRY

(For those who joined in 2021-2022 and after)

Course Name	ORGANIC CHEMISTRY – I										
Course Code	21UCHC21	1UCHC21 L P C									
Category	Core			4	0	4					
Nature of course: EMPLOYABILITY ✓ SKILL ORIENTED ENTREPRENU							✓				

Course Objectives:

- To Recall the definition of hydrocarbons and classification of organic compounds.
- To Understand the preparation, properties of hydrocarbons, alcohols, ethers, aldehydes, ketones and carboxylic acids.
- To Classify the isomerism and determine the concept of stereoisomerisms.
- To Execute the concept of geometrical and optical isomerism.
- To Construct the preparation and properties of monosaccharides, disaccharides and polysaccharides.

Unit: I	HYDROCARBONS	-	In trees	12

Hydrocarbons – Introduction – Definition and Classifications. Alkanes – Nomenclature – General methods of preparation and Chemical properties. Alkenes – Nomenclature – General methods of preparation – chemical properties – Electrophilic additions – Addition of hydrogen halide – Markownikov's rule – Antimarkovinkov's addition – Addition of H₂SO₄, H₂O, Halogen – Hydroboration – oxidation – ozonolysis – hydroxylation – polymerization. Alkynes – Nomenclature – General methods of preparation – physical and chemical properties – polymerization.

Unit: II ALCOHOLS, ETHERS, THIOALCOHOLS AND THIOETHERS 12

Alcohols: Preparation by hydroboration; reduction of carbonyl compounds, acids and esters, by using Grignard reagents. Reaction with metals. Mechanism and reactivity towards HX, dehydration – rearrangement. Ascending and descending the alcohol series – estimation of number of hydroxyl groups. **Ethers**: Mechanism of Williamson's synthesis, mechanism of cleavage by HX, estimation of methoxy group by Zeisel method. Application of crown ethers. **Thioalcohols and thioethers**: Preparation and properties of sulphonal and mustard gas.

Unit: III ALDEHYDES, KETONES AND CARBOXYLIC ACIDS 12

Aldehydes and Ketones: Nomenclature and structure of carbonyl group – Preparation of Aldehydes and Ketones – Physical properties – Chemical reactions and uses of Aldehydes and Ketones. **Carboxylic Acids**: Nomenclature and structure of carboxyl group – Methods of preparation of

Carboxylic acids – Physical properties – Chemical reactions and uses of Carboxylic acids.

Unit: IV | STEREO ISOMERISM

12

Geometrical isomerism: Definition – geometrical isomerism of maleic and fumaric acids – aldoximes and ketoximes – determination of configuration of geometric isomers – E, Z notations – stereo chemistry of addition of bromine to double bond. Optical isomerism: Optical activity – specific rotation – definition of optical isomerism – elements of symmetry - Optical isomerism of compounds containing asymmetric carbon atom – racemization and resolution of racemic mixtures – Walden inversion – asymmetric synthesis – chirality – specifications of absolute configuration by R and S notations. Optical activity of compounds without asymmetric carbon atoms, allenes, spiranes and bi phenyl compounds.

Unit: V | Carbohydrates:

12

Definition – classification – monosaccharides – properties and uses of glucose and fructose – configuration of glucose and fructose – Haworth structure – conversion of glucose to fructose and vice versa. **Disaccharides**: Preparation, properties, constitution and configuration of sucrose. **Poly saccharides**: A general study of starch and cellulose – uses of cellulose in industries.

Total Lecture Hours 60 Hrs

Books for Study:

1. B. S Bahl and Arun Bahl S.Chand, Advanced Organic Chemistry Co Ltd, New Delhi, 2012.

Books for References:

- 1. B-Mehta and M.Mehta, Organic Chemistry E.E Edition, New Delhi, 2010.
- **2.** P.L Soni and H.M Chawla, Organic Chemistry, 29th Edition, Sultan Chand and sons, New Delhi, 2007.

Web Resources:

- 1. https://courses.lumenlearning.com/chemistryformajors/chapter/alcohols-and-ethers/
- 2. https://www.youtube.com/watch?v= vg9T0htW0Y
- 3. https://courses.lumenlearning.com/chemistryformajors/chapter/aldehydes-ketones-carboxylic-acids-and-esters-2/
- 4. https://www.youtube.com/watch?v=JxK5rZxbyQY

Cours	e Outcomes:	K Level						
On th	On the completion of the course the student will be able to							
CO1:	Identify the basic idea of organic compounds and carbohydrates.	[Up to K2]						
CO2:	Classify the hydrocarbons, alcohols, ethers and carbohydrates.	[Up to K3]						
CO3:	Determine the preparation of hydrocarbons, alcohols, ethers and the given carbonyl compounds.	[Up to K3]						
CO4:	Analyze the physical and chemical properties of hydrocarbons, alcohols,	[Up to K4]						
	ethers and the given carbonyl compounds.							

CO5:	Construct the basic idea of preparation, properties of organic compounds	[Up to K4]
	and carbohydrates.	_

CO & PO Mapping:

Course Outcomes	Programme Outcomes (POs)									
(COs)	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6				
CO 1	3	1	2	3	1	2				
CO 2	1	3	1	1	2	3				
CO 3	2	2	3	2	3	3				
CO 4	3	1	0 2	2	1	2				
CO5	2	3	1 6	3	2	1				
Weightage	11 6	10	0 (9) (1	11	9	11				

^{*3 –} Advanced Application; 2 – Intermediate Development; 1 - Introductory Level

LESSON PLAN

UNIT	ORGANIC CHEMISTRY – I	Hrs	Mode
I	Hydrocarbons – Introduction – Definition and Classifications. Alkanes – Nomenclature - General methods of preparation and Chemical properties. Alkenes – Nomenclature – General methods of preparation – chemical properties – Electrophilic additions – Addition of hydrogen halide – Markownikov's rule – Antimarkovinkov's addition – Addition of H ₂ SO ₄ , H ₂ O, Halogen – Hydroboration – oxidation – ozonolysis – hydroxylation – polymerization. Alkynes – Nomenclature – General methods of preparation – physical and chemical properties – polymerization.	12	Chalk & Talk, Power Point
II	Alcohols: Preparation by hydroboration; reduction of carbonyl compounds, acids and esters, by using Grignard reagents. Reaction with metals. Mechanism and reactivity towards HX, dehydration – rearrangement. Ascending and descending the alcohol series – estimation of number of hydroxyl groups. Ethers: Mechanism of Williamson's synthesis, mechanism of cleavage by HX, estimation of methoxy group by Zeisel method. Application of crown ethers. Thioalcohols and thioethers: Preparation and properties of sulphonal and mustdard gas.	12	Chalk & Talk, Power Point
III	ALDEHYDES, KETONES AND CARBOXYLIC ACIDS		Chalk &

	Aldehydes and Ketones: Nomenclature and structure of carbonyl group – Preparation of Aldehydes and Ketones – Physical properties – Chemical reactions and uses of Aldehydes and Ketones. Carboxylic Acids: Nomenclature and structure of carboxyl group – Methods of preparation of Carboxylic acids – Physical properties – Chemical reactions and uses of Carboxylic acids.	12	Talk, Power Point
IV	Geometrical isomerism: Definition – geometrical isomerism of maleic and fumaric acids – aldoximes and ketoximes – determination of configuration of geometric isomers – E, Z notations – stereo chemistry of addition of bromine to double bond. Optical isomerism: Optical activity – specific rotation – definition of optical isomerism – elements of symmetry – Optical isomerism of compounds containing asymmetric carbon atom – racemization and resolution of racemic mixtures – Walden inversion – asymmetric synthesis – chirality – specifications of absolute configuration by R and S notations. Optical activity of compounds without asymmetric carbon atoms, allenes, spiranes and bi phenyl compounds.	12	Chalk & Talk, Power Point
V	Carbohydrates: Definition – classification – monosaccharides – properties and uses of glucose and fructose – configuration of glucose and fructose – Haworth structure – conversion of glucose to fructose and vice versa. Disaccharides: Preparation, properties, constitution and configuration of sucrose. Poly saccharides: A general study of starch and cellulose – uses of cellulose in industries.	12	Chalk & Talk, Power Point

Course Designed by: Dr. K. Muthupandi & Dr. V. Ramasamy Raja

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print

Articulation Mapping – K Levels with Course Outcomes (COs)

Inte	Cos	K Level	Section	A	Section B		Section Section C	Section
rnal			MCQs	5	Short Ans	Short Answers		Section D
			No. of.	K –	No. of.	K -	Either or	Open
			Questions	Level	Questions	Level	Choice	Choice
CI	CO1	Up to K2	2	K1 &	1	K1	2 (K2&K2)	1(K2)
ΑI				K2				
	CO2	Up to K3	2	K1 &	2	K2	2 (K3&K3)	2(K2 &
		_		K2				K3)
CI	CO3	Up to K2	2	K1 &	50m 1	K2	2 (K2&K2)	1(K2)
AII			TO S	K2	6/			
	CO4	Up to K4	2	K1 &	2	K2	2 (K3&K3)	2(K3 &K4)
			1	K2				
Que	estion	No. of	4 3/11/1	Hall !	3		4	3
Pat	tern	Questions to be	CEHIH	$(\bigcirc) V$		SIM		
CIA	I & II	asked	CZINI	DAKE	THE STREET	1		
		No. of	4		3	163	2	2
		Questions to be		EN		1 CA		
		answered		18	K-C-C	IES		
		Marks for each		JUN 1	2	100-07	5	10
		question		Cas	CICIC	0 0		
		Total <mark>Marks</mark>	4	AT)	6	1100	10	20
		for each		1		L.		
		section		DRI				
		3		127				

		Dist	ribution of l	Marks with	K Level C	CIAI&	CIA II	
	K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either / Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
	K1	2	2	7 - 1	-6	4	6.67	67
	K2	2	4	10	20	36	60	
CIA	К3	-	-	10	10	20	33.33	33
I	K4	-	-	<u>-</u>	-	-	-	-
	Marks	4	6	20	30	60	100	100
	K1	2	2	-	-	4	6.67	50
CIA	K2	2	4	10	10	26	43.33	
II	К3	-	-	10	10	20	33.33	33
	K4	-	-	-	10	10	16.67	17
	Marks	4	6	20	30	60	100	100

- **K1** Remembering and recalling facts with specific answers
- K2- Basic understanding of facts and stating main ideas with general answers
- **K3** Application oriented- Solving Problems
- **K4** Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

S	Summati	ve Examinati		int Articu utcomes	_	ping – K	Level with	Course
S.No	COs	K - Level	MCQs		Short Answers		Section C	Section D
			No. of Questions	K – Level	No. of Question	K – Level	(Either / or	(Open Choice)
							Choice)	
1	CO1	Up to K 2	2	K1,K2	1	K1	2 (K2&K2)	1(K2)
2	CO2	Upto K 3	2	K1&K 2	1	K1	2 (K3&K3)	1(K3)
3	CO3	Up to K 3	2	K1&K 2	5 6000	K2	2 (K3&K3)	1(K3)
4	CO4	Up to K 4	2	K1&K 2	1 0	K2	2 (K3&K3)	1(K4)
5	CO5	Up to K 4	2	K1&K 2	1	K2	2 (K3&K3)	1(K4)
No. o	f Question	s to be Asked	10	.11./	5	REST!	10	5
No.of Questions to be answered			10	TIDA (5	194	5	3
Marks for each question		1	PA	2	(0)	5	10	
Total Marks for each section			10		10		25	30
(Figui	es in nai	renthe <mark>sis de</mark> n	otes, question	s should	he asked wi	ith the gi	ven K level)	

	Distribution of Marks with K Level												
K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %						
K1	5	4"	MILLERY		9	7.5	33						
K2	5	6	10	10	31	25.83	33						
K3	-	NO. T.	40	20	60	50	50						
K4	-	- 6		20	20	16.67	17						
Marks	10	10	50	50	120	100	100						

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

${\bf Summative\ Examinations\ -\ Question\ Paper\ -\ Format}$

		, , , , , , , , , , , , , , , , , , ,	Section A (Multiple Choice Questions)				
	Answer All Questions (10x1=10 marks)						
Q.No	CO	K Level	Questions				
1	CO1	K1	Questions				
2	CO1	K2					
3	CO2	K1					
4	CO2	K2					
5	CO3	K1					
6	CO3	K2					
7	CO4	K1	THE RESERVE OF THE PERSON OF T				
8	CO4	K2	8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				
9	CO5	K1					
10	CO5	K2	6 D 00 000 1 %				
			Section B (Short Answers)				
		nswer All					
Q.No	CO	K Level	Questions				
11	CO1	K1	The same of the sa				
12	CO2	K1					
13	CO3	K2					
14	CO4	K2					
15	CO5	K2					
			Section C (Either/Or Type)				
0.37		swer All Qu					
Q.No	CO	K Level	Questions				
16) a	CO1	K2					
16) b	CO1	K2					
17) a	CO2	K3	ALLELY-29 A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
17) b	CO2	K3					
18) a	CO3	K3	CO 11 1111/2 C				
18) b	CO3	K3 K3					
19) a 19) b	CO4	K3					
20) a	CO ₄	K3					
20) b	CO5	K3					
			formance of the students is to be assessed by attempting higher level				
14D; I	ngnei i	ever or per	of K levels				
			Section D (Open Choice)				
	An	swer Anv	Three questions (3x10=30 marks)				
Q.No	CO	K Level	Questions				
21	CO1	K2	X RECORDING				
22	CO2	K3					
23	CO3	K3					
24	CO4	K4					
25	CO5	K4					



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF CHEMISTRY

(For those who joined in 2021-2022 and after)

Course Name	MAJOR CHEMISTRY PRACTICAL – I							
	(Inorganic Semi Micro – Qualitative Analysis)							
Course Code	21UCHCP1	L	P	C				
Category	Core	0	2	2				
Nature of Course	e: EMPLOYABILITY SKILL ORIENTED ENTREPRENUI	RSH	√					

Course Objectives:

- Recall the basic properties of salt mixtures.
- Reminiscence the anionic and cationic species in the salt mixtures.
- Apply the concept of anionic and cationic species in semi micro qualitative analysis.
- Execute the confirmation test for the anions and cations present in the salt mixtures.
- Construct four radicals with correct procedure during analysis of the salt mixtures.

Analysis of a mixture containing two anions of which one is an interfering in semi-micro method two cations

Anions:

30

Carbonate, sulphate, nitrate, fluoride, chloride, bromide, iodide, oxalate, Borate, phosphate and chromate.

Cations: Lead, bismuth, copper, cadmium, antimony, iron (II and III), aluminium,

Chromium, zinc, manganese, cobalt, nickel, barium, calcium,

Magnesium and ammonium.

Distribution of marks

Max marks: 100

Internal : 40 marks External : 60

marks

Laboratory : 30 marks Vivo voce : 10 marks

Performance

Observation note book : 10 marks Record note book : 10 marks

Four radicals with : 40 marks

correct procedure

Total : 40 marks Total : 60 marks

Total Lecture Hours	30
	Hrs

Books for Study:

1. Dr. V. V. Ramanujam, Inorganic Semimicro Qualitative Analysis, National Publishing Company, 3rd edition, Chennai, 1974.

Books for References:

1. Vogel, Text book of Qualitative Analysis including Semi Micro Methods, Longman Sc & Tech, 2008.

Web Resources:

- 1. https://www.youtube.com/watch?v=cEOvj6jkdDw
- 2. https://www.youtube.com/watch?v=T3hi_xEpaDg
- 3. https://www.youtube.com/watch?v=BK7rf4XE4f8
- 4. https://www.youtube.com/watch?v=QQo1e-BUZWs

Cours	se Outcomes:	K Level
On th	e completion of <mark>the course th</mark> e student will be able to	·
CO1:	Identify the basic radical and its group in the given salt mixture.	[Up to K2]
CO2:	Understand the qualitative analysis skill of any given inorganic salt mixture.	[Up to K3]
CO3:	Develop the acid radicals present in the given inorganic salt mixture.	[Up to K3]
CO4:	Analyze the basic radical systematically.	[Up to K4]
CO5:	Apply the four radicals with correct procedure during analysis of the salt mixtures	[Up to K4]

MILLER WE ALL .

CO & PO Mapping:

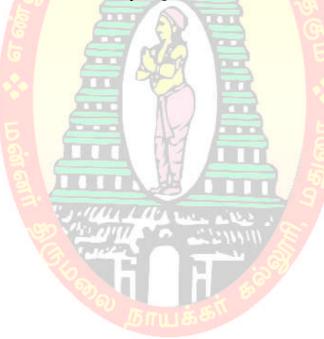
Course Outcomes	Programme Outcomes (POs)						
(COs)	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	
CO 1	3	0.1	2	3	1	2	
CO 2	1	3	TILLE15	1	2	3	
CO 3	2	2	3	2	3	3	
CO 4	3	1	2	2	1	2	
CO5	2	3	1	3	2	1	
Weightage	11	10	9	11	9	11	

^{*3 –} Advanced Application; 2 – Intermediate Development; 1 - Introductory Level

LESSON PLAN

UNIT	INORGANIC SEMI MICRO – QUALITATIVE ANALYSIS	Hrs	Mode
I	Duration of examination: 3hrs Analysis of a mixture containing two anions of which one is an interfering in semi-micro method two cations		
	Anions: Carbonate, sulphate, nitrate, fluoride, chloride, bromide, iodide, oxalate, Borate, phosphate and chromate.	30	Practical
	Cations: Lead, bismuth, copper, cadmium, antimony, iron (II and III), aluminium, Chromium, zinc, manganese, cobalt, nickel, barium, calcium, Magnesium and ammonium.		

Course Designed by: Dr. V. Ramasamy Raja & Dr. R. Satheesh





MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF CHEMISTRY

(For those who joined in 2021-2022 and after)

Course Name	ALLIED PHYSICS –	II:	Electricity, Electroni	ics ,	Optics and M	oderr	Phy	sics
Course Code	21UPHA21					L	P	C
Category Allied						4	-	4
Nature of course: EMPLOYABILITY ✓ SKILL ORIENTED ✓ ENTREPRE						IURS	HIP	
Course Object	ives:	E	ம் கண்		1			
2. To recollect of 3. To apply dec 4. To understand 5. To understand Unit: I Ele Capacitors –Ex	different types of diodes cimal and binary number and the various types of ler and and apply the basic confectricity	and syst nses ncer	em , prism, aberrations, in ots of Relativity in vari plate— Energy of a ch	iatio arge	n of mass with	veloc Loss	ity 12 of en	ergy
Wheatstone's n	harges <mark>between two</mark> capa network – Meter Bridge – ammet <mark>er and</mark> voltmeter(lo	- M	easurement of resistan					
	ectronics orking of n-p-n transist						12	
transistor ampli OPAMP and i algebra – De M	ifier – Frequency respons ts characteristics – OPA Iorgan's theorem – OR, A ometrical Optics	e - MI	Hartley oscillator –Mo Pas adder and subtra	odula actor	ation – Types o r-– Logic circo	of Mo	dulati	on - lean
	uced by thin lens – Focal	len	gth of two thin lenses	in a	nd out of conta	ct – F		
•	prism – Disp <mark>ersion</mark> – Dis	3000						
Deviation with	out dispersion and (b) D	ispe	ersion without deviation	on –	Direct vision	specti	rosco	pe –
Chromatic aber	rration in lenses – Spheri	cal	aberration in lenses –	The	ory of primary	and s	secon	dary
rainbows.								
Unit: IV Ph	ysical Optics						12)
Interference in		NI		1 1	am only) De		4	_
wavelength -	thin films – air wedge –	- 116	ewton's rings (reflecte	a be	am omy) – Do	etermi	inatio	
Experiment to determine wavelengths - Double refraction – Nicol prism – Construction, action and								n of
Experiment to o	Diffraction - Theory o	f p	lane transmission gra	ating	g (normal inci	dence	only	n of y) –
•	Diffraction - Theory o	f p Dou	lane transmission grauble refraction – Nicol	ating I pris	g (normal inci	dence	only	n of y) – and

Unit: V Lasers 12

Introduction of Lasers-Spontaneous and stimulated emission-Population Inversion-Einstein's A and B coefficients-derivation. Types of lasers-Nd:YAG,CO₂ ,Semiconductor lasers-Industrial and Medical Applications.

Total Lecture Hours 60 Hrs

Books for Study:

1. R. Murugesan, Electricity and Electronics, Madurai, First Edition, July 2016.

Unit – I : 1.5,1.6, 1.9-1.14, 1.18,1.19,2.1,2.3-2.7

Unit – II: 4.1,4.2,4.4,4.5.4.6,4.10-4.12,4.14-4.18,4.24,4.25, 5.1-5.7,5.9-14,5.16

2. R.Murugeshan, Optics Dpectroscopy and ModernPhysics

Unit – IIII: 1.1-1.3,1.5-1.11,1.13,1.17,1.23,1.24

Unit – IV: 2.1,2.2,2.4-2.6,2.9,2.10,3.1,3.2,3.4,3.5-3.10

3. P.Mani, A Text book of Engineering Physics, 12th edition, Dhanam Publications,

Chennai

Unit – V: 7.1 - 7.45

Books for References:

- 1. Kakaniand Bhandari Sultan , Optics and Spectroscopy, Chand and Sons, New Delhi, 2004.
- 2.Brijlaland Subramanyam., A Text book of Optics, S. Chandand Co, New Delhi, 2004.
- 3. B.K.Sharma, Spectroscopy, GOEL Publishing House, Meerut, 2006.
- 4. NarayanamoorthyandNagarathinam, Electricity and Magnetism, National Publishing Co,

Web Resources:

- 1. https://www.youtube.com/watch?v=ML7HcZo6IaE
- 2. https://www.khanacademy.org/science/physics/light-waves/introduction-to-light-
- 3. waves/v/polarization-of-light-linear-and-circular

Course	e Outcomes	K Level				
After	After successful completion of the course, the student is expected to					
CO1:	Remember Coulombs theorem, principles of capacitors, Kirchhoff's laws, forward and reverse bias, frequency response, modulation, focal length,					
	dispersive power, cordinal points, double refraction, Biot's law, length contraction, time dilation, De -Brogle wavelength	K2				
CO2:	Understand Coulombs theorem, energy of a capacitor, principle of potentiometer, diode characteristics, working of npn transistor, logic circuits, rainbows, postulated of special theory of relativity	К3				
CO3:	Apply coulombs theorem, Kirchhoff's laws, Boolean algebra, Refraction through a prism, Lorentz transformation equation	К3				
CO4:	Compare electric potential and electric field, calibration of ammeter and voltmeter, OP AMP as an adder and subtractor, logic gates, deviation without dispersion, dispersion without deviation, Q.W.P, H.W.P, G.P Thomson and Michelson-morley experiment	K4				
CO5:	Examine parallel plate capacitor, Cary Foster bridge, transistor characteristics CE mode, frequency of Hartley oscillator, Specific rotatory power, Mass energy equivalence	K4				

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	2	2	2
CO 2	3	2	1	2	2	2
CO 3	3	2	2	2	2	2
CO 4	3	2	2	1	2	2
CO 5	2	2	16	1	2	2

^{*3 –} Advanced Application; 2 – Intermediate Development; 1 - Introductory Level

LESSON PLAN

Unit	ALLIEDPHYSICS-I	Hrs	Pedagogy
0 1210	Mechanics, Properties of Matter, Heat and Sound		
I	Mechanics Torque – Angular momentum – Moment of Inertia – Perpendicular and Parallel axes theorem - Kepler's laws of planetary motion-Newton's laws of gravitation – Massand density of Earth – Boy's method for G – Compound pendulum – Expression for period-Experiment to find "g"	13	Lecture method, PPT, Demonstration
II	Elasticity Different moduli of Elasticity-Poisson's ratio—Bending of beams— Expression for bending moment—Determination of Young's modulus by uniform and non uniform bending — Torsion— Expression for couple per unit twist — Workdone in twisting Torsional oscillations of a body - Workdone in twisting—Rigidity modulus by torsion pendulum	12	Lecture method, PPT, Demonstration
III	Viscosity Viscosity - Derivation of Poiseuille's formula - coefficient of viscosity of a liquid by Poiseuille's method - Equation of continuity - Bernoulli's theorem - derivation - Applications of Bernoulli's theorem (Venturimeter and Pitot tube)	11	Lecture method, PPT, Model
IV	Heat Kinetic theory of gases – Mean free path – Transport phenomena – Expression for the coefficient of Diffusion, viscosity and thermal conductivity – Degree of freedom – Boltzman's law of equipartition of energy – calculation of Υ for mono atomic and diatomic gases - Thermodynamics – First and second laws of thermodynamics (statement only) – Entropy – change of entropy in Carnot's cycle – Change of entropy in conversion of ice into stream	12	Lecture method, PPT

Course Designed by: 1. Mrs.A.Lakshmi, 2. Dr.R.Sangeetha

					native Exan	nination - B	lue Print	·	ŕ		
Toda			Artici	llation Mapp Sect	ion A	Section Section	(8)	Secti (Eith	ion C er or oice)	Section D (Open Choice)	
Inte rnal	COs	Le vel	Uni	No. of. Question	CQs K - Level	Short Ar No. of. Question s	K - Level	No. of. Ques tions	K - Level	No. of. Ques tions	K - Level
CI	CO1	K1	I	2	K1&K2	1	K1	2	K2	1	K2
AI	to CO5	to K4	II	2	K1&K2	2	K2	2	К3	2	К3
CI	CO1	K1	III	2	K1&K2	/1 🚢	K2	2	К3	1	K3
AII	to CO5	to K4	IV	2	K1&K2	2	K2	2	K4	2	K4
		No. of Questions to be asked		4		3		4		3	
_	Question Pattern CIA I & II		o. of estions be be wered	4	F	3			2		2
CIA			ks for ach estion	1	∑ Bin∪	2		5		1	0
		Mar e	otal ks for ach ction	4		6		1	0	2	.0

		Dist	ribution of	Marks with	K Level C	IA I & (CIA II	
	K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either / Or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
	K1	2	2			4	6.7	50
	K2	2	4	10	10	26	43.3	30
CIA	K3			10	20	30	50.0	50
T	K4							ı
1	Marks	4	6	20	30	60	100	100
	K1	2	2	3110		4	6.7	16.7
	K2	2	4		000	6	10.0	10.7
CIA	К3			10	10	20	33.3	33.3
II	K4		6 1	10	20	30	50.0	50
	Marks	4	6	20	30	60	100	100

- K1- Remembering and recalling facts with specific answers
- **K2** Basic understanding of facts and stating main ideas with general answers
- **K3** Application oriented-Solving Problems
- K4- Examining, analyzing, presentation and make inferences with evidences

<u>UNIT-V</u> will be allotted for individual Assignment in <u>CO5 - K4 level which carries five marks as part of CIA component.</u>

Sı	ummati	ive Exar	ninatio	n – Blue	- 5	<mark>rticul</mark> ati mes (CC		ping – I	K Level	with Cou	ırse
CNo	CO	К-	Tii4	MO		Sh	ort wers	Section C (Either / or Choice)			tion D Choice)
S.No.	COs	Level	Unit	No.of Ques tions	K – Level	No.of Ques tions	K – Level	No.of Ques tions	K – Level	No.of Ques tions	K – Level
1	CO1 - CO5	K1 to K4	I	2	K1 & K2	-11	K1	2	K2 & K2	1	K2
2	CO1 - CO5	K1 to K4	II	2	K1 & K2	1 5	K1	2	K3 & K3	1	К3
3	CO1 - CO5	K1 to K4	III	2	K1 & K2	1	K2	2	K3 & K3	1	К3
4	CO1 - CO5	K1 to K4	IV	2	K1 &K2	1	K2	2	K4 & K4	1	K4
5	CO1 - CO5	K1 to K4	v	2	K1 & K2	1	K2	2	K4 & K4	1	K4
No. of	Questio	ns to be	Asked	10		5		1	0		5

No. of Questions to be answered	10	5	5	3
Marks for each question	1	2	5	10
Total Marks for each section	10	10	25	30

		Dis	stribution of	Marks with	ı K Leve	1	
K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either/ or Choice)	Either/ or Open		% of (Marks without choice)	Consolidated %
K1	5	4	5 (LD	56	9	12	47
K2	5	6	10	10	31	34.66	47
К3			_20	20	40	27	27
K4			20	20	40	26.66	26
Marks	10	10	50	50	120	100	100

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

Summative Examinations - Question Paper - Format

				e Choice Questions)
		nswer <mark>All (</mark>	Questions	(1 <mark>0x1=1</mark> 0 marks)
Q.No	CO	K Level	1000	Questions
1	CO1	K1		
2	CO1	K2		6
3	CO2	K1		
4	CO2	K2		[5]
5	CO3	K1		Es .
6	CO3	K2	SHILL SHIP	الله على ا
7	CO4	K1	Con Vanille C	# 1111111 E
8	CO4	K2	O die	
9	CO5	K1	0	
10	CO5	K2	00	8
			Section B (S	hort Answers)
	A	nswer All	Questions	(5x2=10 marks)
Q.No	CO	K Level		Questions
11	CO1	K1		
12	CO2	K1		
13	CO3	K2		
14	CO4	K2		
15	CO5	K2		
			Section C (E	ther/Or Type)
	Ans	wer All Qu	iestions	$(5 \times 5 = 25 \text{ marks})$
Q.No	CO	K Level		Questions
16) a				

16) b							
17) a							
17) b							
18) a							
18) b							
19) a							
19) b							
20) a			•	•	•	•	
20) b			•	•	•	•	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)
Answer Any Three questions (3x10=30 marks)

			(0.110 0 0 11101 111)
Q.No	CO	K Level	Questions
21			
22			
23		7	
24		//	The state of the s
25		1/3	





MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF CHEMISTRY

(For those who joined in 2021-2022 and after)

Course Name A	LLIED PHYSICS PE	RAC	TICAL - I						
Course Code 21	1UPHAP1						L	P	C
Category A	llied							2	1
Nature of course:	EMPLOYABILITY	✓	SKILL ORIENTED	✓	ENTR	EPREN	IURS	HIP	
Course Objective	es:		ம்க		1				1
The learners will	be able:		6						
1. To gain knowle	edge about the experim	ents	based on Optics, Ele	ctric	ity and	Electro	onics		
2. To demonstrate	e modulus of elasticity	37			(
3. To understand t	the bendi <mark>ng of beam,</mark> fo	orwa	ırd and reverse b <mark>iasin</mark>	g, fr	<mark>e</mark> quenc	y respo	nce		
4. To understand	current <mark>conduction in</mark> e	lecti	rical circuits.						
5. To learn about	transis <mark>tor amplifier, o</mark> s	cilla	tor and Operatio <mark>nal a</mark>	mpli	ifier				
LIST	OF EXPERIMENTS	S (A1	ny <mark>Fou</mark> rteen Exp <mark>erim</mark>	ents))				
1. Uniform bendir	ng 6	7	- (Pin & Mici	rosco	ope)			I.	
2. Torsion Pendul	um		- Determi <mark>nati</mark>	on o	f Rigid	ity mod	lulus a	nd M.	I
3. Thermal conduction	ctiv <mark>ity of Bad conduct</mark> e	or	- Lee's disc						
4. Sonometer			- Verification	of 1	aws				
5. Calibration of l	ow r <mark>ange Voltmeter</mark>		- Potentiomet	ter					
6. Carey Foster B	ridge	A	- Resistance	& res	sistivity	of a w	ire.		
7. Spectrometer	2 0111		- Refractive i	ndex	kof a Pr	ism			
8Mirror Galvano	ometer		- Voltage and	cur	rent ser	nsitiven	iess		
9.LCR – Series re	esonance		- Determination	on of	fL&Q	factor			
10.Air wedge	Co Mauri	<u> </u>	- Thickness of	f a w	rire				
11.Grating N by λ	Normal incidence		- Spectrometer						
12.Single stage tra	ansistor amplifier	П	- CE mode						
13.Hartley oscilla	tor	3.	- Determinatio	n of	freque	ncy			
14.Logic gates – N	NAND and NOR		- Using Discre	ete C	Compon	ents.			
15.Zener diode			- Forward & R	evei	rse Cha	racteris	stics		

Books for Study:

16.OP AMP

1. Srinivasan.M.N.,Balasubramanian.S.,Ranganathan.R., **A Text Book of Practical Physics**, 2017 Edition Sultan Chand & Sons

- Adder and Subtractor

Books for References:

- 3. Ouseph.C., Practical Physics and Electronics, 2013. S. Viswanathan. P. Ltd
- 4. Practical Physics and Electronics, C.C.Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan

Total Practical Hours 30 Hrs

Publishers(2007)

Web Resources:

- 1. https://nptel.ac.in/course.html/physics/experimental physics I, II and III
- 2. https://nptel.ac.in/courses/115/105/115105110/
- 3. https://www.youtube.com/playlist?list=PLuiPz6iU5SQ8-rZn_LgLofRX7n8z4tHYK

Course	e Outcomes	K Level						
On suc	ccessful completion of the course, the learners should be able to							
CO1:	Understand and evaluate the Young's modulus and Rigidity modulus of the given material, the ways to calibrate a low range voltmeter using potentiometer	K4						
CO2:	Acquire the knowledge of the characteristics of an operational amplifier	К3						
CO3:	Apply the basic principles of optics to determine the thickness of a wire	K4						
CO4:	Analyze the electrical parameters like resistance and resistivity using Carrey Foster bridge and characteristics of Zener diode	K4						
CO5:	Construct Amplifier and Oscillator	K4						

CO & PO Mapping:

COS	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	3	2	2	1	2	2
CO 2	3	2	2	1	2	2
CO 3	3	2	2	1	2	2
CO 4	3	2	2	1	2	2
CO 5	3	2	2	1	2	2

^{*3 –} Advanced Application; 2 – Intermediate Development; 1 - Introductory Level

LESSON PLAN

Semester	Major Physics Practical - I	Hrs	Pedagogy
II	 Carey Foster Bridge - Resistance & resistivity of a wire. Spectrometer - Refractive index of a Prism Mirror Galvanometer - Voltage and current sensitiveness Air wedge - Thickness of a wire Grating N by λ Normal incidence - Spectrometer Single stage transistor amplifier - CE mode Hartley oscillator - Determination of frequency OP AMP - Adder and Subtractor 	30	Demonstration

Course Designed by: 1. Mrs.A.Lakshmi, 2. Dr.R.Sangeetha



Course Name | DAIRY CHEMISTRY

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF CHEMISTRY

(For those who joined in 2021-2022 and after)

Course Name DAIKT CHEMISTKY									
Course Co	ode 2	1UCHS21					L	P	(
Category	S	Skill					2	_	2
Nature of c	ourse:	EMPLOYABILITY		SKILL ORIENTED	✓	ENTREPRENUR	SH	IP	1
To RerTo ClaTo Exe	nember ssify the cute the ermine	he composition of milk the major milk product e special milk and ferm to types of milk products the composition of milk	ented and and pro	d its estimation. I milk products on their its applications.	0				
Unit: I	Milk protei	POSITION OF MILE — definition — general of ns, carbohydrate, vitam r, odour, acidity, specifi	comp ins	and minerals – physi	ical pr	roperties of milk			6
Unit: II PROCESSING OF MILK Microbiology milk – destruction of microorganisms in milk – physico – chemical changes taking place in milk due to processing – boiling, pasteurization – types of pasteurization –Vacuum pasteurization – Ultra High Temperature Pasteurization.									
Unit: III	Crean and co – defi	OR MILK PRODUCT n – definition – compose entrifugal methods of securition - estimation of actual transfer and the common adults.	ition epara cidity	ation cream – estimation at a moisture content	on of	<mark>fat in cream. Butt</mark>	er		6
Unit: IV									6
Unit: V	FERMENTED AND OTHER MILK PRODUCTS Fermentation of milk – definition, condition- Indigeneous products– Gulabjamun, chana sweet, Rasogolla. Ice cream – definition – percentage composition types – Ingredients – manufacture of ice-cream -milk powder – definition – need for making milk powder. Visit to a pasteurization factory / Milk product company and submission of a report.								6
		-	.tor y	7 Wink product comp	<u> </u>		a		

Books for Study:

- 1. Jaya Shree Ghosh, Fundamental Concepts of Applied Chemistry. 1st Edition. New Delhi: S.Chand & Company Ltd, 2013.
- 2. Bagavathi Sundari. K, Applied Chemistry, 1st Edition. Chennai: MJP Publishers, 2006.

Books for References:

- 1. Wong, N.P. Jenness, R. Keenay, M. & Matrh, E.H., Fundamentals of Dairy Chemistry. 1st Edition. New Delhi: CBS Publishers & Distributors Pvt. Ltd., 1998.
- 2. Sukumar De. Outlines of Dairy Technology. 1st Edition. New Delhi: Oxford University Press, 2000.
- 3. K.S. Rangappa and K.T Acharya, Indian Dairy products, Asia Publishing House, 1975.

Web Resources:

- 1. https://www.youtube.com/watch?v=Vo8m9QvNeAU
- 2. https://www.youtube.com/watch?v=uYhbekSGMZY
- 3. https://www.youtube.com/watch?v=oHCntgYIJbE
- 4. https://nptel.ac.in/courses/126/105/126105013/

Cours	ee Outcomes:	K Level						
On th	On the completion of the course the student will be able to							
CO1:	Understand the chemistry of milk products.	[Up to K2]						
CO2:	Outline the techniques of milk processing.	[Up to K3]						
CO3:	Construct the flow chart diagram in the manufacture of special milk	[Up to K3]						
CO4:	Illustrate the manufacture of various dairy products	[Up to K4]						
CO5:	Determine the ch <mark>emistry of milk products and manufacture of various d</mark> airy products.	[Up to K4]						

CO & PO Mapping:

Course Outcomes	Programme Outcomes (POs)							
(COs)	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6		
CO 1	3	1	2	3	1	2		
CO 2	1	3	1	1	2	3		
CO 3	2	2	3	2	3	3		
CO 4	3	1	2	2	1	2		
CO5	2	3	1	3	2	1		
Weightage	11	10	9	11	9	11		

^{*3 –} Advanced Application; 2 – Intermediate Development; 1 - Introductory Level

LESSON PLAN

UNIT	DAIRY CHEMISTRY	Hrs	Mode
I	COMPOSITION OF MILK Milk – definition – general composition of milk – constituents of milk – lipids, proteins, carbohydrate, vitamins and minerals – physical properties of milk – colour, odour, acidity, specific, gravity, viscosity and conductivity.	06	Chalk & Talk, Power Point
II	PROCESSING OF MILK Microbiology milk – destruction of microorganisms in milk – physico – chemical changes taking place in milk due to processing – boiling, pasteurization – types of pasteurization – Vacuum pasteurization – Ultra High Temperature Pasteurization.	06	Chalk & Talk, Power Point
III	MAJOR MILK PRODUCTS Cream – definition – composition – chemistry of creaming process – gravitational and centrifugal methods of separation cream – estimation of fat in cream. Butter – definition -estimation of acidity and moisture content in butter. Ghee – major constitutents – common adulterants added to ghee.	06	Chalk & Talk, Power Point
IV	SPECIAL MILK Standardised milk – definition – merits – reconstituted milk –definition – flow diagram of manufacture – Homogenised milk – flavoured condensed milk – definition composition and nutritive value.	06	Chalk & Talk, Power Point
V	FERMENTED AND OTHER MILK PRODUCTS Fermentation of milk – definition, condition- Indigeneous products— Gulabjamun, chana sweet, Rasogolla. Ice cream – definition – percentage composition types – Ingredients – manufacture of ice-cream -milk powder – definition – need for making milk powder. Visit to a pasteurization factory / Milk product company and submission of a report.	06	Chalk & Talk, Power Point

Course Designed by: Dr. V. Ramasamy Raja & Dr. K. Muthupandi

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print

Articulation Mapping – K Levels with Course Outcomes (COs)

Inte	Cos	K Level	Section	ı A	Section	Section B Section		
rnal			MCQs		Short An	swers	Either or	Open
			No. of. K - No. of. K -		Choice	Choice		
			Questions	Level	Questions	Level		
CI	CO1	Up to K2	2	K1&	1	K1	2 (K2&K2)	1(K2)
ΑI				K2				
	CO2	Up to K3	2	K1 &	2	K2	2 (K3&K3)	2(K2 &
		_		K2				K3)
CI	CO3	Up to K2	2	K1 &	1	K2	2 (K2&K2)	1(K2)
AII		_		K2	(6)			
	CO4	Up to K4	2 _ /	K1 &	2	K2	2 (K3&K3)	2(K3 &K4)
			13/1	K2		M.		
Que	stion	No. of	4	1	3		4	3
Pat	tern	Questions to be	CLILLI	$(\bigcirc) $	WO -	511		
CIA	I & II	asked	CALLE	DACT	COURS !			
		No. of	4		3	The same	2	2
		Questions to be		EN		(G		
		answered		de	ACCOUNT.	TES.		
		Marks for each		NY	2	11 - 17/3	5	10
		question		To	KIKK	0 0	_	_
		Total Marks for	4	AT 1	6		10	20
		each section		1		H	_	

	Distribution of Marks with K Level CIA I & CIA II											
	K	Section A	Section B	Section C	Section D	Total	% of	Consolidate				
	Level	(Multiple	(Short	(Either /	(Open	Marks	(Marks	of %				
		Choice	Answer	Or	Choice)	200	without					
		Questions)	Questions)	Choice)	52111111		choice)					
	K1	2	2		G C	4	6.67	67				
	K2	2	4	10	20	36	60					
CIA	К3	-	- (a)	10	10	20	33.33	33				
I	K4	-	-	<i>ந</i> ாயக்		-	-	-				
	Marks	4	6	20	30	60	100	100				
	K1	2	2	-	-	4	6.67	50				
CIA	K2	2	4	10	10	26	43.33					
II	К3	-	-	10	10	20	33.33	33				
	K4	-	-	-	10	10	16.67	17				
	Marks	4	6	20	30	60	100	100				

- **K1** Remembering and recalling facts with specific answers
- K2- Basic understanding of facts and stating main ideas with general answers

- **K3** Application oriented- Solving Problems
- **K4** Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

5	Summati	ve Examinati				ping – K	Level with (Course		
Outcomes (COs)										
S.No	COs	K - Level	MCC) s	Short An	swers	Section C	Section D		
			No. of	K –	No. of	K –	(Either /	(Open		
			Questions	Level	Question	Level	or	Choice)		
							Choice)			
1	CO1	Up to K 2	2	K1,K2	1	K1	2 (K2&K2)	1(K2)		
2	CO2	Upto K 3	2	K1&K	1	K1	2 (K3&K3)	1(K3)		
				2						
3	CO3	Up to K 3	2	K1&K	1	K2	2 (K3&K3)	1(K3)		
			155	2	. 6001 -					
4	CO4	Up to K 4	2	K1&K	10/	K2	2 (K3&K3)	1(K4)		
			D	$\sqrt{2}$	MA					
5	CO5	Up to K 4	2	K1&K	1	K2	2 (K3&K3)	1(K4)		
		1		2		3				
No. of	f Question	s to be Asked	10		5	12631	10	5		
N	o.of Quest	tions to be	10	HILAC	1115		5	3		
	answe	ered		10		1791	į.			
Ma	rks for eac	ch questi <mark>on</mark>	1	1 EN	_2_	100	5	10		
Total Marks for each section 10						19	25	30		
	(Figures	in par <mark>enthes</mark> i	is denotes, qu	ie <mark>stions</mark> s	hould be <mark>as</mark> l	ked with	the given K	level)		

	Distribution of Marks with K Level											
K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %					
K1	5	4	01111/15	THE PERSON	9	7.5	33					
K2	5	6	10	10	31	25.83	33					
K3	-	-50	40	20	60	50	50					
K4	-	-		20	20	16.67	17					
Marks	10	10	50	50	120	100	100					

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

${\bf Summative\ Examinations\ -\ Question\ Paper\ -\ Format}$

			Section A (Multiple Choice Questions)
	\mathbf{A}	nswer All (
Q.No	CO	K Level	Questions
1	CO1	K1	
2	CO1	K2	
3	CO2	K1	
4	CO2	K2	
5	CO3	K1	
6	CO3	K2	
7	CO4	K1	THE STATE OF THE S
8	CO4	K2	5 3 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
9	CO5	K1	
10	CO5	K2	6 D 00 000 1 3
	-	•	Section B (Short Answers)
	A	nswer All	
Q.No	CO	K Level	Questions
11	CO1	K1	100
12	CO2	K1	
13	CO3	K2	
14	CO4	K2	
15	CO5	K2	
		10	Section C (Either/Or Type)
	Ans	swer A <mark>ll Q</mark> ı	lestions (5 x 5 = 25 marks)
Q.No	CO	K Level	Questions
16) a	CO1	K2	
16) b	CO1	K2	
17) a	CO2	K3	
17) b	CO2	K3	
18) a	CO3	K3	The state of the s
18) b	CO3	K3	
19) a	CO4	K3	
19) b	CO4	K3	
20) a	CO5	K3	0
20) b	CO5	K3	ISTULISION.
NB: H	ligher l	evel of per	formance of the students is to be assessed by attempting higher level of K levels
			Section D (Open Choice)
	A ==	SWAP Ans	Three questions (3x10=30 marks)
Q.No	CO	K Level	Questions (3x10=30 marks)
21	CO1	K Level K2	Anconono
22	CO2	K2 K3	
23	CO2	K3	
		K3 K4	
7/1			
24 25	CO4 CO5	K4	



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS) DEPARTMENT OF CHEMISTRY

(For those who joined in 2021-2022 and after)

Course Na	me I	DYE CHEMISTRY							
Course Co	de 2	21UCHS22					L	P	C
Category	5	Skill					2	0	2
Nature of c	ourse:	EMPLOYABILITY		SKILL ORIENTED	✓	ENTREPRE NURSHIP	√	1	
To ClasTo ConTo Exe	all the ssify the sify the sify the cute the crimine CHE Color of lig	constitution of colour and edyes and demonstration itrogenous, triphenyl, aze synthesis and application the requirement of a pigor MISTRY AND THEOLOUR and Constitution – Reght absorbed – Terms achorimes, Bathochromes	n of an ons ons ons ons ons one	its various types. d phthalein dyes with of quinonoid dyes incl t and applications and OF COLOURS onship of Colour obse in Colour Chemistr	the erve	ng vat dyes based ir uses.	1	06	
Unit: II	DIRECT AND DISPERSE DYES Direct or substantive dyes, mordent dyes, vat dyes, Ingrain or developed dyes, Disperse dyes, sulphur dyes, reactive dyes, oil and spirit soluble dye, food, dry and cosmetic dyes. (Definition, applications and examples only).								
Unit: III	Class Triph c) A	ROGENOUS, TRIPHE iffication according to chapter that the desired according to chapter that the desired according to chapter that the desired according to the desired acco	emichite rang	cal structure: a) Nitro green, crystal violet e, and congo red.	and and d)	Nitroso dyes. b) its applications Phthalein dye-	-	06	
Unit: IV	Azine	NE, OXACINE AND The, Oxazine and Triazionoid dyes including vat	ne	Dyes – Synthesis a		applications of	f	06	
Unit: V	PIGMENTS AND THEIR APPLICATIONS Requirement of a pigment – Typical Organic and Inorganic pigments – Applications and their uses in paints – Applications of dyes in other areas – medicine, cosmetics, food and beverages.							06	
				Т	'ota	l Lecture Hours	3	0 H	rs
	R.Cha	atwal, Synthetic Dyes – I	Him	alaya Publishing Hous	se, 2	2016.			
Books for 1. B. S. Ba		r ences: Arun Bahl, Advanced O	rgan	ic Chemistry, 2012.					

- 2 P.L.Soni and H.M.Chawla, Text book of Organic Chemistry, Sultan & Sons Publications, 2019.
- 3. K.S.Tewari, N.K.Vishnol & S.N. Mehrotra, A Text book of Organic Chemistry, Vikas Publishing House, 1976.

Web Resources:

- 1. https://www.youtube.com/watch?v=a6Lw7Dzwvqo
- 2. https://www.youtube.com/watch?v=sLcT7P-ZS4E
- 3. https://www.youtube.com/watch?v=SFH0iJmnTLY

Cours	e Outcomes:	K Level						
On th	On the completion of the course the student will be able to							
CO1:	Identify the colour and constitution observed to wavelength of light.	[Up to K2]						
CO2:	Outline the direct or disperse dyes and applications.	[Up to K3]						
CO3:	Apply Azine, Oxacine, triazine dyes, pigments towards its applications.	[Up to K3]						
CO4:	Classify the Nitro, Nitroso, Triphenyl methane, Azo and Phthalein dyes.	[Up to K4]						
CO5:	Determine the properties of dyes and apply in medicine, cosmetics, food and beverages.	[Up to K4]						

CO & PO Mapping:

Course Outcomes	Programme Outcomes (POs)								
(COs)	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6			
CO 1	2	3	2	3	1	2			
CO 2	1	2	3	1	2	3			
CO 3	2	2	2	2	3	3			
CO 4	3	1	2	2 0	1	2			
CO5	2	3		3	2	1			
Weightage	10	.// 11	10	11	9	11			

^{*3 –} Advanced Application; 2 – Intermediate Development; 1 - Introductory Level

LESSON PLAN

UNIT	DYE CHEMISTRY	Hrs	Mode
Ι	CHEMISTRY AND THEORY OF COLOURS		Chalk
	Colour and Constitution – Relationship of Colour observed to wavelength	06	&
	of light absorbed - Terms used in Colour Chemistry - Chromophores,		Talk,
	Auxochromes, Bathochromes shift, Hypsochromic shift.		Power
			Point
II	DIRECT AND DISPERSE DYES		Chalk
	Direct or substantive dyes, mordent dyes, vat dyes, Ingrain or developed	06	&
	dyes, Disperse dyes, sulphur dyes, reactive dyes, oil and spirit soluble		Talk,
	dye, food, dry and cosmetic dyes. (Definition, applications and examples		Power
	only).		Point

III	NITROGENOUS, TRIPHENYL, AZO AND PHTHALEIN DYES Classification according to chemical structure: a) Nitro and Nitroso dyes. b) Tripheyl methane dye -malachite green, crystal violet and its applications. c) Azo dyes –, methyl orange, and congo red. d) Phthalein dye– phenolphthalein and fluorescein. (Definition, applications and examples only)	06	Chalk & Talk, Power Point
IV	AZINE, OXACINE AND TRIAZINE DYES Azine, Oxazine and Triazine Dyes – Synthesis and applications of quinonoid dyes including vat dyes based on anthraquinone.	06	Chalk & Talk, Power Point
V	PIGMENTS AND THEIR APPLICATIONS Requirement of a pigment – Typical Organic and Inorganic pigments – Applications and their uses in paints – Applications of dyes in other areas – medicine, cosmetics, food and beverages.	06	Chalk & Talk, Power Point

Course Designed by: Dr. R. Satheesh & Dr. J.E. Sangeetha

	Learning Outcome Based Education & Assessment (LOBE)									
			A CONTRACTOR OF THE PARTY OF TH	Con Life	on - Blue Pri		a (CO a)			
Inte	Articulation Mapping – K Levels with Course Outcomes (COs) Inte Cos K Level Section A Section B Section Section									
rnal			MCQ	T VI	Short Ans		Section C	Section D		
			No. of. Questions	K - Level	No. of. Questions	K - Level	Either or Choice	Open Choice		
CI AI	CO1	Up to K2	2	K1 & K2		K1	2 (K2&K2)	1(K2)		
	CO2	Up to K3	2	K1 & K2	2	K2	2 (K3&K3)	2(K2 & K3)		
CI AII	CO3	Up to K2	2	K1 & K2		K2	2 (K2&K2)	1(K2)		
	CO4	Up to K4	2	K1 & K2	2	K2	2 (K3&K3)	2(K3 &K4)		
Pat	estion tern I & II	No. of Questions to be asked	4 5	rilliði	3		4	3		
		No. of Questions to be answered	4		3		2	2		
		Marks for each question	1		2		5	10		
		Total Marks for each section	4		6		10	20		

	Distribution of Marks with K Level CIA I & CIA II							
	K Section A Sectio		Section B	Section C	Section D	Total	% of	Consolidate
	Level	(Multiple	(Short	(Either /	(Open	Marks	(Marks	of %
		Choice	Answer	Or	Choice)		without	
		Questions)	Questions)	Choice)			choice)	
	K 1	2	2	-	-	4	6.67	67
	K2	2	4	10	20	36	60	
CIA	К3	-	-	10	10	20	33.33	33
I	K4	-	•	-	-	-	-	-
	Marks	4	6	20	30	60	100	100
	K 1	2	2	STILL 18	-	4	6.67	50
CIA	K2	2	4	10	10	26	43.33	
II	К3	-	-	10	10	20	33.33	33
	K4	-	6-/ [Ω	10	10	16.67	17
	Marks	4	6	20	30	60	100	100

- **K1** Remembering and recalling facts with specific answers
- **K2** Basic understanding of facts and stating main ideas with general answers
- **K3** Application oriented- Solving Problems
- **K4** Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

S	Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)							
S.No	COs	K - Level	MCQs		Short Answers		Section C	Section D
		<u>a</u> .	No. of Questions	K – Level	No. of Question	K – Level	(Either / or	(Open Choice)
		(2)		A JULY		- 50	Choice)	
1	CO1	Up to K 2	2	K1,K2	1	K1	2 (K2&K2)	1(K2)
2	CO2	Upto K 3	2	K1&K 2	<u> </u>	K1	2 (K3&K3)	1(K3)
3	CO3	Up to K 3	2	K1&K 2		K2	2 (K3&K3)	1(K3)
4	CO4	Up to K 4	2	K1&K 2	1 80	K2	2 (K3&K3)	1(K4)
5	CO5	Up to K 4	2	K1&K 2	1	K2	2 (K3&K3)	1(K4)
No. of	Question	s to be Asked	10		5		10	5
No.of Questions to be answered		10		5		5	3	
Marks for each question			1		2		5	10
Total	Marks for	each section	10		10		25	30
	(Figures in parenthesis denotes, questions should be asked with the given K level)							

	Distribution of Marks with K Level									
K Level	Section A (Multiple Choice Questions)	Section B (Short Answer Questions)	Section C (Either/ or Choice)	Section D (Open Choice)	Total Marks	% of (Marks without choice)	Consolidated %			
K1	5	4	-	-	9	7.5	22			
K2	5	6	10	10	31	25.83	33			
K3	-	-	40	20	60	50	50			
K4	-	-	-1115	20	20	16.67	17			
Marks	10	10	50	50	120	100	100			

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

Summative Examinations - Question Paper - Format

	Summative Examinations - Question I aper – Format							
				ole Choice Questions)				
		nswer All (Questions	(10x1=10 marks)				
Q.No	CO	K Level		Questions				
1	CO1	K1						
2	CO1	K2		E DO				
3	CO2	K1	1000					
4	CO2	K2						
5	CO3	K1						
6	CO3	K2						
7	CO4	K1	1111					
8	CO4	K2	*					
9	CO5	K1		الله عالما الم				
10	CO5	K2		الالالات				
			Section B (S	Short Answers)				
	A	nswer All	Questions	(5x2=10 marks)				
Q.No	CO	K Level	000	Questions				
11	CO1	K1	Thirt	115.8				
12	CO2	K1						
13	CO3	K2						
14	CO4	K2						
15	CO5	K2						
			Section C (I	Either/Or Type)				
	Ans	swer All Qu	iestions	$(5 \times 5 = 25 \text{ marks})$				
Q.No	CO	K Level		Questions				
16) a	CO1	K2						
16) b	CO1	K2						
17) a	CO2	К3						
17) b	CO2	К3						
		113						

18) a	CO3	K3	
18) b	CO3	K3	
19) a	CO4	K3	
19) b	CO4	K3	
20) a	CO5	К3	
20) b	CO5	K3	

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels

Section D (Open Choice)

	Ar	iswer Any	Three questions (3x10=30 marks)
Q.No	CO	K Level	Questions
21	CO1	K2	81 L 00 000
22	CO2	K3	102
23	CO3	K3	5 MMM 1 3
24	CO4	K4	
25	CO5	K4	

