C. ABDUL HAKEEM COLLEGE [AUTONOMOUS]

[Affiliated to Thiruvalluvar University, Vellore]

MELVISHARAM – 632509

Syllabus under CBCS Pattern

Learning Outcome Based Curriculum Frame work [LOCF]

with effect from 2018 onwards

B.Sc. Chemistry

Prepared By

Department of Chemistry

Programme Outcomes (PO) for Bachelor of Science (B.Sc.):

PO1: Critical Thinking and Scientific Reasoning

Capable of critical thought after attaining basic disciplinary knowledge and understanding of major concepts, theoretical principles and experimental findings for scientific reasoning in the field of basic sciences.

PO2: Problem Solving

Ability to have effective problem solving skills in relevance to the society based on the knowledge and skills acquired from sciences.

PO3: Skill Development

Capable of demonstrating research, including wider interdisciplinary areas, as well as the ability to use current instruments/information technology in science-related fields. Improving the standard of science with a strong scientific temperament, leadership, and governing abilities.

PO4: Computational/Digital Literacy

Capable of locating, retrieving, and evaluating various science-related needs using computer/mobile-based digital literacy and search resources.

PO5: Effective Communication

Ability to communicate deep technical science information in writing and orally.

PO6: Moral and Ethical Awareness

Capable of carrying out their work with integrity and accuracy, avoiding unethical behaviours such as exaggeration, falsification, misrepresentation or plagiarism. Environmental and sustainability problems in the local area are being brought to the attention of the public.

PO7: Social Responsibility

Demonstrate numerous social issues, empathy and equity-based personal growth, as well as the opportunity to volunteer in real life and function as a true citizen.

PO8: Life-long Learning

Capable of self-paced and self-directed learning for personal growth, as well as imparting knowledge/skills for society re-skilling.

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PSO for B.Sc Chemistry

PSO1: Explain the basic principles of Organic, Physical and Inorganic Chemistry.

PSO2: Solve problems in thermodynamics and electrochemistry.

PSO3: Prepare, purify and analyze the chemical compounds both qualitatively and quantitatively.

For Candidates admitted from June 2018 onwards)

C. ABDUL HAKEEM COLLEGE (AUTONOMOUS), MELVISHARAM-632509

PG AND RESEARCH DEPARTMENT OF CHEMISTRY

B.Sc. CHEMISTRY

CBCS PATTERN (REGULATIONS 2018 - 2019)

The Course of Study, Credits and Scheme of Examinations

I YEAR

S.No	Part	Course Title	Subject Codes	Hrs/ week	Credits	Title of the Paper	Maximum Marks		
I YEAR		**SEMESTER I**					**CIA Mark**	**EXT Mark**	**TOTAL Mark**
1	I	Language	U18FTA101/ U18FUR101	6	4	Tamil/Urdu/Others-I	25	75	100
2	II	English	U18FEN101	6	4	English-I	25	75	100
3	III	Main-Theory	U18MCH101	6	6	General Chemistry-I	25	75	100
	III	Main-Practical	U18MCHP21	3	0	Practical-I Volumetric Analyis	0	0	0
4	III	Allied-I Theory	U18APH101/ U18AZL101	4	4	Physics-I/ Zoology-I	25	75	100
	III	Allied-I Practical	U18APHP21/ U18AZLP21	3	0	Physics/Zoology Practical	0	0	0
5	IV	Environmental Studies	U18CES101	2	2	Environmental Studies	25	75	100
				30	**20**		**125**	**375**	**500**
I YEAR		**SEMESTER II**					**CIA Mark**	**EXT Mark**	**TOTAL MARK**
6	I	Language	U18FTA201/ U18FUR201	6	4	Tamil/Urdu/Others-II	25	75	100
7	II	English	U18FEN201	4	4	English-II	25	75	100
8	III	Main-Theory	U18MCH201	6	5	General Chemistry-II	25	75	100
9	III	Main-Practical	U18MCHP21	3	3	Practical-I Volumetric Analyis	25	75	100
10	III	Allied-I Theory	U18APH201/ U18AZL201	4	4	Physics-II/ Zoology-II	25	75	100
11	III	Allied-I Practical	U18APHP21/ U18AZLP21	3	2	Physics/Zoology Practical	25	75	100
12	IV	Value Education	U18CVE201	2	2	Value Education	25	75	100
13	IV	Soft Skills	U18CSS201	2	1	Soft Skills	25	75	100
				30	**25**		**200**	**600**	**800**

II YEAR

S.No	Part	Course Title	Subject Codes	Hrs/ week	Credits	Title of the Paper	Maximum Marks		
II YEAR		**SEMESTER III**					**CIA Mark**	**EXT Mark**	**TOTAL Mark**
14	I	Language	U18FTA301/ U18FUR301	6	4	Tamil/Urdu/Others-III	25	75	100
15	II	English	U18FEN301	6	4	English-III	25	75	100
16	III	Main-Theory	U18MCH301	3	3	General Chemistry-III	25	75	100
	III	Main-Practical	U18MCHP41	3	0	Practical-II Inorganic Qualitative Analyis	0	0	0
17	III	Allied-II Theory	U18AMA301	7	4	Mathematics-I	25	75	100
			U18ACH302	4	4	Bio- Chemisty-I			
	III	Allied-II Practical	U18ACHP42	3	0	Allied Bio-Chemistry Practical	0	0	0
18	IV	Skill Based	U18SCH301	3	3	Water Treatment Analysis **(SBS-I)**	25	75	100
19	IV	Non Major Elective	U18NCH301	2	2	Chemistry in Daily Life-I **(NME-I)**	25	75	100
			TOTAL	**30**	**20**		**150**	**450**	**600**
II YEAR		**SEMESTER IV**					**CIA Mark**	**EXT Mark**	**TOTAL MARK**
20	I	Language	U18FTA401/ U18FUR401	6/4*	4/3*	Tamil/Urdu/Others-IV	25	75	100
21	II	English	U18FEN401	6	4	English-IV	25	75	100
22	III	Main-Theory	U18MCH401	3	3	General Chemistry-IV	25	75	100
23	III	Main-Practical	U18MCHP41	3	3	Practical-II Inorganic Qualitative Analyis	25	75	100
24	III	Allied-II Theory	U18AMA401	7	6	Mathematics-II	25	75	100
			U18ACH402	4	4	Bio-Chemistry-II			
25	III	Allied-II Practical	U18ACHP42	3	2	Allied Bio-Chemistry Practical	25	75	100
26	IV	Skill Based	U18SCH401	3	3	Food Chemistry **(SBS-II)**	25	75	100
27	IV	Non Major Elective	U18NCH401	2	2	Chemistry in Daily Life-II **(NME-II)**	25	75	100
28	I	Urdu Lab	U18FURP41	2*	1*	Practical Urdu	25	75	100
				30	**25**		**225**	**675**	**900**

*** Urdu**

III YEAR

S.No	Part	Course Title	Subject Codes	Hrs/ week	Credits	Title of the Paper	Maximum Marks		
III YEAR		**SEMESTER V**					**CIA Mark**	**EXT Mark**	**TOTAL Mark**
29	III	Main- Theory	U18MCH501	5	5	Inorganic Chemistry-I	25	75	100
30	III	Main-Theory	U18MCH502	5	5	Organic Chemistry-I	25	75	100
31	III	Main-Theory	U18MCH503	5	5	Physical Chemistry-I	25	75	100
	III	Main-Practical	U18MCHP61	3	0	Practical-III Gravimetric Estimation	0	0	0
	III	Main-Practical	U18MCHP62	3	0	Practical-IV Organic Qualitative Analysis & Preparations	0	0	0
	III	Main-Practical	U18MCHP63	3	0	Practical-V Physical Chemistry Experiments	0	0	0
32	III	Elective	U18ECH501/ U18ECH502/ U18ECH503	3	2	**Choose any one:** Spectroscopy/ Fuel Chemistry/ Pharmaceutical Chemistry **(Elective-I)**	25	75	100
33	III	Main	U18EINP51	0	2	Internship Training	25	75	100
34	IV	Skill Based Subject	U18SCH501	3	2	Data Analysis and Separation Techniques **(SBS-III)**	25	75	100
				30	**21**		**150**	**450**	**600**
III YEAR		**SEMESTER VI**					**CIA Mark**	**EXT Mark**	**TOTAL MARK**
35	III	Main- Theory	U18MCH601	5	5	Inorganic Chemistry-II	25	75	100
36	III	Main-Theory	U18MCH602	5	5	Organic Chemistry-II	25	75	100
37	III	Main-Theory	U18MCH603	5	5	Physical Chemistry-II	25	75	100
38	III	Main-Practical	U18MCHP61	3	3	Practical-III Gravimetric Estimation	25	75	100
39	III	Main-Practical	U18MCHP62	3	3	Practical-IV Organic Qualitative Analysis & Preparations	25	75	100
40	III	Main-Practical	U18MCHP63	3	3	Practical-V Physical Chemistry Experiment	25	75	100
41	III	Elective	U18ECH601/ U18ECH602/ U18ECH603	3	2	**Choose any one:** Polymer Chemistry/ Green Chemistry/ Applied Chemistry **(Elective- II)**	25	75	100

42	IV	Skill Based Subject	U18SCH601	3	2	Agriculture and Leather Chemistry **(SBS-IV)**	25	75	100
43	V	Extension Activities	U18CEA601	0	1	Extension Activitie	100	-	100
				30	**29**		**300**	**600**	**900**

OVERALL COURSE

CREDITS & MARKS STRUCTURE

PART	COURSE TITLE	NO OF PAPERS	HOURS	CREDITS	MARKS FOR EACH PAPER	TOTAL MARKS
I	Tamil/Urdu/Others	4	24/22*	16/15*	100	400
I	Urdu Lab	1	2*	1*	100	100
II	English	4	22	16	100	400
III	Main-Theory	10	48	47	100	1000
III	Main- Practical	5	30	15	100	500
III	Allied-I Theory	2	8	8	100	200
III	Allied-I Practical	1	6	2	100	100
III	Allied-II Theory	2	8	8	100	200
III	Allied-II Practical	1	6	2	100	100
III	Major Elective	2	6	4	100	200
III	Internship Training	1	0	2	100	100
IV	Non Major Elective	2	4	4	100	200
IV	Skill Based	4	12	10	100	400
IV	Soft Skills	1	2	1	100	100
IV	Environmental Studies	1	2	2	100	100
IV	Value Education	1	2	2	100	100
V	Extension Activities	1	0	1	100	100
	TOTAL	**43**	**180**	**140**	**-**	**4300**

*** Urdu**

PART	COURSE TYPE	NUMBER OF PAPERS	HOURS	CREDITS	MARKS
I	TAMIL/URDU/OTHERS	4+1*	24	16	500
II	ENGLISH	4	22	16	400
III	MAJOR, ALLIED, ELECTIVE & INTERNSHIP TRAINING	24	112	88	2400
IV	NON-MAJOR, EVS, SOFT SKILLS, SKILL BASED & VALUE EDUCATION	9	22	19	9
V	EXTENSION ACTIVITIES	1	-	1	100
	TOTAL	**43**	**180**	**140**	**4300**

NOTE:

For Mathematics Allied Students:

NO OF PAPERS	TOTAL HOURS	CREDITS	TOTAL MARKS
42	**180**	**140**	**4200**

For Non-Mathematics Allied Students:

NO OF PAPERS	TOTAL HOURS	CREDITS	TOTAL MARKS
43	**180**	**140**	**4300**

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: I Year Subject Code: U18FTA101 Semester: I

Language-1 Title: **TAMIL I**

Credits: 4 Max.Marks: 75

OBJECTIVES	தமிழ் மொழியின் இலக்கிய, இலக்கணச் செழுமைகளைப் பயிற்சிகளின் வழி வெளிக்கொணர்தல்.
COURSE OUTCOME(S)	
CO1	பக்தி இயக்க காலத்தில் சமூகப் பண்பாட்டு வரலாற்றை இனம் காணல். கவிதை வழி சமூகச் சிந்தனைகளையும் இயற்கையின் முக்கியத்துவத்தையும் கவிதை வழி இயம்பல்.
CO2	தமிழ் உரைநடை இலக்கியங்களில் உள்ள நேர மேலாண்மை மற்றும் அறிவியல் தமிழ் குறித்த பதிவுகளை விளக்குதல். தமிழ்ச் சிறுகதைகளில் தனி மனித மன உணர்வுகளை வெளிக் கொணரல்.
CO3	செவ்வியல் இலக்கிய நெடிய வரலாறு, இலக்கணப் பயிற்சி வழி போட்டித் தேர்வுகளை எதிர்கொள்ளல்.

பாடத்திட்டம்

அலகு - 1 பக்தி

1. திருமூலர் - திருமந்திரம் (7 பாடல்கள்)
2. மு. மேத்தா - நாயகம் ஒரு காவியம்
   அ. தலைக்கு விலை
   ஆ. சிலந்தி செய்த செயல்
3. சேவியர் - இயேசுவின் கதை
   அ. சிலுவை, ஆ. உன்னதரின் உயிர்ப்பு

அலகு - 2 கவிதை

1. பாரதியார் - கண்ணம்மா என் குழந்தை (முழுவதும்)
2. பாரதிதாசன் - குடும்ப விளக்கு - முதியோர் காதல் (தேர்ந்தெடுத்த 10 பாடல்கள்)
3. கவிமணி - ஆறு தன் வரலாறு கூறுதல்
4. நா.காமராசன் - கறுப்பு மலர்கள்
   அ. வானவில், ஆ. கடல்
5. அப்துல் காதர் - மின்னல் திரிகள் - மெழுகுவர்த்தியும் ஊதுவத்தியும்

அலகு - 3 உரைநடை

1. அப்துல் ரகுமான் - எம்மொழி செம்மொழி
2. வா.செ. குழந்தைசாமி - அறிவியலும் வறுமையொழிப்பும்
3. வெ. இறையன்பு - நேரம் கடிகாரத்தில் இல்லை

அலகு - 4 சிறுகதை

1. மேலாண்மை பொன்னுசாமி - அன்பூவாசம்
2. வைரமுத்து - இப்படியும் ஒருவன் இறந்தான்
3. வண்ணதாசன் - ஓர் உல்லாசப் பயணம்

அலகு - 5

அ. இலக்கிய வரலாறு

1. பக்தி & சமய இலக்கியங்கள் - அறிமுகம்
   (சைவம், இசுலாம், கிறித்தவம்)
2. இக்கால இலக்கியங்கள் - தோற்றமும் வளர்ச்சியும்
   (கவிதை, உரைநடை, சிறுகதை)

ஆ. திறனறிப் பயிற்சி

1. அகரவரிசைப்படுத்துதல்
2. வல்லினம் மிகும் இடங்கள்
3. வல்லினம் மிகா இடங்கள்
4. சந்திப்பிழை நீக்குதல்
5. பொதுக் கட்டுரை

பார்வை நூல்கள்

1	இலக்கியச் சோலை	-	சி.அப்துல் ஹக்கீம் கல்லூரி வெளியீடு. 2018 சூன் வெளியீடு
2	மினனல் திரிகள்	-	அப்துல் காதர் சல்மா பதிப்பகம்,வாணியம்பாடி, முதல் பதிப்பு,2004
3	இயேசுவின் கதை	-	சேவியர் யாளி பதிவு வெளியீடு, கோடம்பாக்கம் சென்னை- 24 முதல் பதிப்பு -2005
4	எம்மொழி செம்மொழி	-	கவிக்கோ அப்துல் ரகுமான் நேஷனல் பப்ளிஸர்ஸ்,தி.நகர், சென்னை -17 முதல் பதிப்பு -2010
5	தமிழ் இலக்கிய வரலாறு	-	பேரா.மது.ச.விமலானந்தம் அபிராமி பதிப்பகம், இராயபுரம், சென்னை -13 மறு பதிப்பு -2002
6	நற்றமிழ் இலக்கணம்	-	டாக்டர்.சொ.பரமசிவம், பட்டுப் பதிப்பகம், 1269, 32-ஆம் தெரு அண்ணாநகர் மேற்கு, கம்பர் குடியிருப்பு, சென்னை -40 பன்னிரண்டாம் பதிப்பு -2012

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: I Year Subject Code: U18FUR101 Semester: I

Language-1 Title: **(URDU I – Prose, Grammer & Letter Writing)**

Credits: 4 Max.Marks: 75

OBJECTIVES:	✓ To promote students' proficiency in the basics of Urdu. ✓ To accelerate their zeal to cultivate Writing Skills. ✓ To strengthen their reading and receptive skills.
COURSE OUTCOMES	➢ Students will acquire the required academic efficiency. ➢ They will be learning the techniques of exemplary writing. ➢ They will develop ability to foster fast reading of Texts.

BOOK PRESCRIBED: "ADAB-E-JAMEEL"

Published by Dept. of Urdu, C. Abdul Hakeem College, Melvisharam.

Unit – I

1. SAIR PAHLAY DARWESH KI – Meer Amman Dehalvi
2. UMEED KI KHUSHI – Sir Syed
3. Letter to the Principal Seeking Leave

Unit – II

1. MIRZA GHALIB KE AKHLAQ WA ADAT – Moulana hali
2. ZUBAIDA KHATOON – Abdul Haleem Sharar
3. Zameer Aur Uski Khismien
4. Letter to the Manager of a Firm Seeking Employment

Unit – III

1. NOOR JHAN – Mohamed Hussain Azad
2. SAWERE JO KAL ANKH MERI KHULI – Patras Bukhari
3. Sifat Aur Uski Khimein
4. Letter to a Publisher of Book Seller Placing Order for Books

Unit – IV

1. KHUD GHARAZ DOST – Duputi Nazeer Ahmed
2. SIR SYED MARHOOM AUR URDU LITERATURE– Allama Shibli
3. Letter to the Father / Guardian Asking Money for Payment of College Fees

Unit – V

1. Letter to a Friend Inviting Him to Your Sister's Marriage
2. Sifat Aur Uski Khimein
3. Fe'l Aur Uski Khimein
4. Lawazim-E-Ism
5. Alamat-E-Fael "Nay" Aur Alamat-E-Mafo'ol "Ko" Ke Quaide

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: I Year Subject Code: U18FEN101 Semester: I

English-1 Title: **ENGLISH I**

Credits: 4 Max.Marks: 75

Course Outcome(s)

- **CO1:** Understand various forms of literature like Prose, Poetry, Biography, Short Story and Drama.
- **CO2:** Acquire the knowledge of grammatical system of English Language and also develop four Language Skills. (LSRW)

UNIT - I **PROSE**

1. The Curse of Untouchability — M.K. Gandhi
2. India and Democracy — Dr. B.R. Ambedkar
3. The Ant and the Grasshopper — W.S. Maugham
4. My Lost Dollar — Stephan Leacock

UNIT – II **POETRY**

1. All the World is a Stage — William Shakespeare
2. La Belle Dame Sans Merci — John Keats
3. Ozymandias — P.B. Shelley
4. A River — A.K. Ramanujan

UNIT - III **SHORT STORIES**

1. The Doctor's Word — R. K. Narayan
2. The Model Millionaire — Oscar Wilde

UNIT - IV **ONE-ACT PLAY & BIOGRAPHY**

1. The Refund — Fritz Karinthy
2. Biography of Socrates

UNIT - V **WARM UP**

1. **Lexical Skills:**
    1. Words
    2. Synonyms and Antonyms
    3. Homonyms, Homophones
    4. Words often confused
2. **Descriptive Grammar:**
    1. Describing the Parts of Speech
    2. The Phrase and The Clause
    3. The Sentence and its types
    4. Nouns
3. **Traditional Grammar:**
    1. The Tenses- Introduction

        Present Tense

        - Simple Present Tense
        - Present Continuous Tense
        - Present Perfect Tense
        - Present Perfect Continuous Tense
    2. Voice of the Verb
4. **Communication Skills (LSRW):**
    1. Greeting
    2. Introducing
    3. Inviting someone
    4. Seeking Permission
5. **Composition:**
    1. Letter Writing
    2. Dialogue Writing
    3. Report Writing
    4. Précis Writing
    5. Reading for Comprehension

Prescribed Book: HALL OF FAME – I Board of Editors, Published by Emerald publishers,

Egmore, Chennai – 600 008: www.emeraldpublishers.com, Mail: info@emeraldpubliser.com

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year:	I Year	Subject Code: U18MCH101	Semester: I
Major-1	Title:	**GENERAL CHEMISTRY I**	
Credits:	6		Max.Marks: 75

OBJECTIVES	Basic concepts regarding atomic structure, periodic properties, bonding concepts, ionic bond, VSEPR and MO theories, nomenclature of organic compounds, hybridization, reaction intermediates, quantum theory, gases, and principles of volumetric analysis, related problems, and applications wherever necessary are to be taught for I-Semester.
Course Outcome(s): **On Completion of the course, students will be able to**	
CO1	Recall the basic knowledge of atomic structure, periodicity and characteristics of orbitals.
CO2	Generalize the different type of bonding, characterisation and properties.
CO3	Analyze and predict the nomenclature & bonding of simple organic compounds.
CO4	Illustrate the concept of gaseous and liquid states.
CO5	Explain the various theories of titrations & indicators in volumetric analysis and their calculations.

UNIT: I

1.1 Atomic structure - Quantum numbers n, l, m and s - Pauli Exclusion Principle - Hund's rule of maximum multiplicity - Aufbau's principle - Electronic configurations of elements - Stability of half-filled and completely filled orbitals.

1.2 Classification of elements – General characteristics of s, p, d and f block elements - Periodicity of properties.

1.3 Definition and periodicity of the following properties - Atomic radii, Ionic radii, Ionization potential, Electron affinity and Electronegativity.

UNIT: II

2.1 Ionic bond - Conditions for the formation of ionic bond - General properties – Energetics of formation of NaCl from Na^+ and Cl^- - Hydration energy, Lattice energy and their applications – Born-Haber cycle - Fajan's rule - Characteristics of Electrovalent compounds.

2.2 Valence Bond Theory - Conditions for the formation of covalent bond - General properties - Polarity of bonds - Orbital overlap - Bond lengths and Bond energies - Hybridisation - Sigma and Pi bonds - VSEPR theory - Geometries of BF_3 , NH_3 , H_2O, PCl_5 and SF_6 molecules - Partial ionic character of covalent bond - Percentage of ionic character.

2.3 Molecular Orbital theory – Bonding and Anti-bonding orbitals - Relative order of Energies of molecular orbitals - MO diagram of H_2, He_2, O_2, O_2^+, O_2^-, N_2, F_2 and CO - Bond Order - Stability and Magnetic properties of the molecules - Comparison of VB and MO theories.

UNIT: III

3.1. Classification of organic compounds – Nomenclature of organic compounds – Functional groups – Homologous series – IUPAC recommendations for naming simple aliphatic – alicylic and aromatic compounds – Poly functional compounds – Heterocyclic compounds.

3.2. Basic concepts of bonding in organic chemistry – Hybridization –– geometry of molecules – methane, ethane, ethylene, acetylene and benzene. Electron displacement effects – inductive –electromeric – resonance – hyperconjugation and steric effects.

3.3 Cleavage of bonds - Homolytic and Heterolytic fission of carbon-carbon bond - Reaction intermediates - Methods for determining reaction mechanism (Isotopic labeling and Isolation of intermediates) - Structure and stability of Carbocations - Carboanions and Free radicals.

UNIT: IV

4.1 Gaseous state - Kinetic gas equation - derivation - Gas laws from the kinetic gas equation - Types of velocities - mean, rms, most probable velocities - Calculation of molecular velocities.

4.2 Maxwell's distribution of molecular velocities (no derivation) - Effect of temperature on velocity distribution. Principle of Equipartition of energy – Contribution to heat capacity of an ideal gas.

4.3 Liquid state - vapour pressure - Surface tension- Parachor - definition and applications only-Viscosity- effect of temperature and pressure. Liquid Crystals - classification and molecular arrangements.

UNIT: V

5.1 Definitions of molarity - normality - molality and mole fraction - their calculations - definition and examples for primary and secondary standards. Calculation of equivalent weight of acid, base, oxidizing agent, reducing agent and salt.

5.2 Principles of volumetric analysis. Theories of acid - base, redox, complexometric, iodometric and iodimetric titrations.

5.3 Theories of indicators - acid-base indicators-choice of indicators - redox - metal ion and adsorption indicators.

BOOKS FOR STUDY:

1. R.D. Madan, Modern Inorganic Chemistry, 2nd Edition, S. Chand & Co, Reprint 2004.
2. B.S. Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co., Ltd, Reprint 2008.
3. B. R. Puri, L. R Sharma and M.SPathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008.

Books for Reference:

1. P.L Soni and Mohan Katyal, Textbook of Inorganic Chemistry, 20th Edition, Sultan Chand & Sons, Reprint 2001.
2. P.L Soni and H.M Chawla, Textbook of Organic Chemistry, 25th Revised Edition, Sultan Chand & Sons, 1992.
3. K.S Tewari and M.K Vishnoi, A Textbook of Organic Chemistry, 3rd Edition, Vikas Publishing House Pvt. Ltd, 2006.
4. M.K Jain and S.C Sharma, Modern Organic Chemistry, Vishal Publishing Co, 2004.
5. P.L Soni, O.P Dharmarha and U.N Dash, Textbook of Physical Chemistry, 21st Revised Edition, S. Chand & Co, Reprint 2000.
6. P.K Mani and A.O Thomas, A Textbook of Practical Chemistry, Scientific Publication, 1973.
7. O.P. Pandey, D. N. Bajpai and S.Giri, Practical Chemistry, 8th Edition, S. Chand & Co, 2001.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: I Year Subject Code: U18APH101 Semester: I

Allied-1 Title: **ALLIED PHYSICS – I**

Credits: 4 Max.Marks: 75

OBJECTIVES	To learn concise ideas about basic physics and their applications in day to day life
COURSE OUTCOME(S)	
CO1	Remember the Properties of Matter, types of moduli and viscous nature of surface force
CO2	Understand the laws of gravitation, principle of rockets motion.
CO3	Remember the laws of thermodynamics and applications
CO4	Recall and explain the concepts of electrical measurements and magnetism.
CO5	To learn the production of ultrasonic waves, the concepts of acoustics and their applications

Unit 1: Properties of Matter

Elasticity – Hookes Law – Different moduli of Elasticity – Poisson's ratio. Theory of non-uniform bending-determination of Youngs modulus by non-uniform bending (Pin and Microscope) - Torsion Pendulum – Expression for period of oscillation-determination of rigidity modulus without masses (experiment).

Viscosity – Streamline and Turbulent flow – Poiseuille's formula for the flow of a liquid through a capillary tube - Determination of coefficient of viscosity of a liquid (variable pressure head) – Poiseuille's method.

Surface tension – Jaegar's method to determine S.T. – Variation of surface tension with temperature.

Unit 2: Mechanics

Newton's law of gravitation– Mass and mean density of the earth - Kepler's laws - Determination of gravitational constant – Boy's method.

Laws of floatation – meta centre – meta centric height of a ship – Bernoulli's theorem explanation - venturimeter.

Rocket motion - Principle –Theory – Velocity of rocket – Rocket propulsion systems – Multistage rockets - Artificial satellites.

Unit 3: Thermal Physics

Heat engine – Efficiency – Carnot's Theorem – Otto and Diesel engines –Construction, working and efficiency.

Coefficient of thermal conductivity – Determination of thermal conductivity of a bad conductor by Lee's disc method - Practical applications of conduction of heat.

Regenerative cooling - Liquefaction of air (Linde's process) – Liquefaction of helium (Onnes method) – applications of low temperatures.

Unit 4: Electricity and Magnetism

Potentiometer – Principle – Calibration of low range voltmeter and ammeter - Principle of a capacitor – Parallel plate capacitor – Spherical capacitor - Energy stored in a capacitor.

Seebeck effect –Laws of thermo E.M.F. – Thermo couple - Determination of Thermo E.M.F using potentiometer – Applications of thermo-electricity.
Magnetic Induction (B) – Magnetisation (M)- Magnetising field (H) – Relationship between B, H and M– Magnetic susceptibility – Magnetic permeability – Electron theory of para dia and ferro magnetism – Explanation (Qualitative only) - Properties of para, dia and ferro magnetic materials.

Unit 5: Acoustics and ultrasound

Transverse waves – Expression for the velocity of transverse waves in a stretched string – Frequency of transverse vibration of stretched strings – verification of laws of transverse vibration of string using sonometer.
Acoustics of building - Reverberation time – Sabine's formula (no derivation) – absorption coefficient – factors affecting acoustics of building.
Introduction to ultrasonics – piezoelectric effect – production of ultrasonic waves by piezoelectric method – uses of ultrasonic waves.

Books for Study:

1. Allied Physics , R. Murugesan S. Chand & Co., (2005)
2. Properties of Matter and Acoustics, R. Murugesan and Kiruthiga Sivaprasath, S. Chand & Co., (2014).
3. Mechanics and Mathematical Physics, R. Murugesan, S. Chand & Co., (2013).
4. Thermal Physics, R.Murugesan and Kiruthiga Sivaprasath, S. Chand & Co, (2004).
5. Electricity and Magnetism, R. Murugesan, S. Chand & Co., (2013).
6. Engineering Physics – I, Dr. P. Mani (2106)

Books for Reference:

1. College Physics Volume I and II , A.B. Gupta, Books and Allied (P) Ltd (2014)
2. Heat and Thermodynamics, Brij Lal and N.Subrahmanyam, S. Chand & Co., (2006).
3. Elements of Properties of Matter, D.S. Mathur, S. Chand & Co. (1999).

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc. Chemistry effective from the year 2018-2019

Year:	**I Year**	Subject Code: **U18AZL101**		Semester:	**I**
Allied - 1		Title: **ALLIED ZOOLOGY - I**			
Credits:	**4**			Max. Marks:	**75**

OBJECTIVES:

To study the systems and functional morphology of Invertebrates and Chordates.

Unit-I

Morphology and life history of Plasmodium vivax, Obeliageniculata and Taeniasolium.

Unit-II

Leech: Morphology, Digestive system & parasitic adaptations of Leech.
Cockroach: Morphology, Mouth parts-Digestive system and Nervous system.
Freshwater Mussel: Morphology, Digestive system, Respiratory System, Glochidium Larva.

Unit-III

Sea Star: Morphology, Digestive system, Water vascular system and Bipinnaria larva.
Amphioxus: Morphology, Digestive system, circulatory system.
Shark: Morphology, Respiratory System, Circulatory system, Yolksac placenta.

Unit-IV

Frog: Morphology, Digestive System, Respiratory System, circulatory system, Brain.
Calotes: Morphology, circulatory system, Urinogenital system.

Unit-V

Pigeon: Morphology & Respiratory system, Flight adaptations.
Rabbit: Morphology, Dentition, Digestive system, structure & function of heart.

REFERENCE BOOKS:

1. EkambranathaAyyar, M and Anantha Krishnan, T.N. “Manual of Zoology, Volume I & II Viswanathan Printers and Publishers, Chennai
2. Jordon, E.L, and Verma, P.S. “Invertebrate Zoology”. Chand & Co, Ltd, New Delhi.
3. Yung, J.Z., “Life of Vertebrates”, Cambridge Uni. Press.
4. Arumugham. N., “Invertebrate Zoology” Vol. I Saras publication.
5. P.S.Dhami and J.K.Dhami-Invertebrate Zoology, “S.Chand& Co, New Delhli.
6. Dr.(Tmt)BernesAnandharaj “tpy’;fpay; Jizg;ghlk;” Vol. I Cresolite Publications.
7. Arumugam, N., “Chordate Zoology” Vol.2. Saras Publication.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: I Year Subject Code: U18CES01 Semester: I

Part-IV Title: **ENVIRONMENTAL STUDIES**

Credits: 2 Max.Marks: 75

OBJECTIVES	To understand the environment around us and to conserve our nature.
COURSE OUTCOME(S) :At the end of course the students shall able to	
CO1	Describe the available food and natural resources.
CO2	Explain the structure and functions of ecosystem
CO3	Elaborate the control of environmental pollution.
CO4	Analyze the social issues of human beings.

UNIT-I

INTRODUCTION TO ENVIRONMENTAL SCIENCES: NATURAL RESOURCES:

Environmental Sciences - Relevance - Significance - Public awareness - Forest resources - Water resources - Mineral resources - Food resources - conflicts over resource sharing - Exploitation - Land use pattern - Environmental impact - fertilizer - Pesticide Problems - case studies.

UNIT-II

ECOSYSTEM, BIODIVERSITY AND ITS CONSERVATION:

Ecosystem - concept - structure and function - producers, consumers and decomposers - Food chain - Food web - Ecological pyramids - Energy flow - Forest, Grassland, desert and aquatic ecosystem. Biodiversity - Definition - genetic, species and ecosystem diversity - Values and uses of biodiversity - biodiversity at global, national (India) and local levels - Hotspots, threats to biodiversity - conservation of biodiversity - Insitu & Exsitu.

UNIT-III

ENVIRONMENTAL POLLUTION AND MANAGEMENT:

Environmental Pollution - Causes - Effects and control measures of Air, Water, Marine, soil, solid waste, Thermal, Nuclear pollution and Disaster Management - Floods, Earth quake, Cyclone and Landslides. Role of individuals in prevention of pollution - pollution case studies.

UNIT-IV

SOCIAL ISSUES - HUMAN POPULATION:

Urban issues - Energy - water conservation - Environmental Ethics - Global warming - Resettlement and Rehabilitation issues - Environmental legislations - Environmental production Act. 1986 - Air, Water, Wildlife and forest conservation Act - Population growth and Explosion - Human rights and Value Education - Environmental Health - HIV/AIDS - Role of IT in Environment and Human Health - Women and child welfare - Public awareness - Case studies.

UNIT-V

FIELD WORK:

Visit to a local area / local polluted site / local simple ecosystem - Report submission

Suggested Readings:

1. KUMARASAMY, K., A.ALAGAPPA MOSES AND M.VASANTHY, 2004. ENVIRONMENTAL STUDIES, BHARATHIDSAN UNIVERSITY PUB, 1, TRICHY
2. RAJAMANNAR, 2004, ENVIRONEMNTAL STUDIES, EVR COLLEGE PUB, TRICHY
3. KALAVATHY,S. (ED.) 2004, ENVIRONMENTAL STUDIES, BISHOP HEBER COLLEGE PUB., TRICHY

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: I Year Subject Code: U18FTA201 Semester: II

Language - 2 Title: **TAMIL II**

Credits: 4 Max.Marks: 75

OBJECTIVES	தமிழ் மொழியின் இலக்கிய, இலக்கணச் செழுமைகளைப் படைப்புகளின் வழி வெளிக்கொணர்தல்.
COURSE OUTCOME(S)	
CO1	காலம்தோறும் நிலவி வந்த அறம் சார் விழுமியங்களை அடையாளம் காணல். ஆளுமைகளின் அறிமுகத்தால் தன்னம்பிக்கை, விடாமுயற்சி, ஆளுமைத்திறன்களை விளக்கி எடுத்துரைத்தல்.
CO2	சமூகச் சீர்கேடு,பண்டைய அரச வரலாறு போன்றவற்றை விளக்கி,வாசிப்பையும் உச்சரிப்பையும் மேம்படுத்தல். திரைப் பாடல்கள் வழி நாட்டின் நிலைப்பாட்டை எடுத்துரைத்து தனி மனித சுயப் பண்புகளைப் பரிசோதித்தல்.
CO3	காலந்தோறும் தமிழ் இலக்கியங்களில் மாறுபடும் பாடுபொருள். வடிவம் முதலியவற்றை வரலாற்றின் வழி எடுத்துரைத்தல்.

பாடத்திட்டம்

அலகு - 1 நீதி இலக்கியங்கள்

1. திருக்குறள் - செய்ந்நன்றி அறிதல், நட்பு பிரிவாற்றாமை
2. நாலடியார் - தேர்ந்தெடுத்த 10 செய்யுள்
3. விவேக சிந்தாமணி - தேர்ந்தெடுத்த 7 செய்யுள்

அலகு - 2 வாழ்க்கை வரலாறு

1. நவாப். சி. அப்துல் ஹக்கீம்
2. டாக்டர். ஐடா ஸ்கடர்
3. டாக்டர் மு. வரதராசனார்

அலகு - 3 நாடகம்

1. பேரறிஞர் அண்ணா - வழக்கு வாபஸ்
2. ப. சங்கரலிங்கனார் - மானம் பெரிதே!
3. இன்குலாப் - மணிமேகலை (சிறை விடு கதை)

அலகு - 4 திரைத்தமிழ்

1. கண்ணதாசன்
   1. ஆறு மனம் - ஆறு மனமே ஆறு
   2. வாழ்க்கை - வாழ நினைத்தால் வாழலாம்
2. பட்டுக்கோட்டை கல்யாணசுந்தரம்
   3. விவசாயி - கடவுள் எனும் முதலாளி
   4. ஏழை ஏக்கம் - கையிலே வாங்கினேன்
3. வாலி
   5. பரிவு - புத்தன் காந்தி ஏசு
   6. பிரிவு - தரைமேல் பிறக்கவிட்டார்

அலகு - 5

(அ) இலக்கிய வரலாறு

1. நீதி இலக்கியங்கள்
2. நாடகம் தோற்றமும் வளர்ச்சியும்

(ஆ) திறனறிப் பயிற்சி

1. மரபுப் பெயர்கள் - அறிமுகம்
2. வழூஉச் சொற்கள் - அறிமுகம்
3. பிற மொழிச் சொற்களை நீக்குதல்
4. வடமொழிச் சொற்களை நீக்குதல்
5. விண்ணப்பம் எழுதுதல்

பார்வை நூல்கள்

1	இலக்கியச் சோலை	-	சி.அப்துல் ஹக்கீம் கல்லூரி வெளியீடு. 2018 சூன் வெளியீடு
2	கொடை வள்ளல் நவாப் சி.அப்துல் ஹக்கீம்	-	அப்துல் காதர் உலகத் தமிழாராய்ச்சி நிறுவனம்,சென்னை முதல் பதிப்பு,2015
3	வெற்றித்தூண்	-	ப.சங்கரலிங்கனார் என்.சி.பி.எச். அம்பத்தூர் சென்னை- 98 முதல் பதிப்பு -2013
4	மணிமேகலை நாடகம்	-	இன்குலாப் குமரன் பப்ளிஸர்ஸ், வடபழனி , சென்னை -26 முதல் பதிப்பு -2005
5	விவேக சிந்தாமணி	-	ஞா.மாணிக்கவாசகன் (உ.ஆ) உமா பதிப்பகம், சென்னை-001 ஆறாம் பதிப்பு – 2010
6	பட்டுக்கோட்டை கல்யாணசுந்தரம் பாடல்கள்	-	என்.சி.பி.எச். அம்பத்தூர் சென்னை- 98 பதினாறாவது பதிப்பு -2009
7	கண்ணதாசன் திரை இசைப் பாடல்கள்	-	கண்ணதாசன், வானதி பதிப்பகம்,தீனதயாளு தெரு, தி.நகர்,சென்னை -17 பன்னிரண்டாம் பதிப்பு – டிசம்பர் 2007
8	தமிழ் இலக்கிய வரலாறு	-	பேரா.மது.ச.விமலானந்தம் அபிராமி பதிப்பகம், இராயபுரம், சென்னை -13 மறு பதிப்பு -2002
9	நற்றமிழ் இலக்கணம்	-	டாக்டர்.சொ.பரமசிவம், பட்டுப் பதிப்பகம், 1269, 32-ஆம் தெரு அண்ணாநகர் மேற்கு, கம்பர் குடியிருப்பு, சென்னை -40 பன்னிரண்டாம் பதிப்பு -2012

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: I Year Subject Code: U18FUR201 Semester: II

Language - 2 Title: **URDU- II (Manzoomath, Ghazaliath & Translation)**

Credits: 4 Max.Marks: 75

OBJECTIVES:	✓ To enhance students' creative thinking. ✓ To trigger the literary skills dormant in them. ✓ To train them to advance their Translation Skills.
COURSE OUTCOMES	➢ Students will be able to expand the frontiers of their creative intellect. ➢ Their fascination for Literature will get doubled or tripled. ➢ The translation skills will help them professionally.

BOOK PRESCRIBED: "ADAB-E-JAMEEL"

Published by Dept. of Urdu, C. Abdul Hakeem College, Melvisharam.

Unit – I

1. NAGHMA-E-HASRATH – Akbar Allahbadi
2. MEER TAQI MEER - Hasthi Apni Habbab Ki Si Hai
3. KHAJA MEER DARD - Tohmaten Chand Apne Zimmz Dhar Chale

Unit – II

1.QAUMI GEETH – Allama Iqbal
2.SHAIK IBRAHIM ZAUQ - Layi Hayath Aaye Qaza Le Chali
3.MIRZA GHALIB - Dil Hi To Hai Na Sang Wa Khisht

Unit – III

1. NISAR MAIN TERI GALIYON KE – Faiz Ahmed Faiz
2. MOMIN KHAN MOMIN - Adam Mein Rehthe
3. JIGAR MURADABADE - Dil Gaya Ronaq Hayath Gayi

Unit – IV

1. WO NABION MEIN RAHMATH LAQAB PANE WALA - Masaddas Hali
2. FIRAQ - Sar Mein Souda Bhi Nahin
3. KAWISH BADRI - Az Sare Nav Fikr Ka Aaghaaz Karna Chahiye
4. A General Passage Translation from English to Urdu

Unit – V

1. TAJ MAHAL – Sahir Ludhyanwi
2. SHAKIR NAITHI - Shahid Maqsood Ek Din Rubaroo Ho Jayega
3. PARVEEN - Chalna Ka Hosala Naye
4. A General Passage Translation from English to Urdu

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: I Year Subject Code: U18FEN201 Semester: II

English - 2 Title: **ENGLISH II**

Credits: 4 Max.Marks: 75

Course Outcome(s)

- **CO1:** Comprehend various forms of literature like Prose, Poetry, Biography, Short Story and Drama.
- **CO2:** Develop the knowledge of grammatical system of English Language and also develop four Language Skills. (LSRW)

UNIT - I **PROSE**

1. The Eternal Silence of These Infinite Crowds — N.C. Chaudhari
2. Comfort — Aldous Huxley
3. The Challenge of Our Time — E.M. Foster
4. Words of Wisdom — Chetan Bhagat

UNIT – II **POETRY**

1. Kubla Khan — S.T. Coleridge
2. I Know Why the Caged Bird Sings — Maya Angelo
3. Punishment in Kindergarten — Kamala Das
4. The Unknown Citizen — W.H. Auden

UNIT - III **SHORT STORIES**

1. A Devoted Son — Anita Desai
2. A Cup of Tea — Katherine Mansfield

UNIT - IV **ONE-ACT PLAY & BIOGRAPHY**

1. Funeral Oration from Julius Caesar — William Shakespeare
2. Biography of Sir Syed Ahmed Khan

UNIT - V **WARM UP**

1. **Lexical Skills:**
    1. One Word Substitutes

2. Correct Usage of words
3. Commonly misspelt words
4. Formation of plurals

2. Descriptive Grammar:

1. Articles and its kinds
2. Prepositions and its kinds
3. Pronouns
4. Kind of Pronouns
5. Verbs – Transitive and Intransitive Verbs

3. Traditional Grammar:

1. The Tenses- Introduction

   Past Tense

   (a) Simple Past Tense

   (b) Past Continuous Tense

   (c) Past Perfect Tense

   (d) Past Perfect Continuous Tense
2. Direct and Indirect Speech

4. Communication Skills (LSRW):

1. Offering a Suggestion
2. Asking For Advice
3. Persuading
4. Complimenting

5. Composition:

1. Electronic Mail
2. Body Language
3. Facing and Interview
4. Negotiating
5. Group Discussion

Prescribed Book: HALL OF FAME – II Board of Editors, Published by Emerald publishers,

Egmore, Chennai – 600 008: www.emeraldpublishers.com, Mail: info@emeraldpubliser.com

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: I Year Subject Code: U18MCH201 Semester: II

Major-2 Title: **GENERAL CHEMISTRY II**

Credits: 5 Max.Marks: 75

OBJECTIVES	Basic knowledge on alkanes, alkenes, alkynes, cyclo alkanes, dienes, thermochemistry, basic concepts in thermodynamics, first law, derivation of equations, related problems, s and p block elements, group study, mechanism, applications wherever necessary are to be taught for II-Semester.
Course Outcome(s): **On Completion of the course, students will be able to**	
CO1	Summarize the exceptional properties of alkali, alkaline earth metals and boron family.
CO2	Discuss the preparation and chemical properties of alkane, alkene and alkyne.
CO3	Relate the synthetic methods and mechanism of dienes and cycloalkanes.
CO4	Outline the concepts of solid states, quantum chemistry and thermodynamics.
CO5	Assess the various states of thermodynamics Systems.

UNIT: I

1.1 Alkali metals - Li, Na, K, Rb and Cs - Occurrence - Comparative study of with respect to elements - oxides, halides, hydroxides and carbonates - Exceptional property of Lithium - Diagonal relationship of Li with Mg.

1.2 Alkaline earth metals - Be, Mg, Ca, Sr and Ba - Occurrence - comparative study of the elements with respect to oxides, hydroxides, halides, sulphates and carbonates - Exceptional property of Beryllium - Diagonal relationship of Be with Al - Comparison of alkaline earth metals with alkali metals.

1.3 p-block elements - Boron family - group discussion - anomalous behavior of Boron - diagonal relationship between B and Si - Electron deficiency and electron acceptor behaviour of Boron trihalides– bonding in diborane.

UNIT: II

2.1 Alkanes - Methods of preparation of alkanes - Wurtz method, Kolbe's method and Reduction of alkyl halides - Physical and Chemical Properties of alkanes - Mechanism of Free Radical Substitution in alkanes – Halogenation and Reactivity.

2.2 Alkenes - Properties of alkenes – Electrophilic and Free radical addition - Addition reactions of Alkenes with mechanism - Addition of Hydrogen, Halogens, Hydrogen Halide (Markownikoff''s rule) - Hydrogen bromide (Peroxide effect) - Sulphuric Acid, Water, BH_3, Ozonolysis, Hydroxylation with $KMnO_4$ - Allylic substitution by NBS.

2.3 Alkynes - Acidity of alkynes - Addition of hydrogen - Hydroboration - Hydrohalogenation - Addition of hypohalous acid, Hydration - Addition of water with $HgSO_4$ catalyst - Oxidation with $KMnO_4$ – Ozonolysis - Formation of Acetylides.

UNIT: III

3.1 Dienes – Classification - Conjugated, Isolated and Cumulative Dienes - Stability of Dienes - 1, 2- and 1, 4- Addition reactions of H_2 and HX with mechanisms – Synthesis of dienes – 1, 3 - Butadiene, Isoprene and Chloroprene - Diels-Alder reaction.

3.2 Cycloalkanes - Preparation using Wurtz's reaction, Dieckmann's ring closure and Reduction of aromatic hydrocarbons - Substitution and Ring opening reactions.

3.3 Stability of Alkanes, Alkenes and Cycloalkanes - Bayer's strain theory - Theory of Strainless rings.

UNIT: IV

4.1 Solid State - Crystal lattices - Laws of crystallography - Elements of symmetry - crystal systems - unit cell - space lattice - Bravais' lattices - structure of NaCl - structure of CsCl – Law of rational indices - Miller's indices.

4.2 Quantum chemistry - Planck's Quantum theory - photoelectric effect - Compton effect - Wave mechanical concept of the atom - de Broglie's relationship –Heisenberg's uncertainty principle. Schrodinger wave equation (without derivation) - significance of wave functions, ψ and ψ^2.

4.3 Thermodynamics - Definition and explanation of terms - System, boundary, surroundings - Homogeneous and heterogeneous system – Types of system - Intensive and extensive properties - State of a system - Independent state variables - Dependent state variables - Thermodynamic functions - State and path functions.

UNIT: V

5.1 Thermodynamic processes - types of processes - cyclic - reversible - irreversible - isothermal - adiabatic. Exact and inexact differentials - concept of heat and work - Zeroth law of thermodynamics.

5.2 First law of thermodynamics - statement and equation - Cp, Cv relationship - calculation of W, Q, ΔE and ΔH for the expansion of ideal gases under reversible - isothermal and adiabatic conditions.

5.3 Thermochemistry - Heat of reaction - Exothermic and endothermic reaction. Thermochemical equations - bond dissociation energy. Variation of heat of a reaction with temperature - Kirchoff's equation and its significance.

BOOKS FOR STUDY:

1. R.D. Madan, Modern Inorganic Chemistry, 2nd Edition, S. Chand & Co, Reprint 2004.
2. B.S. Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co., Ltd, Reprint 2008.
3. B. R. Puri, L. R Sharma and M.S. Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008.

Books for Reference:

1. P.L Soni and Mohan Katyal, Textbook of Inorganic Chemistry, 20th Edition, Sultan Chand & Sons, Reprint 2001.

2 P.L Soni and H.M Chawla, Textbook of Organic Chemistry, 25th Revised Edition, Sultan Chand & Sons, 1992.

3. K.S Tewari and M.K Vishnoi, A Textbook of Organic Chemistry, 3rd Edition, Vikas Publishing House Pvt. Ltd, 2006.

4. M.K Jain and S.C Sharma, Modern Organic Chemistry, Vishal Publishing Co, 2004.

5. P.L Soni, O.P Dharmarha and U.N Dash, Textbook of Physical Chemistry, 21st Revised Edition, S. Chand & Co, Reprint 2000.

6. P.K Mani and A.O Thomas, A Textbook of Practical Chemistry, Scientific Publication, 1973.

7. O.P. Pandey, D. N. Bajpai and S.Giri, Practical Chemistry, 8th Edition, S. Chand & Co, 2001.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: I Year Subject Code: U18MCHP21 Semester: II

Major Practical -1 Title: **VOLUMETRIC ANALYSIS**

Credits: 3 Max.Marks: 75

Objective	To Analyse various volumetric estimations.
Course Outcome(s): **On Completion of the course, students will be able to**	
CO1	Develop the skill required for the quantitative analysis of acidimetry, permanganometry and iodometry titrations.
CO2	Acquiring the industrial knowledge of hardness of water by complexometric titrations.

Acidimetry

1. Estimation of sodium hydroxide - Standard sodium carbonate.
2. Estimation of borax - Standard sodium carbonate.
3. Estimation of HCl – Standard Oxalic acid.

Permanganometry

4. Estimation of oxalic acid- Standard Mohr's salt or Ferrous sulphate
5. Estimation of ferrous sulphate - Standard FAS.

Iodometry

6. Estimation of copper - Standard copper sulphate
7. Estimation of potassium dichromate - Standard potassium dichromate

Complexometry

8. Estimation of Temporary, Permanent and Total hardness of water.
9. Estimation of Zinc by EDTA.

Dichrometry

10. Estimation of Ferrous ion using diphenylamine/ N-phenylanthranilic acid as indicator

Precipitation titration

11. Estimation of chloride in neutral medium (Demonstration experiment).

SCHEME OF VALUATION FOR PRACTICAL EXAMINATIONS
PRACTICAL – I
VOLUMETRIC ANALYSIS

Internal assessment: 25 Marks

External assessment: 75 Marks

Total: 100 marks

Error upto 2 % : 50

2.1 – 3 % : 40

3.1 – 4 % : 30

4.1 – 5 % : 20

>5 % : 10

For incomplete or wrong calculation deduct 20 % of total marks scored.

For no calculation deduct 40 % of total marks scored.

For each arithmetic error deduct 1 mark.

Marks distribution:

Semester Examination	**Marks**
Estimation	50
Procedure	10
Viva voce	05
Record	10
Total	**75**

CONTINUOUS INTERNAL ASSESSMENT MARKS (CIA MARK)
MAX. MARKS = 25

Evaluation method for practical paper:

Distribution of Marks

Internal assessment	**Marks**
Two Tests	**10**
Results accuracy	**10**
Attendance/ Regularity	**5**
Total	**25**

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: I Year Subject Code: U18APH201 Semester: II

Allied-2 Title: **ALLIED PHYSICS – II**

Credits: 4 Max.Marks: 75

OBJECTIVES	To learn concise ideas in modern physics and their development.
COURSE OUTCOME(S)	
CO1	To understand the concept of interference, phenomenon of diffraction and its applications
CO2	To learn the vector model, law of photoelectric emission and its applications
CO3	To study the nuclei properties, principles and working of different types of detectors, counters and accelerators.
CO4	To study the principles of fiber optics and the application of it in communication.
CO5	To understand the fundamental of diode and Fabrication of integrated circuits

UNIT - I

Optics:

Interference – air wedge – expression for the fringe width – experiment to measure the diameter of a thin wire – Diffraction – determination of wave length of light using transmission grating (normal incidence method) – Polarization – Double refraction – Nicol Prism - Optical activity- Specific rotatory power- Laurent's half shade polarimeter.

UNIT - II

Atomic Physics:

Vector Atom model – Quantum numbers associated with vector atom model – Pauli's exclusion principle – statement, explanation.

Matter waves - Dual Nature - De Broglie Waves –– Davisson and Germer's Experiment. Photoelectric effect – Laws of photoelectric emission – Einstein's photoelectric equation – Millikan's experiment - Photoelectric cells.

UNIT - III

Nuclear Physics:

Nuclear fission – Energy released in nuclear fission – Bohr and Wheeler's theory – Chain reaction. Nuclear fusion – Carbon-Nitrogen cycle – Proton-Proton cycle – thermonuclear reactions – hydrogen bomb.

Particle accelerators - Betatron - Electron synchrotron - Detection Methods - Scintillation counter- Bubble chamber.

UNIT - IV

Applied Physics:

Principle of fiber optics – acceptance angle - numerical aperture - classification of fibers - losses in fibers - Fiber optic communication system (Block diagram only).

Lasers - Components of Laser – Types of Laser- Semiconductor Laser – Applications. Holography – Principle – Recording of hologram – Reconstruction of the Image – Properties – Applications.

UNIT - V

Electronics:

Zener diode – Characteristics – Voltage regulator – LED – Construction, working and uses.

Logic gates - AND, OR, NOT, NAND and NOR gates – NAND and NOR as universal gates – Fabrication of integrated circuits – monolithic process - LSI, MSI and VLSI – advantages and limitations of an integrated circuit.

Books for Study:

1. Allied Physics, R. Murugesan S. Chand & Co., (2005)
2. Optics and Spectroscopy , R.Murugesan and Kiruthiga Sivaprasath, S. Chand & Co
3. Modern Physics, R.Murugesan and Kiruthiga Sivaprasath, S. Chand & Co, (2012).
4. Principles of Electronics, V.K. Mehta and Rohit Mehta , S. Chand & Co, (2005).

Books for Reference:

1. College Physics Volume I and II, A.B. Gupta, Books and Allied (P) Ltd (2014).
2. A Textbook of Optics Dr. N.Subrahmanyam, Brij Lal and Dr. M.N. Avadhanulu, S. Chand & Co, (2014)
3. Basic Electronics Solid State, B.L. Theraja, S. Chand & Co, (2004)

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc. Chemistry effective from the year 2018-2019

Year: **I Year** Subject Code: **U18APHP21** Semester: **II**

Allied Practical Title: **ALLIED PHYSICS PRACTICAL**

Credits: **2** Max. Marks: **75**

OBJECTIVES	To understand the basics of Properties of matter, Optics, Electricity and Electronics by doing related experiments.
COURSE OUTCOME(S)	
CO1	understand and evaluate the Young's modulus and Rigidity modulus of the given material
CO2	understand the principles of optics through air wedge and spectrometer experiments
CO3	Construct a voltage regulation using zener diodes
CO4	remember the functions of logic gates.
CO5	understand and analyze the characteristics of various diodes
CO6	Skill Development-Practical exposure

(Any 15 Experiments)

1. Young's modulus – non uniform bending – pin and microscope.
2. Rigidity modulus – Static Torsion Method Using Scale and Telescope.
3. Rigidity modulus – Torsional oscillation method (without symmetric masses).
4. Determination of Co-efficient of Viscosity – Graduated Burette method.
5. Surface Tension and Interfacial Tension – By drop weight method.
6. Specific Heat Capacity of a liquid – by Newton's Law of Cooling.
7. Sonometer – Determining A.C. Frequency. (Screw Gauge is given).
8. Sonometer – Frequency of tuning fork.
9. Newton's Rings – Radius of Curvature.
10. Air Wedge – Determination of thickness of thin wire.
11. Spectrometer - Grating – Minimum Deviation – Mercury spectrum.
12. Spectrometer – Refractive Index of a liquid – Hollow Prism.
13. Potentiometer – Calibration of High Range Ammeter.
14. Potentiometer – Calibration of Low Range Voltmeter.
15. Determination of m and B_H using Deflection Magnetometer in Tan C position and vibration magnetometer.
16. Figure of merit and voltage sensitiveness of table galvanometer.
17. Construction of AND, OR gates using diodes and NOT gate by transistors.
18. Zener diode – Voltage Regulation.
19. NAND as universal gate.
20. NOR as universal gate.
21. De Morgan's theorems verification.

Books for study & reference:

1. A Text book of Practical Physicsa, M.N.Srinivasan, S.Balasubramanian and R.Renganathan, Sultan Chand & Sons, New Delhi, 2005.
2. C.C Ouseph, G.Rangarajan- A Text Book of Practical Physics- S. Viswanathan Publisher-Part I 1990.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc. Chemistry effective from the year 2018-2019

Year:	**I Year**	Subject Code: **U18AZL201**		Semester:	**II**
Allied - 2		Title: **ALLIED ZOOLOGY - II**			
Credits:	**4**			Max. Marks:	**75**

OBJECTIVES:

To study the principles of Cell Biology, Genetics, Human Physiology, Developmental Biology, Biotechnology and Medical Microbiology.

Unit-I CELL BIOLOGY AND GENETICS

Cell Biology: Ultra-structure of a typical animal cell – Structure and function of mitochondria, lysosome and nucleus.

Genetics: Structure of DNA, the genetic material – Human genetic disorders (Phenylketonuria, Alkaptonuria and Albinism) – Sex determination in man – X and Y-linked inheritance in man.

Unit-II HUMAN PHYSIOLOGY

Respiration – Respiratory pigments – Role of respiratory pigments in transport of gases.

Excretion – Types of excretory products – Omithine cycle, Kidney failure and transplantation.

Diseases of circulatory system: Blood pressure, Coronary heart disease, Rheumatic heart disease, Cerebral thrombosis.

Unit-III DEVELOPMENTAL BIOLOGY

Human: Spermatogenesis, Ogenesis, Fertilization – Twin-types.

Cleavage and gastrulation in frog.

Unit-IV BIO-TECHNOLOGY

Scope and Application of Biotechnology in human health/medicine – Application of Biotechnology in Agriculture – Biological waste treatment.

Unit-V MEDICAL MICROBIOLOGY

Introduction to medical microbiology – Study of some common bacterial diseases (Diptheria, Tuberculosis), viral diseases (AIDS and Rabies) and protozoan diseases (amoebiosis and malaria) – Their control measures.

REFERENCE BOOK:

1. Verma P.S. and Agarwal – Cell and Molecular Biology, S.Chand & Co., New Delhi.

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Syllabus for B.Sc. Chemistry effective from the year 2018-2019

Year:	**I Year**	Subject Code:	**U18AZLP21**	Semester:	**II**
Allied Practical		Title:	**ALLIED ZOOLOGY PRACTICAL**		
Credits:	**2**			Max. Marks:	**75**

INVERTEBRATA AND CHORDATA

SPOTTERS

I: Study of the following specimens to bring out and their adaptations to their respective modes of life.

Entamoeba, Plasmodium, Obelia Polyp, Obelia Medusa, *Taenia solium*, Taenia Scolex, Taenia proglattids, *Hirudinaria granulosa* (Leech), T.S. of Leech, fresh water muscle, glochidium larva, Starfish, Pedicellaria of Star fish, Bipinnaria Larva, Amphioxus, Shark, Placoid Scale of Shark, Pigeon, Quill Feather of Pigeon, Rabbit, Frog two cell stage, Frog four cell stage, Frog eight cell stage, blastopore of frog, Sperm of man, Ovum of woman, Stethoscope, Sphygmomanometer.

MINOR PARCTICAL

II: MOUNTING

Earthworm - Body seta, Mouth Parts: Cockroach, Honey bee, and Mosquito, Brain of frog.

MAJOR PARCTICAL

III: DISSECTIONS

Morphology of Cockroach

Cockroach - Digestive and Nervous system

Morphology of Frog

Frog - Digestive system, Urino-genital system (male and female) (Chart/Model)

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: I Year Subject Code: U18CVE201 Semester: II

Part-IV Title: **VALUE EDUCATION**

Credits: 2 Max.Marks: 75

OBJECTIVES	To understand human values and ethical issues
COURSE OUTCOME(S): At the end of course the students shall able to	
CO1	Describe the basic concept of human values.
CO2	Explain the structure and responsibility of families
CO3	Elaborate the human ethical relationships.
CO4	Analyze the modern welfare and globalization.

UNIT-I:

Value Education - Definition - relevance to present day - Concept of Human Values - self introspection - Self-esteem.

UNIT-II:

Family values - Components, structure and responsibilities of family - Neutralization of anger - Adjustability - Threats of family life - Status of women in family and society - Caring for needy and elderly - Time allotment for sharing ideas and concerns.

UNIT-III:

Ethical values - Professional ethics - Mass media ethics - Advertising ethics - Influence of ethics on family life - psychology of children and youth - Leadership qualities - Personality development.

UNIT-IV

Social values - Faith, service and secularism - Social sense and commitment - Students and Politics - Social awareness, Consumer awareness, Consumer rights and responsibilities - Redressal mechanisms.

UNIT-V

Effect of international affairs on values of life / Issue of Globalization - Modern warfare - Terrorism. Environmental issues - mutual respect of different cultures, religions and their beliefs.

Suggested Readings:

1. T. Anchukandam and J. Kuttainimathathil (Ed) Grow Free Live Free, Krisitu Jyoti Publications, Bangalore (1995)

2. Mani Jacob (Ed) Resource Book for Value Education, Institute for Value Education, New Delhi 2002.
3. DBNI, NCERT, SCERT, Dharma Bharti National Institute of Peace and Value Education, Secunderabad, 2002.
4. Daniel and Selvamony - Value Education Today, (Madras Christian College, Tambaram and ALACHE, New Delhi, 1990)
5. S. Ignacimuthu - Values for Life - Better Yourself Books, Mumbai, 1991.
6. M.M.M.Mascaronhas Centre for Research Education Science and Training for Family Life Promotion - Family Life Education, Bangalore, 1993

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: I Year Subject Code: U18CVE201 Semester: II

Part-IV Title: **SOFT SKILL**

Credits: 2 Max.Marks: 75

Course Outcome(s)

- **CO1:** Effectively communicate through verbal / written communication and also improve the listening skills.
- **CO2:** Actively participate in Group Discussion / Meetings / Interviews and prepare and deliver presentations.

UNIT I

1. Ability to listen and document what you have heard
2. Reading and comprehension

UNIT II

3. Ability to read and follow instructions
4. Ability to interpret and transcode information

UNIT III

5. Asking for and responding to information
6. Communication skills with public, fellow employees, supervisors and customers

UNIT IV

7. Spelling and Grammar
8. Ability to fill out a job application

UNIT V

9. Expressing courtesy
10. General and Individual Traits:
    (a) Honesty
    (b) Reliability
    (c) Good Attitude
    (d) Common Sense

Prescribed Book: Basic Soft skills for Under Graduate, Board of Editors, Published by Emerald publishers, Egmore, Chennai – 600 008: www.emeraldpublishers.com, Mail: info@emeraldpubliser.com

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18FTA301 Semester: III

Language-3 Title: **TAMIL III**

Credits: 4 Max.Marks: 75

OBJECTIVES	தமிழ்மொழியிலுள்ள பண்பு, பழமை, சிறப்பு, வடிவம், இலக்கண முறைமை போன்றவற்றை வெளிக்கொணர்தல்.
COURSE OUTCOME(S)	
CO1	தமிழில் உள்ள காப்பிய இலக்கியங்களையும் கதை வழி வாழ்வியலையும் அறிய வைத்தல். நெடுங்கவிதைகளைப் பயிற்றுவிப்பதன் மூலம் நவீன திறனாய்வு முறைகளில் ஈடுபட துணை நிற்றல்.
CO2	உரைநடையின் அடிப்படைத் திறனையும் பிழையின்றி எழுதும் முறையையும் சமூக உண்மைகளையும் நிலைநாட்டல். இலக்கணத்தைப் பயிற்றுவிப்பதன் மூலம் சிறந்த மொழியாக்க முயற்சிக்கு ஆயத்தப்படுத்தல்.
CO3	காலந்தோறும் தமிழ் இலக்கியங்களில் மாறுபடும் பாடுபொருள். வடிவம் முதலியவற்றை இலக்கிய வரலாற்றின் வழி பயிற்றுவித்தல்.

பாடத்திட்டம்

அலகு–I காப்பியம்

1. சிலப்பதிகாரம் - கனாத்திறம் உரைத்த காதை (முழுவதும்)
2. மணிமேகலை - ஆபுத்திரன் திறம் அறிவித்த காதை (முழுவதும்)
3. சீவக சிந்தாமணி - விமலையார் இலம்பகம் (தேர்ந்தெடுத்த 20 பாடல்கள்)

அலகு–II புதுக்காவியம்

1. பாரதிதாசன் - சஞ்சீவி பர்வதத்தின் சாரல் (முழுவதும்)
2. துறவி - நளவெண்பா - கலி நீங்கு காண்டம் - 'நீங்கினான் கலி'

அலகு–III உரைநடை

1. கலைஞர் மு.கருணாநிதி - சிந்தனையும் செயலும் - அழுக்காறு, ஒழுக்கம்
2. தொ.பரமசிவம் - விடுபூக்கள் - 'சமூக வரலாற்றுப் பார்வையில் திருவிழாக்கள்'
3. சுகி.சிவம் - வாழப் பழகுவோம் - 'மனம் போல வாழ்வு'

அலகு–IV இலக்கணம்

1. **எழுத்து** - முதல், சார்பெழுத்துக்கள் **சொல்** - பகுபத உறுப்புகள், ஆகுபெயர் , வழக்கு **அணி** – உவமை, உருவகம், சொற்பொருள், தற்குறிப்பேற்றம், எடுத்துக்காட்டு உவமை.

அலகு–V (அ) இலக்கிய வரலாறு

1. ஐம்பெருங்காப்பியங்கள், ஐஞ்சிறுகாப்பியங்கள்
2. உரைநடை தோற்றமும் வளர்ச்சியும்

(ஆ) திறனறிப் பயிற்சி

1. அலுவலகக் கடிதங்கள்,
2. அறிக்கை மற்றும் செய்தி எழுதுதல்

பார்வை நூல்கள்

1	இலக்கியச் சாரல்	-	சி.அப்துல் ஹக்கீம் கல்லூரி வெளியீடு. 2019 சூன் வெளியீடு
2	சிந்தனையும் செயலும்	-	கலைஞர் மு.கருணாநிதி பூம்புகார் பதிப்பகம்,127,பிராகசம் சாலை,சென்னை -18 நான்காம் பதிப்பு -2017
3	விடுபூக்கள்	-	தொ.பரமசிவம் மணி பதிப்பகம், 29ஏ, யாதவர் கீழத் தெரு, பாளையங்கோட்டை. மூன்றாம் பதிப்பு -2016
4	வாழப் பழகுவோம் வாருங்கள்	-	சுகி.சிவம் வானதி பதிப்பகம், 13, தீனதயாளு தெரு, தி.நகர், சென்னை. மூன்றாம் பதிப்பு -2003
5	வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு	-	முனைவர் பாக்யமேரி என்.சி.பி.எச்., அம்பத்தூர், சென்னை -98 முதல் பதிப்பு -2008
6	நற்றமிழ் இலக்கணம்	-	டாக்டர்.சொ.பரமசிவம், பட்டுப் பதிப்பகம், 1269, 32-ஆம் தெரு அண்ணாநகர் மேற்கு, கம்பர் குடியிருப்பு, சென்னை -40 பன்னிரண்டாம் பதிப்பு -2012

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18FUR301 Semester: III

Language-3 Title: **URDU – III (AFSANA, MAZMOON NAWESI & MUKALAMA NIGARI)**

Credits: 4 Max.Marks: 75

OBJECTIVES:	✓ To arouse interest for Non-Detailed Texts. ✓ To equip them with ample knowledge to pen their own articles. ✓ To instill in them a flair for translation.
COURSE OUTCOMES	➢ Students will care more for Non-Detailed Texts on par with Detailed Texts. ➢ They will sharpen necessary skills to draft essays on varied themes. ➢ They will succeed in their official routine with their ability to translate.

BOOK PRESCRIBED: "ADAB-E-JAMEEL"

Published by Dept. of Urdu, C. Abdul Hakeem College, Melvisharam.

Unit – I

1.KAFAN – Prem Chand

2.JAMUN KA PED – Krishan Chander

Unit – II

1.KHUSH NASEEB – Ali Akbar Amburi

2.DARD KA EHSAS – Ameerunnisa

Unit – III

1.BHOLA – Rajender Singh Bedi

2.NAYA QANOON – Saadath Husain Manto

Unit – IV

1.NOOR-O-NAR – Ali Abbas Hussani

2.AAKHR PAISA BACH HI GAYA – B.S.Ramaiya

Unit – V

1. Guldasta-E-Mazameen-O-Insha Pardazi By **Mohammed Arif Khan**
2. A General Passage for Translation from Urdu To English

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18FEN301 Semester: III

English-3 Title: **ENGLISH III**

Credits: 4 Max.Marks: 75

Course Outcome(s)

- **CO1:** Recognize the various forms of literature like Prose, Poetry, Biography, Short Story and Drama.
- **CO2:** Describe the knowledge of grammatical system of English Language and also develop four Language Skills.(LSRW)

UNIT - I **PROSE**

1. Futurology — Aldous Huxley
2. Engine Trouble — R. K. Narayan
3. I have a Dream — Martin Luther King
4. Function of Education — J Krishnamurthi

UNIT – II **POETRY**

1. Poor Girl — Maya Angelou
2. Solitary Reaper — William Wordsworth
3. The Tyger — William Blake
4. My Grand Mother's House — Kamala Das

UNIT - III **SHORT STORIES**

1. The Last Leaf — O' Henry
2. Sparrows — K Ahmed Abbas

UNIT - IV **ONE-ACT PLAY& BIOGRAPHY**

1. The Proposal — Anton Chekov
2. Father Damien — G. F. Lamb

UNIT - V **WARM UP**

1. **Lexical Skills**
   - Foreign Words and Special Terminology
   - Building Vocabulary (Affixes)

- Phrasal Verbs
- Idioms and Phrases

2. **Descriptive Grammar**

- Adjectives
- Kinds of Adjectives
- Adverb
- Kinds of Adverbs
- Participles, Gerund & Infinitive

3. **Traditional Grammar**

- The Tenses – Introduction
- Future Tense – Simple Future Tense, Future Continuous Tense, Future Perfect Tense & Future Perfect Continuous Tense.
- Degrees of Comparison

4. **Communication Skills (LSRW)**

- Expressing Sympathy
- Expressing Gratitude
- Complaining
- Apologizing

5. **Composition**

- Public speaking
- Seminar
- Writing a Memorandum
- Expansion of Proverbs

Prescribed Book: HALL OF FAME – III Board of Editors, Published by Emerald publishers, Egmore, Chennai – 600 008: www.emeraldpublishers.com, Mail: info@emeraldpubliser.com.

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18MCH301 Semester: III

Major-3 Title: **GENERAL CHEMISTRY III**

Credits: 3 Max.Marks: 75

OBJECTIVES	To make the students to learn and understand the basic concepts regarding the principles of inorganic analysis and applications of qualitative analysis, p- Block elements, Group Study. To understand the concept of aromaticity, Reaction Mechanism, Second Law of Thermodynamics, Derivation of equations, Related problems and applications. To understand the mechanism of nucleophilic, electrophilic substitution reactions and elimination reactions.

Course Outcome(s):

On Completion of the course, students will be able to

CO1	Describe the reaction involved in the separation and qualitative analysis of cation and anions.
CO2	Point out the special compound in Carbon, Nitrogen and Oxygen family.
CO3	Argue the various Electrophilic Substitution reaction in Aromatic compounds.
CO4	Explain the mechanism of Aliphatic and Aromatic Nucleophilic substitution reaction.
CO5	Summarize the Entropy changes in Thermodynamic systems.

UNIT: I

1.1 Semimicro Techniques - Principles of acid-base equilibria - Common ion effect - Solubility product and its applications in qualitative analysis - Principles of inorganic analysis.

1.2 Types of reactions: Flame test, complexation, masking and demasking, sodium carbonate extract, and separation of cations into groups.

1.3 Reactions involved in the Separation and identification of cations and anions in qualitative analysis - Spot test reagents - Aluminon, Cupferon, DMG, Thiourea, Magneson, Alizarin and Nessler's reagent. Hazards in inorganic analysis.

UNIT: II

2.1 Carbon family – Group study - Comparative study of elements with respect to Valency, Oxides, Halides, Hydrides and Oxyacids - Catenation - Comparison of properties of carbon and silicon – Carbides - Silicates - Silicones - Classification and structure.

2.2 Nitrogen family - Group study - Comparative study of N, P, As, Sb and Bi with respect to Oxides, Oxyacids, Halides and Hydrides – Hydrazine, Hydroxylamine and Hydrazoic acid-Structure and Uses.

2.3 Oxygen family - Group study - Comparative study of O, S, Se and Te with respect to Catenation, Oxides, Halides, Hydrides and Oxyacids - Anomalous behaviour of oxygen - Oxyacids of sulphur (structure only) - Peracids of sulphur - Differences between permonosulphuric acid and perdisulphuric acid.

UNIT: III

3.1 Aromatic hydrocarbons and aromaticity – Resonance in benzene – delocalized in benzene -Modern theory of aromaticity - Huckel's (4n +2) rule and its simple applications to Benzenoid and Non- benzenoid Compounds.

3.2 Electrophilic substitution reactions in aromatic compounds - Mechanisms of Nitration, Halogenations, Sulphonation, Friedel-Crafts Acylation and Alkylation.

3.3 Directive influence - Orientation - Ortho/Para ratio - Nuclear and Side chain Halogenation.

UNIT: IV

4.1 Aliphatic Nucleophilic Substitutions - Mechanisms of S_N1, S_N2 and S_Ni reactions – Effect of Structure of Substrate, Solvent, Nucleophile and Leaving Group.

4.2 Elimination reactions - Mechanism of E_1 and E_2 reactions - Hoffmann and Saytzeff''s rules - Cis and Trans Eliminations. Elimination Vs Substitution.

4.3 Aromatic Nucleophilic Substitutions - Unimolecular nucleophilic substitution, Bimolecular nucleophilic substitution and their mechanism

UNIT: V

5.1 Second Law of Thermodynamics - Need for the II Law of Thermodynamics - Spontaneous Process – Criteria of Spontaneity - Different forms of statements of the Second Law – Cyclic Process – Definition - Heat Engines.

5.2 Carnot's cycle - Efficiency - Carnot's theorem (Statement only) - Concept of entropy - Definition and mathematical statement - Randomness and Entropy – Standard entropy - Derivation of entropy from Carnot Cycle.

5.3 Entropy change of an ideal gas during isothermal process - Entropy changes in Cyclic, Reversible and Irreversible Processes - Entropy Changes in physical transformations - Calculation of entropy changes with changes in T, V and P - Entropy of mixing of ideal gases – Physical significance of entropy.

Text Books:

1. Arun Bahl and B.S. Bahl, A Text book of Organic Chemistry, (22nd Edition), Sultan Chand & Co., New Delhi, (2018).

2. Bahl, B.S. and Bahl, A., Advanced Organic Chemistry, (12th Edition), Sultan Chand & Co., New Delhi, (2010).

3. Morrison R.T. and Boyd R.N., Bhattacharjee S. K. Organic Chemistry (7th edition), Pearson India, (2011).

4. R. Gopalan, Textbook of Inorganic Chemistry, Universities Press (2012).

5. R.D. Madan, “Modern Inorganic Chemistry”, 2nd edition, S. Chand & Company Ltd., 2000.

6. P.L. Soni, “Text book of Inorganic Chemistry”, 20th revised edition, Sultan Chand & Sons, 2000.

7. W.U. Malik, G.D. Tuli and R.D. Madan, S.Chand and Company Ltd., ‘Selected Topics in Inorganic Chemistry’, 7th edition, 2001.

8. Puri B.R., Sharma L.R. and Pathania M.S. Principles of Physical Chemistry, (47^{th} Edition), Vishal Publishing Co. New Delhi (2018).

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18AMA301 Semester: III

Allied-1 Title: **ALLIED MATHEMATICS - I (ALLIED)**

Credits: 4 Max.Marks: 75

OBJECTIVES:	This course covers basic ideas of theory of equations, matrices & calculus.
COURSE OUTCOME(S): At the end of the course, the students will able to:	
CO1	Evaluate the sum of the series by using Binomial, Logarithm, and Exponential series.
CO2	Examine the nature of the roots of the polynomial equation, reciprocal equations and Application of Newton's method to find approximate solution of the polynomial equations.
CO3	Identify the different types of a matrix and calculate eigen values and corresponding eigen vectors of a square matrix.
CO4	Compute nth derivative, Jacobians , Evaluate Curvature, Radius of Curvature ,Construct the PDE by eliminating arbitrary constants, arbitrary functions and solve different types of nonlinear PDE's.

UNIT - I:

ALGEBRA

Partial Fractions – Binomial - Exponential and logarithmic Series (without Proof) - Simple problems.

UNIT - II:

THEORY OF EQUATIONS

Polynomial Equations with real Coefficients - Irrational roots - Complex roots- Transformation of equation by increasing or decreasing roots by a constant - Reciprocal equations - Newton's method to find a root approximately - Simple problems.

UNIT - III:

MATRICES

Symmetric - Skew-Symmetric - Orthogonal and Unitary matrices - Rank of a matrix - Consistency of equations - Eigen roots and eigen vectors - Cayley Hamilton theorem (without proof) - Verification and computation of inverse matrix.

UNIT - IV:

DIFFERENTIAL CALCULUS

n^{th} derivatives - Leibnitz theorem (without proof) and applications - Jacobians -Concepts of polar co-ordinates - Curvature and radius of curvature in Cartesian co-ordinates.

UNIT - V:

PARTIAL DIFFERENTIAL EQUATIONS

Formation - complete integrals and general integrals - Four standard types - Lagrange's equation and simple problems.

Recommended Text:

P.Duraipandian and S.Udayabaskaran,(1997) Allied Mathematics, Vol. I & II. Muhil Publishers, Chennai.

Reference Books:

1. P.Balasubramanian and K.G.Subramanian,(1997) Ancillary Mathematics. Vol. I & II. Tata McGraw Hill, New Delhi.
2. S.P.Rajagopalan and R.Sattanathan,(2005) Allied Mathematics .Vol. I & II. Vikas Publications, New Delhi.
3. P.R.Vittal (2003) Allied Mathematics . Marghan Publications, Chennai
4. P.Kandasamy, K.Thilagavathy (2003) Allied Mathematics Vol-I, II S.Chand & company Ltd., New Delhi-55.
5. Isaac, Allied Mathematics. New Gamma Publishing House, Palayamkottai**.**

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18ACH302 Semester: III

Allied-1 Title: **BIOCHEMISTRY – I**

Credits: 4 Max.Marks: 75

OBJECTIVES	The main objectives of this course is intended to provide a basic foundation and understanding of the principles of modern biochemistry necessary for further work in the biochemical/biomedical areas. Knowledge and understanding of the basic principles in biochemistry including the molecular composition of living cells, the organization of biological molecules within the cell, and the structure and function of these biological molecules with some practical connections to everyday life.
Course Outcome(s): **On Completion of the course, students will be able to**	
CO1	Outline the fundamental knowledge of delineate structure, function and inter-relationships of carbohydrates.
CO2	Point out the structure and biological functions of amino acids and proteins.
CO3	Infer the concepts of structure and biological functions of various lipids and the difference between simple and complex lipids.
CO4	Explain the basic concepts of Structures, functions, difference and formation and their significance DNA and RNA.
CO5	Evaluate the concept of body regulators- Vitamins and minerals.

UNIT-I

Chemistry of carbohydrates:

General Functions, Classification and Structure of Glucose - features and Haworth Projection. Stereoisomers, chemical reactions of monosaccharide, oxidation, reduction, action of alkali, strong acid, osazones formation. Disaccharides - Occurrence and structure of maltose, lactose, sucrose. Polysaccharides- structure and functions of starch.

UNIT-II

Chemistry of Amino acids and Proteins:

Amino acid structure- D & L forms of amino acids. Classification based on polarity, essential and non essential amino acid. Physical properties: Zwitter ions, pI, ampholytes of amino acids, UV absorption and chemical properties. Protein classification, functions, structural organization - Primary structure, Secondary structure-alpha helix and beta sheet. Denaturation of protein.

UNIT-III

Chemistry of Lipids:

Classification and general functions of lipids Fatty acids saturated and unsaturated, clinical significance of PUFA. Simple lipids, Triglycerides. Definition and significance - Acid Number, Saponification Number, Iodine Number and Reichert- Meissel Number. Compound lipids - Structure and function of Glycerophospholipids (Cephalin, Lecithin and Phosphotidyl inositol), Phosphosphingolipids (ceramide, Sphingomyeline), Glycolipids or Cerebrosides (Galacto and Glucocerebrocides). Steroids - Cholesterol structure and biochemical significance.

UNIT-IV

Chemistry of Nucleic acids:

Definition, nucleoside, nucleotide and polynucleotide. Double helical model of DNA and its biological functions. Structure and biological functions of RNA Differences between DNA and RNA. DNA replication, transcription and translation process.

UNIT-V

Vitamins and Minerals:

A brief outline of occurrence and biological function of Vitamins and minerals (Na, K, Cl, Ca, P, I, Fe, Mg & S).

REFERENCES:

1. Lehninger Principles of Biochemistry-David L. Nelson, Michael M. Cox, Macmillan Worth Publishers.
2. Biochemistry - Garrett Grishmam. 3rd edition. International student's edition.
3. Biochemistry by L . Veerakumari , MJP publishers,Chennai-5.
4. Harper's Biochemistry-Rober K. Murray, Daryl K. Grammer, McGraw Hill, Lange Medical Books. 25th edition.
5. Fundamentals of Biochemistry-J.L. Jain, Sunjay Jain, Nitin Jain, S. Chand & Company.
6. Biochemistry-Dr. Amit Krishna De, S. Chand & Co., Ltd.
7. Biochemistry-Dr. Ambika Shanmugam, Published by Author.
8. Biomolecules-C.Kannan , MJP Publishers,Chennai-5.
9. Biophysical Chemistry - Upadhyay and Upadhyay Nath, Himalayan Publication.
10. Analytical Biochemistry - R.B. Turner, Elsevier, N.Y

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18SCH301 Semester: III

Skill Based-1 Title: **WATER TREATMENT AND ANALYSIS**

Credits: 3 Max.Marks: 75

OBJECTIVES	To impart knowledge about the various methods of Water Analysis and Treatment of Water.
Course Outcome(s): **On Completion of the course, students will be able to**	
CO1	Describe water quality, characteristics of water sources and techniques for the purification of water for drinking purpose.
CO2	Illustrate the operational steps of key water treatment processes used to improve water quality
CO3	Explain maintenance procedures of equipment used in industries and processes including Desalination.
CO4	Analyze the physical and chemical properties of water.
CO5	Point out the chemical substances affecting health, Dissolved oxygen and microorganisms present in water.

UNIT: I

1.1: Introduction - Characteristics of water - Hardness - Unit of hardness – Total solids - Oxidation - Transparency - Silica content.

1.2: Purification of Water for drinking purpose - Potability of water – Clarification - Coagulation - Contact and Electrochemical Coagulation.

1.3: Sterilisation and Disinfection of water - Precipitation - Aeration - Ozonisation – Chlorination.

UNIT: II

2.1: Water softening methods - Clark's process - lime soda process - modified lime soda process - permutit or zeolite process - Ion exchange process - demineralization of water.

2.2: Determination of hardness of water - Titration method - complexometric method using EDTA - expressing hardness.

2.3: equivalents of calcium carbonate - problems to determine temporary & permanent hardness.

UNIT: III

3.1: Hard water and industries - industrial water treatment - boiler feed water method of softening - prevention of plumbo solvency - scales in boilers - consequences - internal conditioning methods.

3.2: Desalination of brackish water - elecrodialysis - Reverse osmosis - removal of Fe, Mn and Silicic acid.

3.3: Primary, Chemical and Biological treatment of effluent from Leather industry.

UNIT: IV

4.1: Water analysis - Sampling of Water for analysis - Chemical Substances affecting Potability - Colour, Turbidity, Odour, Taste, Temperature, pH and Electrical Conductivity.

4.2: Analysis of Solids present in water - Suspended Solids - Dissolved Solids.

4.3: Total Acidity - Alkalinity - Free CO_2 - Free Chlorine - Ca, Mg, Fe, Mn, Ag and Zn

UNIT: V

5.1: Analysis of chemical substances affecting health - NH_3, Nitrate, Nitrite, cyanide, sulphate, sulphide, chloride, fluoride - measurement of toxic chemical substances.

5.2: Dissolved oxygen - Bio Chemical Oxygen Demand (BOD) - Chemical Oxygen Demand (COD)

5.3: Bacteriological examination of water - total count test - E.coli test - E.coli index - most probable number method - Biological examination of water - physical examination of water - radioactivity of water - methods of removing radioactivity from water.

Reference Books:

1. Industrial Chemistry (including chemical - engineering) - B.K. Sharma - Goel publishing house, Meerut.
2. Pollution control in process industries - S.P. Mahajan - Tata McGraw - Hill Publishing Company Ltd., New Delhi.
3. Water pollution and management - C.K. Varashney - Wiley Eastern Ltd., Chennai - 20.

C.ABDUL HAKEEM COLLEGE (Autonomous), Melvisharam

Syllabus for Second year UG Programmes effective from the year 2018-2019

Class	: Second year UG Programmes	**Semester**	: III
Subject Code	: U18NTA301	**Title**	: Basic Tamil (Non Major-1)
Credits	: 2	**Max Marks**	: 75

OBJECTIVES	தமிழ்மொழியின் அடிப்படை இலக்கண, இலக்கியப் பண்புகளை எழுத மற்றும் வாசிக்க ஆயத்தப்படுத்தல்.
COURSE OUTCOME(S)	
CO1	தமிழ் எழுத்துக்களை ஒலி வடிவம், வரி வடிவம் என பிரித்து வகைப்படுத்தல். தமிழின் அடிப்படை இலக்கிண வடிவ மாறுதல்களை எடுத்துரைத்தல்.
CO2	எளிமையான தமிழ்ச் சொற்களை அறிமுகப்படுத்தி பொருளை விளக்குதல். அதிகம் பயன்படும் பெயர், வினை, மற்றும் தொகுப்புச் சொற்களை அமைக்க பயிற்சி வழங்கல்
CO3	எளிமையான சிறுகதைகளின் வழி வாசிப்புத் திறனை மேம்படுத்தல்.

பாடத்திட்டம்

அலகு–I எழுத்து

1. உயிர் எழுத்துக்கள். மெய்யெழுத்துக்கள் - வகை, எண்ணிக்கை அறிதல்
2. உயிர் மெய் எழுத்துக்கள், வல்லினம், மெல்லினம், இடையினம்

அலகு–II எழுத்து

திணை, பால், எண், இடம், காலம், ஒருமை - பன்மை வேறுபாடு, குறில் நெடில் வேறுபாடு

அலகு–III சொல்

1. ஒரெழுத்து ஒரு மொழி பெயர் (பூ,ஆ,கா...) வினை (வா,போ...)
2. ஈரெழுத்து ஒரு மொழி பெயர் (கனி, பனி...) வினை (நில், படி...)
3. தொடர் மொழி : முக்கனி ,முத்தமிழ், மூவேந்தர் ,நாற்றிசை, ஐம்பொறி , அறு சுவைகள் - இவற்றை விளக்குக.

அலகு–IV சொல்

1. பெயர்ச்சொல் , வினைச்சொல் வகைகள்
2. பறவைப் பெயர்கள், விலங்குகளின் பெயர்கள், மலர்கள், வானவில்லின் வண்ணங்கள், இந்திய மொழிகள், எண்கள் (ஒன்று முதல் பத்து வரை எழுத்தால் எழுதுதல்)

அலகு–V சிறுகதை

1. நேர்மை தந்த பரிசு

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NUR301 Semester: III

Non-Major-1 Title: **FUNCTIONAL URDU-I (NME-1)**

Credits: 2 Max.Marks: 75

OBJECTIVES:	✓ To popularize Urdu among Non-Urdu Knowing students. ✓ To introduce them to the basic infrastructure of Urdu. ✓ To train them in exact pronunciation of Urdu words.
COURSE OUTCOMES	➢ Students will learn the primary lessons in Urdu. ➢ They will develop the ability to form simple sentences. ➢ They will gain proficiency in Urdu Calendar.

Unit I

Urdu alphabet

Reading & Writing practice in Urdu

Unit II

Word completion,

Pronunciation, Connecting words.

Unit III

Vowels,

Prepositions & Urdu Numerals.

Unit IV

Formation of Simple Sentences.

Unit V

Conversation &

Urdu Calendar (Week days and Months).

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NEN301 Semester: III

Non-Major-1 Title: **ENGLISH FOR COMMUNICATION-I (NME-1)**

Credits: 2 Max.Marks: 75

Objectives:

- To streamline students' knowledge of sending communication through e-means.
- To strengthen their Non-Verbal Communication.
- To activate their ability to prepare an effective Resume.

Course Outcome:

- Students will learn the benefits of e-business and e-mail.
- They will have the skill to promote their Marginal and Projective Listening Skills.
- They will be able to overcome the problems related to Interviews.

Unit-1 : E-Mail Communication

- E-Business
- E-Mail
- Writing an E-Mail
- Formatting an E-mail

Unit-2 : Non-Verbal Communication

- Elements of Non-Verbal Communication
- Body Language / Kinesics
- Facial Expressions
- Eye Contact
- Posture
- Gestures

Unit-3 : Effective Listening

The Listening Process

- Types of Listening
- Passive Listening
- Sensitive Listening
- Active Listening
- Summary

Unit-4 : Interview Techniques

- Interview Problems
- Team Interviews
- Group Discussion

Unit-5 : Preparing an Effective CV

- Types of CVs
- Skills-based CV
- CV Templates
- CV Cover Letters.

Prescribed Text : Business Communication Techniques and Methods,
by P.Juneja & Aarati Mujumdar, Orient Black Swan.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NPH301 Semester: III

Non-Major-1 Title: **BASIC PHYSICS-I (NME-1)**

Credits: 2 Max.Marks: 75

OBJECTIVES	To understand the basics of physics in day to day life and its importance through its applications.
COURSE OUTCOME(S)	
CO1	To know about Newton's laws and their application in Washing machine
CO2	To know about absorption of heat, its transfer and their domestic applications.
CO3	To know about the principles involved in sound, light and its common applications
CO4	To know about natural calamities in Geophysics view, Medical physics and their common applications.
CO5	To know about the Radio waves and Satellites and their common applications

UNIT – I: MECHANICS **6 Hours**

Newton's laws and their importance – Definitions of Work, Power, Energy and their units – Principle and working of Centrifuge - Washing Machine and its functional parts.

UNIT – II: HEAT **6 Hours**

Thermometry - Celsius and Fahrenheit scales - Variation of boiling point with pressure – Principle and working of Pressure cooker – Refrigerator – Air Conditioner – Principle and their capacities

UNIT – III: ACOUSTICS AND OPTICS **6 Hours**

Acoustics - applications and its importance - Ultrasonics – SONAR and its applications – Power of lens – Long sight and short sight – Microscope, Telescope, Binocular and their basic principles and applications.

UNIT – IV: GEO PHYSICS AND MEDICAL PHYSICS **6 Hours**

Earthquake – Richter scale – Thunder and lightning – Lightning arrestors – Principles and Medical applications of X-rays, Ultrasound, Computerised Tomography, Magnetic Resonance Imaging in medicine and their importance.

UNIT – V: RADIOWAVES AND COMMUNICATION **6 Hours**

Electromagnetic spectrum–Radio Waves–Basics of AM and FM Transmission and Reception–Mobile communication fundamentals–Importance of Satellites.

Books for study:

1. The Learner's Series – Everyday Science – Published by INFINITY BOOKS, New Delhi.
2. The Hindu speaks on Science, Vol I & II, Kasturi & Sons, Chennai.

Books for Reference:

1. Fundamentals of Physics, D. Hallidy, R. Rensick and J. Walker, 6th Edition, Wiley, NY (2001).
2. Physics, Vols I, II, III , D. Halliday, R. Rensick and K.S. Krane, 4th Edition, Wiley, New York (1994).

The Feymann Lectures on Physics Vols, I, II, III , R.P. Feynmann, R.B. Leighton & M. Sands, Narosa, New Delhi (1998).

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NZL301 Semester: III

Non-Major-1 Title: **POULTRY FARMING-I (NME-1)**

Credits: 2 Max.Marks: 75

Objective:

To impart training on Modern Poultry Farming Technology

To create knowledge on self employment opportunity.

Course outcomes

CO1: To learn the importance and current need of Poultry
CO2: Promote and encourage the students to study the types of fowls.
CO3: To study the morphology of breeds
CO4: Learn the proper and scientific methodology of feed
Co5: To learn the diseases and management.

UNIT – I

Poultry-definition-types of poultry-fowls-ducks-Quails. Scope and importance of poultry-Status of Poultry in India and World. Classification of fowls based on colour, comb and meat.

UNIT – II

External structure of a male and female fowl-identification of sex-External morphology of variety of fowls: American Class (Rhode Island Red and Plymouth Rock), Asiatic class (Brahma), English Class (Sussex, Australop and Orpington), Mediterranean class (Leghorn and Minorca)

UNIT – III

Feeding poultry –Feed Preparation- Feeing equipments-Management of Egg Layers – Management of Broilers in large scale farms.

UNIT – IV

Poultry diseases: Causative agent and prevention of Viral, Bacterial, Fungal, protozoan and Parasitic diseases. Vaccination chart for fowls.

UNIT – V

Construction and Management of modern poultry farms – Management of egg layers-care during winter and summer-Progressive plans to promote poultry as a self-employment venture.

Reference Books:

1. Jull Morley, A. 1971: Poultry Husbanry, Tata –McGraw Hill Publ. Co New Delhi – India.

2. Sastry, Thomas and Singh, 1982: Farm Animals Management and Poultry production – Vikas Publ. co. New Delhi – India.

3. Harbans Singh and Earl.N. Moore, 1982: Live stock and poultry production – prentice hall India Publ. Co., New Delhi – India.

4. Banarjee, G.C. 1986: poultry, Oxford – IBH publ. co., New Delhi – India.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NMA301 Semester: III

Non-Major-1 Title: **BASIC MATHEMATICS-I (NME-1)**

Credits: 2 Max.Marks: 75

Objectives: This Course aims to study about the basic elementary concepts of Mathematics for Non-Major Students.

Course Outcomes: At the end of the course, the students will able to	
CO1	Understand the concepts of Set theory.
CO2	Understand the number system.
CO3	Understand the logic concepts.
CO4	Understand the elementary concepts of Matrices.
CO5	Find the determinant of Matrices.

UNIT-I: Sets

Definition - Subsets - Power sets - Equality of sets - Finite and Infinite sets - Set operations - De-Morgan's laws - Distributive tables - Cartesian products.

UNIT-II: Number system

Binary, Octal, Hexadecimal numbers - conversion from one system to another system - addition and subtraction - one's complement.

UNIT-III: Symbolic logics

Logical statements - connectives - truth tables - tautologies operations - groups – (problems and simple properties only).

UNIT-IV: Matrices

Definition - types of matrices - operations on matrices - adjoint and inverse - applications - solving non-homogeneous equations.

UNIT-V: Determinants

Definition - properties (without proof) - application of determinants - Cramer's rule for the solution of a system of equations.

Reference Books

1. Dr.M.K.Venkataraman & others, “Discrete mathematics and structures”, The National Publishing Company, Madras.
2. Trembly J.P and Manohar.R “Discrete Mathematical Structures with applications to computer science” Tata McGraw - Hill Pub., Co., Ltd. New Delhi 2003.
3. Richard Johnsonbaugh, “Discrete Mathematics” fifth Edn., Pearson Education Asia, New Delhi 2002.
4. V.Vijayendran “Digital Fundamentals” S.Viswanathan Printers & Publishers Pvt. Ltd.

T.K.Manicavachagom Pillay & Others, “Algebra”, Volume II, S.Viswanathan Printers & Publishers Pvt. Ltd

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NBA301 Semester: III

Non-Major-1 Title: **MANAGEMENT CONCEPTS-I (NME-1)**

Credits: 2 Max.Marks: 75

Unit-1

Management-Definition-Importance of management – Henry Fayol Principles of Management - -Function of Management- Level of Management-

Unit-2

Planning - meaning- importance- steps in planning- features of a good plan.

Unit-3

Staffing- Functions of staffing- Importance - Recruitment-Sources of Recruitment.

Unit-4

Selection- Selection Procedure –Test: (Aptitude test, Intelligence test, Proficiency test, Interest test, Personality test)-Interview: Types of interview.

Unit-5

Training- Need for training - Advantages– Methods of training (On the Job and Off the Job Training)

Text Book

1. Business Management- Dr. C.B Gupta – Sultan Chand & Sons.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NKS301 Semester: III

Non-Major-1 Title: **FUNDAMENTALS OF MARKETING-I (NME-1)**

Credits: 2 Max.Marks: 75

OBJECTIVES:

To acquaint the students with the basics of marketing to make them understand the consumer behaviour and buying motives.

COURSE OUTCOME(S):

CO1 - Provide an idea about marketing and its functions.

CO2 - Enhance the knowledge of students on marketing of service.

CO3 - Students will familiar with the products and its classifications

CO4 - Learn basic concept of sales forecast and distribution channel.

CO5 - Understand the effective pricing policies and strategy.

UNIT: I

INTRODUCTION TO MARKETING

Market – Meaning, Definition - Classifications of Market – Marketing - Meaning, Definition Importance of marketing – Functions of Marketing – Marketing Concept - Marketing Mix

UNIT: II

PRODUCTS

Products – Classifications of products – Product characteristics – Product life cycle – Product mix - Product mix Strategy.

UNIT: III

PRICING

Pricing – Objectives, pricing policies and procedures, Factors influencing pricing decision – Kinds of Pricing – Pricing Strategy.

UNIT: IV

SALES FORECASTING

Sales Forecasting – Various methods of Sales Forecasting – Limitation of Sales Forecasting – Distribution Channel – Meaning – Importance – Merits and Demerits – Types of Intermediaries.

UNIT: V

MARKETING OF SERVICE

Service Marketing - Concept of Service - Characteristics of Services Marketing - Future of the Service Sector - The mix elements in Service Product - Pricing for Services - Promoting Services - Physical Evidence.

Text books:

2. Slanton , W.J. “Fundamentals of Marketing”,

Reference books:

1. Rajan Nair, “Marketing Management”, Sultan Chand & Sons, 01-Jan-1995

2. RamaswanyNamakumari, “Marketing Management”, Macmillan India Limited, 2002.
3. Philp Kotler, “Marketing Management”, Pearson Education, 06-Jan-2015.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NCM301 Semester: III

Non-Major-1 Title: **BUSINESS MANAGEMENT AND COMMUNICATION-I (NME-1)**

Credits: 2 Max.Marks: 75

OBJECTIVES:	To enable the students to know management and impart skill in communication to draft business letters.
COURSE OUTCOME(S)	
CO1	To understand the management principles and functions
CO2	To perceive the knowledge in planning and organising
CO3	To understand the knowledge of leaders and their qualities.
CO4	To impart skills in communication and provide guideline for effective communication.
CO5	To seek knowledge about letters and became aware of drafting letters to various organization.

UNIT-I – INTRODUCTION TO MANAGEMENT

Management – Meaning – Nature – Levels of Management -Functions of Management -Henry fayol's principles of Management;

UNIT-II - PLANNING

Planning – Meaning – Merits & Demerits of Planning - Steps in Planning - Organizing – Meaning – characteristics –– Principles of organization.

UNIT-III – LEADERSHIP

Meaning**–** Importance-Leadership styles – Qualities of a Leader.

UNIT-IV - INTRODUCTION TO COMMUNICATION

Business Communication – Meaning - Importance – Media of Communication (Written, oral, face to face and visual communication) – Principles of an Effective Communication – Types of communication.

UNIT- V – BUSINESS LETTERS

Layout of a letter –Application for Situation - Letter of enquiry and complaint.

TEXT BOOK

1.Dr. C.B. Gupta, Business Management –Sultan Chand & Sons

Reference Books:

1. Rajendra Pal & J S Korlahali, Essentials of Business Communication.

2. Ramesh and Pattanchetti, Business Communication, R Chand & Co.

3. Jayashankar, Business Management –Margham Publications, Chennai.

4. Dr.N.Premavathy, Principles of Management, Sri Vishnu Publications, Chennai.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NCS301 Semester: III

Non-Major-1 Title: **INFORMATION TECHNOLOGY FUNDAMENTALS-I (NME-1)**

Credits: 2 Max.Marks: 75

Objectives	❖ To inculcate the fundamental knowledge of Information Technology, internet and computer security
COURSE OUTCOME(S)	
CO1	❖ The students can able to know the knowledge of computer generations, classification of computers and its components
CO2	❖ The computer memory and storage details will be expressed through unit-2. ❖ The students will get ideas about the secondary storage devices
CO3	❖ Internet and its opportunities will be known and the idea of software piracy is expressed. So that the students will be aware of IT basics
CO4	❖ The idea of web browser, email and search engines are the technology which may be useful for getting the knowledge of internet basics
CO5	❖ Computer security is the important concept which will be useful to protect our information's and all the files. So that the unauthorized peoples access will be denied. Students can get all these ideas and concepts.

Unit-1

Computer Basics: Evolution- Generations- Classifications- Components-Applications- CPU- Instruction Set- Inside a Computer

Unit-2

Computer Memory & Storage: RAM – ROM – types of secondary storage devices: optical disk and its types – Magnetic Disk and its types

Unit-3

IT Basics: IT – Role of IT and internet – Carriers in IT industry

Computer Software: Definition – Categories – Installing and uninstalling software – Software Piracy

Unit-4

Internet: Introduction – Basic terms – internet tools: introduction – web browser- browsing internet – email – search engines.

Unit-5

Computer Security: Definition – Cryptography – Digital Signature – Firewall

Prescribed Text Books:

1. Introduction to Information Technology – ITL Education Solutions Limited, Pearson Educations

Books for Reference:

1. Alexis Leon and Mathews Leon, Fundamentals of IT, Vikas Publishing House Private Limited
2. Introduction to IT, PelinAksoy, Laura DeNardis, Cengage Learning India Private Limited.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NHS301 Semester: III

Non-Major-1 Title: **INDIAN NATIONAL MOVEMENT-I (NME-1)**

Credits: 2 Max.Marks: 75

Objectives:

To enable the students to perceive how traders of the west
became the rulers of the east.
To understand the policies and strategies of the East Indian Company
and the British empire.
To evaluate the contribution of the freedom fighters

COURSE OUTCOME(S) Students are able to	
CO1	Understand the Early Nationalists, socio – Religion Reformers in 19th Century and demonstrate the Political Associations.
CO2	Think Critically about nationalism and its Impact on our Freedom History. Integrate these regarding analyzes the Salient Features of Moderates.
CO3	Understand the Phase of Extremist and their role and Contributions.
CO4	State the role of Gandhiji in the Freedom Movement.
CO5	Evaluate the sacrifices of our freedom fighters and understand the nation hood.

UNIT - I

Early Nationalist Response : Vellore Mutiny of 1806 - Causes, Course, Causes for Failure, Nature and Impact of the Revolt of 1857 – Socio-Religious Reform Movements in 19 th Century - Brahmo Samaj, Raja Ram Mohan Roy - Devendrnath Tagore – Kesav Chandira Sen - Arya Samaj, Dayanada Saraswathi - Prarthana Samaj -Ramakrishna Mission , Swami Vivekananda-Theosophical Society, Annie Besant - Aligarh Movement, Sir Sayed Ahamad Khan - Political Associations In Bengal, Bombay and Madras upto 1885

UNIT - II

Institutionalization of the National Movement: Factors responsible for the formation of the Indian National Congress – Objectives, Origin of the Congress – A.O. Hume - Moderate Phase (1885-1905) – Early Congressman – Gopala Krishna Gokhale - their nature, ideology, politics and leaders .

UNIT – III

Extremist Phase (1905-1916): Partition of Bengal – Swadeshi Movement – Bala Gangadhara Tilak - Formation of Muslim Leaque - Surat Split – Swadeshi and Boycott Movement – Bengal Reunion and Transfer of Capital – India in First World War –Home Rule Movement - Lucknow Pact – August Declaration .

UNIT – IV

Emergence of Gandhiji: Rowlatt Act – Jalianwala Bagh Massacre – Khilafat Movement and Non-Cooperation Movement – Boycott of council , Court , School and colleges - Swarajya Party – Simon Commission – Nehru Report – Civil Disobedience Movement – Round Table Conferences – Gandhi Irwin Pact – Poona Pact - Government of India Act 1935

UNIT - V

Final Phase: Provincial Governments – Lahore Resolution – Concept of Pakistan - Subas Chandra Bose and Azad Hind Fauj - INA - Individual Satyagraha - The Cripps Mission – Quit India Movement – Cabinet Mission – Transfer of Power - Mountbatten Plan – Partition – Indian Independence Act - Independence

Books for Reference

1. Tara Chand: History of Freedom Movement Vol. I-IV, Publications Division, Govt. of India, 1983.
2. SumitSarkar: Modern India, 1885 - 1947, MacMillan India Ltd, Madras, 1986.
3. Bipin Chandra and Others: India's Struggle for Independence, Penguin Books, 1990.
4. Majumdar, R.C., & Chopra, P.N., Main Currents of Indian History, Sterling Publishers Pvt Ltd, New Delhi, 1979
5. Desai, A.R., Social Background of Indian Nationalism
6. Grover, B.L., A New Look at Modern Indian History, S.Chand & Company Ltd, New Delhi, 2009.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18FTA401 Semester: IV

Language-4 Title: **TAMIL IV**

Credits: 4 Max.Marks: 75

OBJECTIVES	செவ்வியல் தமிழ் இலக்கிய வடிவங்கள், விழுமியங்கள், இலக்கண அமைப்பியல் போன்றவற்றை அறியச் செய்தல்.
COURSE OUTCOME(S)	
CO1	சங்க கால சமூகவியலையும் வாழ்வியல் அறங்களையும் அறிய வைத்தல். இடைக்காலத்தில் சமூக அமைப்பினையும் இலக்கிய வடிவ மாறுதல்களையும் விளக்கி எடுத்துரைத்தல்.
CO2	கவிதைகள் வெளிக்காட்டும் சம கால பதிவுகளை எளிமையாக வெளிக்கொணர்தல். இலக்கணத்தைப் பயிற்றுவிப்பதன் மூலம் சிறந்த மொழியாக்க முயற்சிக்கு ஆயத்தப்படுத்தல்
CO3	படைப்பிலக்கியப் பயிற்சி வழி படைப்புத்திறனை மேம்படுத்தல்.

பாடத்திட்டம்

அலகு–I சங்க இலக்கியம்

1. குறுந்தொகை - பாடல் எண்கள் : 32, 40, 58, 69, 79, 176 (6 பாடல்கள்)
2. ஐங்குறுநூறு - குறிஞ்சி – கபிலர் - கிள்ளைப்பத்து (முதல் 6 பாடல்கள்)
3. புறநானூறு - பாடல் எண்கள் : 86, 182, 188, 196, 277, 279 (6 பாடல்கள்)

அலகு–II சிற்றிலக்கியம்

1. குற்றாலக் குறவஞ்சி - குற்றால மலை வளம் (6 பாடல்கள்)
2. முக்கூடற் பள்ளு - பள்ளியர் ஏசல் (8 பாடல்கள்)
3. முத்தொள்ளாயிரம் - சேரன் -3 சோழன் -3 பாண்டியன் - 3 (9 பாடல்கள்)

அலகு–III கவிதை

1. கவிஞர் மீரா - 'ஏற்றம் காண்போம்'
2. கவிஞர் முடியரசன் - 'துயில்'
3. கவிஞர் தாராபாரதி - 'காற்றுக்குப் புதிய திசை காட்டு'

அலகு–IV இலக்கணம்

யாப்பு- எழுத்து – அசை – சீர் - தளை – அடி – தொடை

அலகு–V(அ) இலக்கியவரலாறு

1. சங்க இலக்கியங்கள்
2. சிற்றிலக்கியங்கள்'

(ஆ) திறனறிப் பயிற்சி

1. படைப்பிலக்கியம் - கட்டுரை , கதை ,– பயிற்சி வழங்கல்

பார்வை நூல்கள்

1	இலக்கியச் சாரல்	-	சி.அப்துல் ஹக்கீம் கல்லூரி வெளியீடு. 2019 சூன் வெளியீடு
2	மீரா கவிதைகள்	-	கவிஞர் மீரா அகரம் பதிப்பகம்,1,நிர்மலா நகர்,தஞ்சாவூர் -7 முதல் பதிப்பு -2002
3	முடியரசன் கவிதைகள்	-	கவிஞர் முடியரசன் பாரி நிலையம், 29ஏ, பிராட்வே, சென்னை -1 முதல் பதிப்பு -1954
4	கவிஞாயிறு தாராபாரதி கவிதைகள்	-	மலர் மகன் (தொ.ஆ) இலக்கிய வீதி, 149- பூங்கா சாலை அண்ணா நகர் மேற்கு - விரிவு சென்னை. -01 முதல் பதிப்பு -2007
5	வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு	-	முனைவர் பாக்யமேரி என்.சி.பி.எச்., அம்பத்தூர், சென்னை -98 முதல் பதிப்பு -2008
6	நற்றமிழ் இலக்கணம்	-	டாக்டர்.சொ.பரமசிவம், பட்டுப் பதிப்பகம், 1269, 32-ஆம் தெரு அண்ணாநகர் மேற்கு, கம்பர் குடியிருப்பு, சென்னை -40 பன்னிரண்டாம் பதிப்பு -2012

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18FUR401 Semester: IV

Language-4 Title: **URDU IV – (DRAMA, RUBAYIATH & HISTORY OF URDU LITERATURE)**

Credits: 3 Max.Marks: 75

OBJECTIVES:	✓ To promote students' knowledge of various literary genres like Drama. ✓ To effectuate their caliber to pen poems of their own. ✓ To motivate them to build lively conversations.
COURSE OUTCOMES	➢ Students will learn to excel in the art of reading Plays. ➢ They will hoan their faculty of imagination. ➢ They will emerge as exponents of good conversation.

BOOK PRESCRIBED: "ADAB-E-JAMEEL" Published by Dept. of Urdu,
C. Abdul Hakeem College, Melvisharam.

Unit – I

1. Darwaza kholdo-Krishan Chander [First Quarter]
2. Agoosh-E- Lihad Mein Jab Ke Sona Hoga - Anees
3. Gulshan Mein Phiroou – Anees
4. Meer Taqi Meer

Unit – II

1. Darwaza kholdo-Krishan Chander [Second Quarter]
2. Ghaflat Kihansihse Aah Bharna Acha –Akber Allahbadi
3. Har Ek Se Sun Naye Fasana Ham Ne – Aker Allahbadi
4. Mirza Ghalib

Unit – III

1. Darwaza kholdo-Krishan Chander [Third Quarter]
2. Gunche Teri Zindagi Pe Dil Halth Hai -- Josh
3. Gunche Teri Zindagi Pe Dil Halth Hai – Josh
4. Sir Syed Ahmed Khan

Unit – IV

1. Darwaza kholdo-Krishan Chander [Last Quarter]
2. Muflis Hun Na Dowlath Hai Na Sermaya Hai –Amjad
3. Is Naam Ki Zindagi Mein Kuch Jaan To Ho – Amjad
4. Moulana Hali
5. Prem Chand

Unit – V

1. Roshan Nahi Karta Jala Dethe Hain –Asghar Vellori
2. Dhoonda Tho Kithabon Mein Sadaqath Na Mili –Asghar Vellori
3. Akber Ilahbadi
4. Allama Iqbal
5. Krishan Chanda

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18FURP41 Semester: IV

Language Lab Title: **URDU IV**

Credits: 1 Max.Marks: 75

OBJECTIVES:	✓ To monitor students' career prospects through their academic expertise. ✓ To train them to be fit enough for jobs in Software Sector. ✓ To groom them to be adepts at using various Fronts and Inpage Tools.
COURSE OUTCOMES	➢ Students will be rolled out as maximum beneficiaries. ➢ They will be fully armoured with sensitive software techniques. ➢ Their computeracy will help them to gain control over their Professional assignments.

URDU SOFTWARE

[Practical & Viva-voce]

Prescribed Text Book "URDU SOFTWARE" Publish by NCPUL, New Delhi

LINGUSTIC WITH PRACTICAL (Job Oriented Urdu Software Programme)

Unit I

Introduction to Urdu Software

Practical

Unit II

Key Board and its kinds

Practical

Unit III

Types of Fonts

Practical

Unit IV

Text Alignment

Practical

Unit V

Inpage & Unicode Tools

Practical

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18FEN401 Semester: IV

English-4 Title: **ENGLISH IV**

Credits: 4 Max.Marks: 75

Course Outcome(s)

- **CO1:** Perceive the various forms of literature like Prose, Poetry, Biography, Short Story and Drama.
- **CO2:** Assimilate the knowledge of grammatical system of English Language and also develop four Language Skills.(LSRW)

UNIT - I **PROSE**

1. The Rule of the Road — A. G. Gardiner
2. Forgetting — Robert Lynd
3. Mobile and Mixed Up — Anil Dharker
4. Water: The Elixir of Life — Sir C. V. Raman

UNIT - II **POETRY**

1. The Lotus — Toru Dutt
2. The Highway Man — Alfred Noyes
3. Character of a Happy Life — Henry Wotton
4. Refugee Mother and Child — Chinua Achebe

UNIT - III **SHORT STORIES**

1. Two Gentlemen of Verona — A. J. Cronin
2. The World Renowned Nose — V. M. Basheer

UNIT - IV **ONE-ACT PLAY& BIOGRAPHY**

1. Love at First Sight – The Tempest — William Shakespeare
1. My Friend, Albert Einstein — Hoffman

UNIT - V **WARM UP**

1. **Lexical Skills**
   - Common Errors in English
   - Formation of Words
   - Spelling and Sound: Introduction to Phonetics
   - Vowels and Consonants
2. **Descriptive Grammar**
   - Conjunction and its Kinds

- Interjection
- Regular and Irregular Verbs
- Modals and Auxiliaries Verbs

3. **Traditional Grammar**
   - Question Tags
   - Simple, Compound & Complex Sentences
   - Figures of Speech (a) Metaphor (b) Irony (c) Oxymoron (d) Personification (e) Simile
4. **Communication Skills (LSRW)**
   - Phoning
   - Offering Help
   - Asking for Information
   - Making Appointment
5. **Composition**
   - Designing a Resume
   - Writing Covering Letters for Resume
   - Preparing Agenda for Meetings
   - Writing Minutes of Meetings

Prescribed Book: HALL OF FAME – IV Board of Editors, Published by Emerald publishers, Egmore, Chennai – 600 008: www.emeraldpublishers.com, Mail: info@emeraldpubliser.com.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18MCH401 Semester: IV

Major-4 Title: **GENERAL CHEMISTRY IV**

Credits: 3 Max.Marks: 75

OBJECTIVES	To make the students learn and understand the basic aspects regarding Noble gases, solvents, polyhydric alcohol, phenols, preparation, properties, important name reactions, and their mechanism, thermodynamics, derivation of equations, partial molar properties, chemical potential, related problems and applications wherever necessary.
Course Outcome(s): **On Completion of the course, students will be able to**	
CO1	Recognize the various important aspects of noble gases.
CO2	Interpret the aqueous, non-aqueous solvents with their advantage and disadvantages.
CO3	Explain the steps involved in the preparation, properties and uses of Phenols, Catechol and Pyrogallol.
CO4	Validate the Relationship of Gibbs Free energy, Helmholtz work function, Gibbs-Helmholtz equation.
CO5	Appraise the concepts of III law of thermodynamics.

UNIT: I

1.1 Noble gases - Electronic configurations - position in the periodic table - Chemical inertness of noble gases - reasons

1.2 Compounds of xenon - hybridization and geometries of XeF_2, XeF_4, XeF_6, $XeOF_4$, $XeOF_2$, XeO_2F_2 , XeO_3 and XeO_4 (preparation and properties – not necessary)

1.3 Clathrates –definition,examples and their applications- Essentials conditions for Clathrate formation. Uses of noble gases.

UNIT: II

2.1 Solvents: Introduction-Definition of related terms – Types of solvents – efficacy of a solvent – ideal solvent.

2.2 Aqueous solvents – solvent properties of water- solvation and hydrogen bonding , Green Solvents – definition, examples and its advantages – Solvents in industries.

2.3 Non aqueous solvents: Advantages and disadvantages of non-aqueous solvents. Liquid ammonia as non-aqueous solvent with special reference to cleaning of nuclear reactors.

UNIT: III

3.1 Phenols – classification and nomenclature of polyhydric phenols - acidic character of phenols - Kolbe's reaction - Reimer - Tiemann reaction - Gattermann - Lederer – Manasse, Houben – Hoesh and Diazo coupling reactions.

3.2 Preparation, properties and uses of catechol and pyrogallol.

3.3 Preparation and properties of naphthols.

UNIT: IV

4.1 Free energy and work function - Gibbs free energy - Helmholtz work function – Relationship between Gibbs free energy and Helmholtz work function – Variation of Helmholtz work function with temperature and volume- Variation of Gibbs free energy with temperature and pressure- Free energy change as a criterion for equilibrium and spontaneity.

4.2 Maxwell's relations and thermodynamic equation of state.

4.3 Gibbs-Helmholtz equations - derivation and applications. Clausius- clapeyron equation – Derivation and Application.

UNIT: V

5.1 Third law of thermodynamics - Nernst heat theorem of III law of thermodynamics - Planck's formulation of third law and illustration of III law of thermodynamics.

5.2 Evaluation of absolute entropies: Absolute entropy from heat capacity measurements - Applications of III law of thermodynamics- Testing of III law and exceptions to III law.

5.3 Partial molar properties - Chemical potential - effect of temperature and pressure on chemical potential - Gibbs-Duhem equation.

Text Books:

1. Arun Bahl and B.S. Bahl, A Text book of Organic Chemistry, (22nd Edition), Sultan Chand & Co., New Delhi, (2018).

2. Bahl, B.S. and Bahl, A., Advanced Organic Chemistry, (12th Edition), Sultan Chand & Co., New Delhi, (2010).

3. Morrison R.T. and Boyd R.N., Bhattacharjee S. K. Organic Chemistry (7th edition), Pearson India, (2011).

4. R. Gopalan, Textbook of Inorganic Chemistry, Universities Press (2012).

5. R.D. Madan, "Modern Inorganic Chemistry", 2nd edition, S. Chand & Company Ltd., 2000.

6. P.L. Soni, “Text book of Inorganic Chemistry”, 20th revised edition, Sultan Chand & Sons, 2000.

7. W.U. Malik, G.D. Tuli and R.D. Madan, S.Chand and Company Ltd., ‘Selected Topics in Inorganic Chemistry’, 7th edition, 2001.

8. Puri B.R., Sharma L.R. and Pathania M.S. Principles of Physical Chemistry, (47th Edition), Vishal Publishing Co. New Delhi (2018).

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18MCHP41 Semester: IV

Major Practical -2 Title: **INORGANIC QUALITATIVE ANALYSIS AND PREPARATION**

Credits: 3 Max.Marks: 75

Objective	To know about qualitative analysis of inorganic salt mixtures and to prepare inorganic compounds.
Course Outcome(s): **On Completion of the course, students will be able to**	
CO1	Determine the anions present and separate cations from a mixture of inorganic salts.
CO2	Develop skills to prepare inorganic compounds.

Analysis of inorganic mixture containing two cations and two anions of which one will be an interfering ion. Semi micro methods using the conventional scheme to be adopted.

Cations to be studied

Lead, Copper, Bismuth, Cadmium, Iron, Aluminium, Zinc, Manganese, Cobalt, Nickel, Barium, Calcium, Strontium, Magnesium and Ammonium.

Anions to be studied

Carbonate, Sulphide, Sulphate, Nitrate, Chloride, Bromide, Fluoride, Borate, Oxalate and Phosphate.

Preparation of Inorganic compounds.

1. Tetrammine Copper II sulphate
2. Tris (thiourea) Copper I chloride
3. Potassium trioxalato ferrate II
4. Ferrous ammonium sulphate
5. Microcosmic salt

Semester Examination	**Marks**	**Internal Assessment**	**Marks**
Qualitative Analysis	48	Two Tests	10
Inorganic Preparation	22	Attendance / Regularity	10
Record	05	Results accuracy	05
Total	**75**	**Total**	**25**

Systematic Inorganic Qualitative Analysis: 48 Marks

Procedures	Marks
Cation	12
Interfering cation	12
Anions	24
Total	48

SCHEME OF VALUATION FOR PRACTICAL EXAMINATIONS

Internal assessment: 25 Marks

INTERNAL ASSESSMENT	Marks
Two Tests	10
Attendance / Regularity	10
Results accuracy	05
Total	**25**

External assessment: 75 Marks Total: 100 marks

Record : 15 Marks
Preparation : 20 (Quantity- 15 Marks; Quality- 5 marks)
Analysis : 40 Marks.
Each radical with procedure : 10 Marks
(Spotting for each radical - 5 Marks; Fixing the group - 5 Marks)

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18AMA401 Semester: IV

Allied-1 Title: **ALLIED MATHEMATICS - II (ALLIED)**

Credits: 6 Max.Marks: 75

OBJECTIVES:	This course covers basic ideas of integrals, trigonometry functions, Laplace transform & Vector analysis.
COURSE OUTCOME(S): At the end of the course, the students will able:	
CO1	Use Bernoulli and Reduction formulae to evaluate the single integrals and Define Beta and Gamma functions and to solve the double & triple integrals & to expand Fourier series for several functions.
CO2	Express multiples of θ interms of powers of θ of trigonometry function and vice versa..
CO3	Define Laplace Transforms, Inverse Laplace Transforms and is application to solve ordinary differential equations.
CO4	To know the concepts and simple applications of Vector differentiation and Vector integration.

UNIT-I :

INTEGRAL CALCULUS

Bernoulli's formula for integration by parts - Reduction formulae for: $\int x^n e^{ax}$, $\int \sin^n x dx$, $\int \cos^n x dx$, (with proof & problems), $\int_0^{\pi/2} \sin^m x \cos^n x dx$ (no proof, problems only) - properties of definite integrals and simple problems.

UNIT-II:

APPLICATION OF INTEGRATION

Evaluation of double, triple integrals -
Fourier series for functions in (0, 2π) and (-π, π).

UNIT-III:

TRIGONOMETRY

Expansions of $\sin^n \theta$, $\cos^n \theta$, $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ - Expansions of $\sin \theta$, $\cos \theta$, $\tan \theta$ in terms of θ - Hyperbolic and inverse hyperbolic functions - Logarithms of complex numbers.

UNIT-IV :

LAPLACE TRANSFORMS

Laplace Transformations of standard functions and simple properties - Inverse Laplace transforms - Applications to solutions of linear differential equations of order 1 and 2 - simple problems.

UNIT-V:

VECTOR ANALYSIS

Scalar point functions - Vector point functions - Gradient - divergence - curl - Directional derivatives - Unit to normal to a surface - Line and surface integrals - Guass, Stoke's and Green's theorems(without proofs) - Simple problem based on these Theorems.

Recommended Text:

P.Duraipandian and S.Udayabaskaran,(1997) Allied Mathematics, Vol. I & II. Muhil Publishers,Chennai.

Reference Books:

1. P.Balasubramanian and K.G.Subramanian,(1997)Ancillary Mathematics. Vol. I & II. Tata McGraw Hill, New Delhi.
2. S.P.Rajagopalan and R.Sattanathan,(2005) Allied Mathematics .Vol. I & II. Vikas Publications, New Delhi.
3. P.R.Vittal(2003). Allied Mathematics . Marghan Publications, Chennai.
4. P.Kandasamy, K.Thilagavathy (2003) Allied Mathematics Vol-I, II S.Chand & company Ltd., New Delhi-55.
5. Isaac, Allied Mathematics. New Gamma Publishing House, Palayamkottai.

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18ACH402 Semester: IV

Allied-2 Title: **BIOCHEMISTRY – II**

Credits: 4 Max.Marks: 75

OBJECTIVES	To gain a basic working knowledge of biochemical concepts and techniques which will be necessary for future scientific endeavours.
Course Outcome(s): **On Completion of the course, students will be able to**	
CO1	Demonstrate the fundamental knowledge of mechanisms involved in maintenance of body fluid pH homeostasis and electrolytes.
CO2	Apply the knowledge of the fundamental aspects of enzymology- action, mechanism, kinetics and inhibition.
CO3	Relate to integrate the various aspects of metabolism and their regulatory pathways.
CO4	Classify the basic concepts of biochemical basis of inborn error metabolism.
CO5	Illustrate the principles of various conventional and specialized laboratory investigations and instrumentation analysis.

UNIT - I

Acid - Base balance:

Concept of pH, pOH, buffer and its application, buffer capacity. Henderson - Hasselbalch equation and its importance. Buffer in body fluids of extracellular and intracellular fluids and their function. Fluid and Electrolytes balance, Disorders.

UNIT - II

Enzyme Chemistry:

Definition - enzyme, apoenzyme, holoenzyme, prosthetic group, active site, enzyme specificity, turnover number, specific activity, Katal, IU, coenzyme, co-factor, allosteric enzymes. IUB/EC Classification (up to one digit). Factors affecting enzyme reaction - substrate, pH and temperature. Enzyme kinetics-Derivation of Michaelis-Menten equation and Lineweaver-Burk plot for mono-substrate reaction. Enzyme inhibition - Competitive and Non-competitive.

UNIT – III

Metabolism:

Carbohydrate metabolism-Glycolysis, TCA cycle, HMP shunt and its energy yield. amino acids metabolism-Deamination, Transamination reactions, SGOT and SGPT. Urea cycle, beta oxidation of fatty acids.

UNIT – IV

Inborn Errors of Metabolism:

Disease definition, causes and symptoms-Galactosemia, Von - Gierke's Disease, Hemophilia, Albinism, Alkaptonuria, Taysach's.

UNIT - V

Biochemical Techniques:

Principles and application of: (a)chromatography (paper, and thin layer) , (b) electrophoresis (SDS PAGE), (c) absorption photometry (colorimetry and spectrophotometry), (d) centrifugation (Differential centrifugation), (e) radio immunoassay.

REFERENCES:

1. Lehninger Principles of Biochemistry-David L. Nelson, Michael M. Cox, Macmillan Worth Publishers.

2. Biochemistry - Garrett Grishmam. 3rd edition. International student's edition.

3. Biochemistry by L . Veerakumari , MJP publishers,Chennai-5.

4. Harper's Biochemistry-Rober K. Murray, Daryl K. Grammer, McGraw Hill, Lange Medical Books. 25th edition.

5. Fundamentals of Biochemistry-J.L. Jain, Sunjay Jain, Nitin Jain, S. Chand & Company.

6. Biochemistry-Dr. Amit Krishna De, S. Chand & Co., Ltd.

7. Biochemistry-Dr. Ambika Shanmugam, Published by Author.

8. Biomolecules-C.Kannan , MJP Publishers,Chennai-5.

9. Biophysical Chemistry - Upadhyay and Upadhyay Nath, Himalayan Publication.

10. Analytical Biochemistry - R.B. Turner, Elsevier, N.Y.

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18ACHP42 Semester: IV

Allied Practical-1 Title: **ALLIED BIOCHEMISTRY PRACTICALS**

Credits: 2 Max.Marks: 75

OBJECTIVES	The main objectives of these experiments to support theoretical concepts and clinical diagnosis.
Course Outcome(s): **On Completion of the course, students will be able to**	
CO1	Demonstrate the skills for quantitative estimation using the different branches of volumetric Analysis.
CO2	Evaluate the skills required for the qualitative analysis of organic compounds, determination of physical constants.
CO3	Outline the use of conventional techniques/instruments to perform biochemical analysis.

Volumetric Estimation:

1. Estimation of Iron in Ferrous Ammonium Sulphate using potassium permanganate as link solution and oxalic acid as primary standard.
2. Estimation of Glucose by Benedict's quantitative method.
3. Estimation of Glycine by formal titration.
4. Estimation of ascorbic acid by titrimetric method using 2, 6-dichlorophenol indophenol.
5. Determination of saponification value of edible oil.

Qualitative analysis:

1. Identification of biomolecules - Amino acids, proteins, carbohydrates, lipids and nucleic acids.
2. Qualitative tests for Amino acids and proteins (Million's , Ninhydrin, Xanthoproteic and Biuret test)
3. Qualitative tests for lipids a) Miscibility test b) Saponification test c) Unsaturation test d) Sudan black dye test e) Salkowski test for cholesterol
4. Qualitative tests for DNA (DPA) & RNA (Orcinol) (Neumann's test for presence of phosphorus)

Preparation:

1. Casein from milk
2. Starch from potato.
3. Albumins and globulins from egg white.

Reference Books for Practical:

i) An Introduction to Practical Biochemistry - David T Plummer
ii) Introductory Practical Biochemistry - Sawhney & Singh
iii) Biochemical Methods - S.Sadasivam and A.Manickam
iv) Experimental Biochemistry-Rao & Deshpande

CONTINUOUS ASSESSMENT *– 25 MARKS*

SEMESTER PRACTICAL EXAMINATION *– 75 MARKS*

Volumetric Estimation **- 40**

Organic Analysis **- 30**

Record **- 05**

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18SCH401 Semester: IV

Skill Based-2 Title: **FOOD CHEMISTRY**

Credits: 3 Max.Marks: 75

OBJECTIVES	To impart knowledge about different foods, their nutritive values and food preservation. To know about food additives and different techniques of packaging food.
Course Outcome(s): **On Completion of the course, students will be able to**	
CO1	Explain the structure, composition and nutritive value of cereals, pulses and Sugar. To study about artificial sweeteners.
CO2	Describe vegetables and fruits, their classification, composition and nutritive value.
CO3	Categorize beverages and appetizers.
CO4	Illustrate the methods of food preservation and food spoilage.
CO5	Outline the methods of packaging food and food additives, food colours.

UNIT-I

1.1: Cereals - Definition – Classification - Structure of Cereals - Composition and Nutritive value – Pulses - Definition - Classification - Processing - Structure of Pulses - Composition and Nutritive Value - Toxic Constituents in Pulses - Medicinal value of Cereals and Pulses.

1.2: Sugar - Structure and Properties - Nutritive value - Sugar composition in different food items.

1.3: Sugar related products - Classification and Nutritive value - Artificial sweeteners – Examples – Saccharin and Cyclamate - Advantages and Disadvantages.

UNIT-II

2.1: Vegetables & Fruits- Classification - Composition & nutritive values.

2.2: Fungi and algae as food - enzymatic browning and non enzymatic browning.

2.3: Nutritive value of some common foods - milk, egg, soyabeans

UNIT-III

3.1: Beverages - definition and examples - Classification of beverages.

3.2: Fruit beverages - Milk based beverages - malted beverages - examples. Alcoholic and non alcoholic beverages - examples.

3.3: Appetizers - definition - classification - examples - Water - functions and deficiency.

UNIT-IV

4.1: Food Preservatives - definition - classification - Food Spoilage - definition - Prevention.

4.2: Methods of preservation - classification - Low and high temperature - preservatives examples

4.3: Dehydration - osmotic pressure - food irradiation.

UNIT-V

5.1: Food Additives - Definition - Classification - Their functions - Chemical substances.

5.2: Packaging of Foods – Classification - Materials used for Packaging.

5.3: Food Colours – Restricted use – Spurious Colours – Taste Enhancers – MSG – Vinegar.

REFERENCE BOOKS

1. Food Science - III Edition - B. Sri Lakshmi. New Age International Publisher, 2005.
2. Food Chemistry - Lilian Hoagland Meyer CBS Publishers & Distributors, 2004.
3. Food Science, Nutrition and Health - Brian.A.Fox, Allan G.Cameron Edward Arnold, London.
4. Fundamentals of Foods and Nutrition - Mudambi. R.Sumathi, and Raja gopal, M.V. - Wiley Eastern Ltd., Madras.
5. Handbook of Food and Nutrition - M. Swaminathan - Bangalore Printing and Publishing Co. Ltd., Bangalore

C.ABDUL HAKEEM COLLEGE (Autonomous), Melvisharam

Syllabus for Second year UG Programmes effective from the year 2018-2019

Class	: Second year UG Programmes	Semester	: IV
Subject Code	: U18NTA401	Title : Basic Tamil (Non Major-2)	
Credits	: 2	Max Marks	: 75

OBJECTIVES	தமிழ் மொழியின் அடிப்படை பண்புகளை அறிய வைத்து எளிய இலக்கண, இலக்கியப் பயிற்சிகளின் வழி மதிப்பீடு செய்தல்.
COURSE OUTCOME(S)	
CO1	தமிழ் அகராதிகளைப் பயன்படுத்தவும் எழுத்துக்களை நினைவில் கொள்ளவும் பயிற்சி வழங்கல். தமிழ்ச் சொற்களில் சந்திப்பிழை தவிர்க்க எளிய பயிற்சி வழங்கல்
CO2	தமிழில் உள்ள எளிய மற்றும் இனிய இலக்கியங்களை அறிமுகப்படுத்தி பொருளை விளக்குதல். எளிமையான சிறுகதைகளின் வழி வாசிப்புத் திறனை மேம்படுத்தல்.
CO3	கலைச் சொற்களையும் ,மரபுத் தொடர்புகளையும் மொழிபெயர்த்தல்

பாடத்திட்டம்

அலகு–I எழுத்து

1.அகர வரிசையில் அமைத்தல் (ஒவ்வொன்றிற்கும் 10 பெயர்கள்)
தமிழ் மாதங்கள், தமிழ்ப் புலவர்கள், தமிழக ஊர்கள் , தலைவர்கள், தமிழ் நூல்கள்,

2. பிழை நீக்கி எழுதுதல்

1..ஆளும் வேளும் பல்லுக்கு உறுதி
2. ஆரம் செய விரும்பு
3.பனிவுடைமை நல்ல பன்பு
4. எண்ணை குலியல் நல்லது
5.இங்கு விரகு விற்க்கப்படும்
6. நூன் பள் மருத்துவரைப் பார்த்தேன்
7.பேரூந்து நிருத்தும் இடம்
8. உணக்கு உனவு தேவையா?
9.கம்பண் வீட்டுக் கட்டுத்தரியும் கவி பாடும்
10. ஐந்திள் வலையாதது ஐம்பதில் வளையுமா?

அலகு–II

(அ) சேர்த்து எழுதுதல் : சுட்டு, வினா, திசைப் பெயர் - அடிப்படையிலான சொற்கள்
எ.கா : அ + இடம் = அவ்விடம், எ + பையன் = எப்பையன், வடக்கு+ மேற்கு=வடமேற்கு

(ஆ) பிரித்து எழுதுதல் : கனி, மரம் - அடிப்படையிலான சொற்கள்
எ.கா : வாழை + பழம் = வாழைப்பழம் மரம் + வேர் = மரவேர்

(இ) எதிர்ச்சொல் தருதல் : பண்பு அடிப்படையிலான சொற்கள்
எ.கா : நன்மை X தீமை நல்ல X கெட்ட உயரம் X குட்டை .

அலகு–III செய்யுள்

(அ) ஆத்திசூடி (முதல் 12 செய்யுள்)
(ஆ) திருக்குறள் (குறள் எண்கள் : 10, 15, 82, 398, 788)
(இ) கவிமணி - நூறு வயது தருவன

அலகு–IV சிறுகதை

1. கொடிக்குக் காய் பாரமா ?
2. மூன்று பொற்காசுகள்

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NUR401 Semester: IV

Non Major -2 Title: **FUNCTIONAL URDU-II (NME-II)**

Credits: 2 Max.Marks: 75

OBJECTIVES:	✓ **To advance students' knowledge of Urdu.** ✓ **To impart training in Urdu Composition.** ✓ **To brief them about Urdu poetry.**
COURSE OUTCOMES	➢ **Students will learn Urdu equivalents of important Nomenclature.** ➢ **They will develop interest in Urdu poetry.** ➢ **They will acquire the ability to translate technical terms.**

Unit I

Basics of Urdu Grammar

Unit II

Names of flowers, fruits,

birds, colours & Vegetables.

Unit III

Composition

(A short paragraph consisting of four or five simple sentences).

Unit IV

Two simple poems.

Unit V

Translation

(Technical terms and a passage).

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NEN401 Semester: IV

Non Major -2 Title: **ENGLISH FOR COMMUNICATION-II (NME-II)**

Credits: 2 Max.Marks: 75

Objectives:

- To motivate students to build interesting Communication.
- To accelerate their efficiency of Business Correspondence.
- To provide to them effective instruction to excel in different Skills.

Course Outcome:

- Students will master the skill of drafting Notices and Writing Minutes.
- They will strengthen their ability to streamline Business Correspondence.
- They will gain proficiency in Editing and Team-Work Skills.

Unit-1:

An Introduction to Communication

Notices, Agendas and Minutes

Unit-2:

Business Correspondence

Speeches

Unit-3:

Meetings

Vocabulary Development

Unit-4:

Editing Skills

Reference Skills

Unit-5:

Teamwork Skills

Emotional Intelligence Skills

Prescribed Text:

Synergy: Communication in English and Study Skills,
by Board of Editors, Orient Longman.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NPH401 Semester: IV

Non Major -2 Title: **BASIC PHYSICS-II (NME-II)**

Credits: 2 Max.Marks: 75

OBJECTIVES	To understand the basics of physics in day to day life and its importance through its applications.
COURSE OUTCOME(S)	
CO1	To know about properties of matter and its applications
CO2	To get knowledge on basic principles of electricity and magnetism and applications of electromagnets
CO3	To acquire knowledge in the content areas of nuclear and particle physics
CO4	To apply principles of physics to astronomical objects
CO5	Know about the conventional and non-conventional sources like Nuclear energy and Ocean thermal energies.

UNIT – I: Properties of Matter **6 Hours**

Strain and stress, elastic limit, Hooke's law – Surface tension – Capillary action – Flow of liquids and gases – Streamline and turbulent flow – Laws of floatation and its applications – Bernoulli's theorem and its applications – Viscosity and its applications.

UNIT – II: Electricity and Magnetism **6 Hours**

Voltage, Current, Resistance, and Ohm's Law, Electrical Power – Difference between AC and DC – Single Phase and Three Phase supply – Transformers and its applications – Dia, Para and Ferromagnetic materials – Properties of magnetic materials.

UNIT – III: Modern Physics **6 Hours**

Atom models evolution up to Bohr atom model (Qualitative description only) – Nucleons and other elementary particles – Fundamental Forces of Nature – Radioactivity and its applications – Crystalline and Amorphous Solids – examples, comparison and applications.

UNIT – IV: Astrophysics **6 Hours**

Introduction – Solar system – Inner planets and outer planets – Kepler's laws of Planetary motion – Constituents of stars – birth and death of stars, stellar explosions, white dwarfs, neutron stars, pulsars, and black holes – Expansion of universe.

UNIT – V: Energy Physics **6 Hours**

Energy sources – Conventional and Non Conventional – Types – Hydro and Thermal – Coal Oil, Gas and their importance – Green house effect – Nuclear energy, Solar energy, Wind energy.

Books for Study:

3. Properties of Matter, R Murugeshan, 5th Edition, S. Chand Publishing, New Delhi.
4. Electricity and Magnetism, R Murugeshan, 10th Edition, S. Chand Publishing, New Delhi.
5. Modern Physics, R Murugeshan and Kiruthiga Sivaprasath, 18th Edition, S. Chand Publishing, New Delhi.
6. Mechanics & Mathematical Physics, R Murugeshan, 3rd Edition, S. Chand Publishing, New Delhi.

Books for Reference:

3. Fundamentals of Physics, D. Hallidy, R. Rensick and J. Walker, 6th Edition, Wiley, NY (2001).
4. https://en.wikipedia.org/wiki/Solar_System.
5. https://en.wikipedia.org/wiki/List_of_Indian_satellites.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NZL401 Semester: IV

Non Major -2 Title: **SERICULTURE (NME-II)**

Credits: 2 Max.Marks: 75

Objective:

To impart training on silk worm culture technology

To create knowledge on self-employment opportunity

Course outcomes

CO1: To describe about the Taxonomy, Morphological sex differences in larva and adult.
CO2: To understand the culture of mulberry plants
CO3: To know about the culture methods of *B.mori and* mulberry silk
CO4: To describe the diseases and pests of *B.mori.* and Mulberry

CO5: To Study the quality of silk, silk gland and marketing strategies of silk.

UNIT – I

Classification of commercial varieties of mulberry. Biology of silk worm (*Bombyx mori*). Mulberry plantation establishment and cultivation practices.

UNIT – II

Diseases of mulberry – fungal, bacterial, viral and nematode diseases, deficiency diseases and their remedial measures.

UNIT – III

Silkworm rearing operations – Chawki rearing and late age rearing techniques.

UNIT – IV

Diseases of silk worm.Physical and commercial characters of cocoons. Reeling operations, importance of by – products of Sericulture.

UNIT – V

Economics of Sericulture – Sericulture prospects in India- Sericulture as Self Employment venture.

Reference Books:

Ganga, G. 2003: comprehensive sericulture Vol-l, Moriculture – Oxford –IBH Puubl. Co. India.

Ganga, G. 2003: comprehensive sericulture Vol –II Silkworm rearing – Oxford – IBH Publ. Co. India.

Ganga, G. and Sculochana Chetty, J. 1997: An Introduction to sericulture Oxford – IBH Publ. Co.

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NMA401 Semester: IV

Non Major -2 Title: **FOUNDATION MATHEMATICS FOR COMPETITIVE EXAMINATIONS (NME-II)**

Credits: 2 Max.Marks: 75

Objectives: This Course aims to prepare the students for various competitive examinations.

Course Outcomes: At the end of the course, the students will able to	
CO1	Understand the concepts of Ratio and Proportion**.**
CO2	Understand the concepts of Percentages.
CO3	Solve the problems on profit and loss.
CO4	Understand simple interest and compound interest**.**
CO5	Solve the problems on time & work and time & distance.

UNIT-I

Ratio and proportions.

UNIT-II

Percentages.

UNIT-III

Profit and loss, discounts.

UNIT-IV

Simple and compound interest**.**

UNIT-V

Time, Distance and Work.

Reference Book

1. Quantitative Aptitude - R.S. Aggarwal (S.Chand & Co. - New Delhi 2008).
2. Course in Mental Abilities and Quantitative Aptitude for Competitive Examinations - Edgar Thorpe (Tata McGraw - Hill Pub., Co., Ltd. New Delhi – II Edn.,).

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NKS401 Semester: IV

Non Major -2 Title: **PROJECT MANAGEMENT (NME-II)**

Credits: 2 Max.Marks: 75

OBJECTIVES:

To initiate students into the starting of a project and to help them execute the project successfully. To give theoretical knowledge for planning and management in the review of the projects undertaken.

COURSE OUTCOME(S):

CO1 - Understand the basics about project and it's types.

CO2 - Learn about project survey and idea generation.

CO3 - Have in depth knowledge about project selection and choice of technology

CO4 - Understand project finance and its sources.

CO5 - Understand the project formulation and preparation of project report.

UNIT-I

INTRODUCTION

Meaning – Definition – Characteristics of Project – Classification of Projects - Project life cycle.

UNIT-II

PROJECT SURVEY

Project Ideas and Innovation **-** Sources of Project Idea **-** Need Analysis - Market Research - Market Planning.

UNIT-III

PROJECT SELECTION

Selection of project: Criteria for Selection of Project - Site selection - Factors Influencing Location of Project – Locational Advantages and Disadvantages - Choice of technology and appropriate Technology.

UNIT-IV

PROJECT FINANCE

Sources of Finance – Shares and Debentures-types and features - Public Deposits - Bank Credit – Institutional Supports: ICICI, IDBI, IFCI.

UNIT-V

PROJECT FORMULATION AND INCENTIVES

Project Formulation: Meaning – Importance of Project formulation - Feasibility Analysis – Project Report - Incentives – Subsidy, Bounty and Concession – Need for Incentives – State and Central incentives – Taxation benefit.

Text book:

1. C.B. Gupta, “Project management”, A.P.H Publishing Corporation, New Delhi, 2000.

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NBA401 Semester: IV

Non Major -2 Title: **BUSSINESS CORRESPONDENCE (NME-II)**

Credits: 2 Max.Marks: 75

UNIT-I INTRODUCTION

Communication-Importance and Needs of Business correspondence - Objectives – Principles of effective Communication- Formal and Informal Communication- Communication Barriers.

UNIT-II MEDIA OF COMMUNICATION

Written, Oral, Visual, Audio and Computer based Communication and the merits and demerits of each.

UNIT-III BUSINESS LETTERS

Business Letters Kinds of Business Letters-Layout of Business Letter.

UNIT-IV LETTER WRITING

Application for the Situation- Bio-data- Business Enquiries- Complaint Letter.

UNIT-V HI-TECH COMMUNICATION

Hi-tech Communication -internet: Websites-Email -Video Conferencing- social Networking (face book, whatsapp, twitter)

Text Books:

1. Rajendra Pal and Korlehalli - Essentials of Business Communication

Reference Book

2. S.M Ramesh & C.C Pattanshetti - Business Communication.
3. Kathiresan And Dr. Radha - Business Communication
4. R.S.N. Pillai & Bagavathi - Modern Commercial Correspondence

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NCM401 Semester: IV

Non Major -2 Title: **GENERAL COMMERCIAL KNOWLEDGE (NME-II)**

Credits: 2 Max.Marks: 75

OBJECTIVES:	To enable the students to gain basic knowledge of Trade, Commerce and Industry
COURSE OUTCOME(S)	
CO1	To understand basic concept of trade, commerce and industry
CO2	To glimpse the knowledge in different form of organization.
CO3	To learn about company and its workings
CO4	To impart knowledge in company management and administration.
CO5	To seek knowledge about Company Meetings, Minutes, Agenda, Quorum and Resolution.

UNIT-I - INTRODUCTION

Commerce, Trade, Industry – Meaning – Scope and Importance of Commerce – Economic Basis of Commerce.

UNIT-II – TYPES OF BUSINESS

Sole Trade – characteristics- advantages and disadvantage – Partnership - Features – Merits and Demerits - Co-operatives – Features – Types of co-operatives

UNIT-III – JOINT STOCK COMPANY

Joint Stock Company – Features – Memorandum and Articles – Contents – Prospectus and Contents.

UNIT-IV – MANAGEMENT OF COMPANY

Management of Joint Stock Company – Directors – Qualification, Appointment, Removal, Powers and Duties.

UNIT-V – COMPANY MEETINGS

Company Meetings – Types – Minutes – Agenda – Quorum – Resolution.

REFERENCE BOOKS:

1. Gosh and Bhutan, General Commercial Knowledge, Sultan Chand & Sons, New Delhi

2. J.C. Bahl&E.R.Dhongde, Elements of Commerce & Business Methods, New Book & Co., Mumbai

3. P.N. Reddy &S.S.Gulshan, Commerce – Principles & Practice, S. Chand & Co., New Delhi

4. J.C. Sinha &V.N.Mughali, A text book of Commerce, R. Chand & Co., New Delhi

5. K.L.Nagarajan, Vinayagam, Radhasamy and Vasudevan, Principles of Commerce and General Commercial Knowledge, S.Chand & Co., New Delhi.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NCS401 Semester: IV

Non Major -2 Title: **HTML BASICS (NME-II)**

Credits: 2 Max.Marks: 75

Objectives	Provides web development knowledge with HTML basics
COURSE OUTCOME(S)	
CO1	❖ Understand the HTML basics with WWW,TCP,FTP
CO2	❖ Facilitates the knowledge of web server with HTML tags
CO3	❖ Creating knowledge with HTML graphics, tabes
CO4	❖ Enriches linking techniques of web pages
CO5	❖ Attractive background style using CSS

Unit-1

Internet basics: basic concepts – internet domains – client I/P address – TCP – WWW – FTP- introduction to Internet Explorer 7 – introduction to Firefox web browser

Unit-2

Introduction to HTML – web server – web client- HTML tags - HTML Command: Structure of HTML program – text formatting – titles and

footers – text styles – heading styles –drawing lines

Unit-3

HTML list – types of list – adding graphics to HTML documents – tables

Unit-4

HTML linking documents – external document reference – internal document reference – images as hyperlink – frames.

Unit-5

Introduction of CSS – inline styles –embedded style sheets – backgrounds –user styles sheets – CSS 3 – web resources

Prescribed Text Books:

1. Web enabled commercial Application development using HTML, Java Script , DHTML & PHP, Ivan Bayross, BPB publications, fourth edition
2. Internet & WWW how to program, Deitel , P.J.Deitel, H.M.Deitel, PHI, fourth edition.

Books for Reference:

1. The Complete Reference HTML & XHTML, fourth edition, Thomas A. Powell
HTML 5 Up and Running dive into the future of the web development, Mark Pilgrim, first Edition.

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: II Year Subject Code: U18NHS401 Semester: IV

Non Major -2 Title: **CIVIL SERVICES AND OTHER COMPETITIVE EXAMINATIONS (NME-II)**

Credits: 2 Max.Marks: 75

Objectives:

To enable the students to perceive how Competitive Examinations in India.

To understand the policies and strategies of the Central Services Union Public Service Commission, Railway Recruitment Board.

To evaluate the contribution of the Subjects of Study for TNPSC Examinations Group I and Competitive Examination Preparation Tips

COURSE OUTCOME(S) Students are able to	
CO1	Understand the Union Public Service Commission and its Competitive Examinations in India.
CO2	Study the jobs, in central Government Organizations and how to apply Competitive Examinations.
CO3	Narrate the Kind of Tamil Nadu Public Service Examination Group Wise.
CO4	Understand and Recognize the Subject of Study for the TNPSC Examinations
CO5	Visualize the future Plans and describe the Competitive Examination Preparation Tips

UNIT – I

Competitive Examinations in India: Introduction – Civil Services – Preliminary and Main Examinations – Government Employment in Other Services – Examination Patterns

UNIT - II

Central Services: Union Public Service Commission – Railway Recruitment Board – Defence Examinations – LIC/GIC Examinations – Staff Selection Commission Examinations – UGC / NET Examinations – Bank Examinations

UNIT – III

TNPSC: Tamil Nadu Public Services Commissions – Combined Civil Services Examinations, Group I – Combined Civil Services Examinations, Group II (Interview Posts) – Madras High

Court Service Examinations – District Educational Officers Examinations – Village Administrative Officers Examinations – Other Technical Examinations

UNIT – IV

Subjects of Study for TNPSC Examinations Group I: – Mathematics – Physics – Chemistry – Biology – Zoology – History – Sociology – Computer Science – TNPSC Group II, III and IV: General Knowledge – Politics – History – Current Affairs – National Movement – Science – Geography – Economics and Business – Intelligent Quotient –General Tamil – Perusing Previous Years Question Papers

UNIT – V

Competitive Examination Preparation Tips: Motivation – Active Learner – Organizing Studies – Time Management – Reading Newspapers, Magazines, Subject and Reference Books – Writing Examinations at Home – Good Handwriting Practice – Avoiding Stress – Perusing Previous Years Question Papers

Books for Reference

1. Dr. Divya S Iyer, Path Finder: Civil Services Main Examination, DC Books Pvt Ltd, New Delhi
2. Edgar Thorpe, The Pearson CSAT Manual 2013: Civil Services Aptitude Test for the UPSC Civil Services Preliminary Examination, New Delhi
3. S.A. Majid, Special Current Affairs for Civil Services Examination, Kalinjar Publications, New Delhi
4. SanjivVerma, The Indian Economy : For UPSC and State Civil Services Preliminary and Main Examinations, Unique Publications, New Delhi
5. Veerasekaran, TNPSC Group II, Kizhakku Publishers, Chennai
6. Veerasekaran, TNPSC Group III, Kizhakku Publishers, Chennai

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18MCH501 Semester: V

Major Title: **INORGANIC CHEMISTRY - I**

Credits: 5 Max.Marks: 75

Objective	To effectively impart knowledge and understanding on gravimetry, coordination chemistry, Organometallic chemistry and halogens.
Course Outcome: On successful completion of the course, students will be able to	
CO1	Determine the amount of substances using gravimetric technique.
CO2	Identify the nature of coordination complexes and its isomerism.
CO3	Describe the type of bonding, geometry, properties and the stability of the coordination complexes
CO4	Explain the basics of halogen family and their compounds

UNIT: I

1.1 Principles of gravimetric analysis - Characteristics of precipitating agents - choice of precipitants - conditions of precipitation - specific and selective precipitants - DMG, cupferron, salicylaldehyde, ethylene diamine - use of sequestering agents.

1.2 Co-precipitation - post precipitation - differences - minimization of error - precipitation from homogeneous solution - calculation in gravimetric methods - use of gravimetric factor.

1.3 Thermo analytical methods - principle involved in thermo gravimetric analysis and differential thermal analysis - characteristics of TGA and DTA - thermo grams – factors affecting TGA and DTA curves - discussion of various components of the instrument with block diagrams - Applications of thermogravimetry - Applications of DTA - thermometric titration. Electrogravimetry - principle and applications.

UNIT: II

2.1 Coordination Compounds: Introduction - Ligands- monodentate, bidentate and polydentate ligands, Coordination Sphere, Coordination Number - Chelation and effect of Chelation - Applications of EDTA.

2.2 Types of ligands - Nomenclature of coordination complexes.

2.3 Isomerism in complexes - Ionization Isomerism, hydrate Isomerism, linkage Isomerism, ligand Isomerism, coordination Isomerism, polymerization Isomerism, geometrical and optical Isomerism in 4 and 6 coordinate complexes.

UNIT: III

3.1 Werner's theory – Important postulates and examples - EAN rule – theories of bonding - Valence bond theory – Inner and outer orbital complexes of Cr, Fe and Ni – Drawbacks of VBT.

3.2 Crystal field theory - spectrochemical series - splitting of d - orbitals in octahedral, tetrahedral and square planar complexes - crystal field stabilization energy - calculation of CFSE in octahedral and tetrahedral complexes – Compare VBT and CFT.

3.3 Low spin and high spin complexes – explanation of magnetic properties, colour and geometry using CFT.

UNIT: IV

4.1 Organometallic compounds- Definition and types- Metal-Alkene complexes- Bonding and structure- Zeise's salt- preparation and structural features- Importance of organometallic compounds as catalysts-Wilkinson's catalyst- Preparation and application in Hydrogenation reactions- Advantages and disadvantages of Wilkinson's catalyst.

4.2 Metallic Carbonyls – types – geometry, hybridization and magnetic properties of mononuclear carbonyls of V, Cr, Mo, W, Fe, Ni.

4.3 Geometry, hybridization and magnetic properties of binuclear carbonyls of Mn, Fe, Co.

UNIT: V

5.1 Halogen-comparative study of F, Cl, Br and I - elements - reactivities - comparison of F and O - hydracids - oxides.

5.2 Classification of halide - fluorides of oxygen - exceptional properties of fluorine.

5.3 Oxy acids of halogens - Structure. Interhalogen compounds – pseudohalogens - basic properties of halogens- positive iodine – Evidences.

REFERENCE BOOKS:

1. Inorganic Chemistry - P.L. Soni - Sultan Chand (2013).

2. Inorganic Chemistry - B.R. Puri, L.R. Sharma and K.C. Kallia - Vallabh Publications (2017).

3. Selected Topics in Inorganic Chemistry - W.U. Malik, G.D. Tuli and R.D. Madan - S. Chand Publications (2009).

4. Inorganic Chemistry - J.E. Huheey, Harper and Collins - NY IV edition (2006).

5. Concise Inorganic Chemistry - J.D. Lee – Wiley Publishers- V edition (2008).

6. Industrial Chemistry - B.K Sharma – Krishan Prakashan Publications- XVII Edition (2014).

7. Inorganic Chemistry- Catherine Housecroft and Alan G. Sharpe- Pearson Publishers- IV Edition (2012).

8. Advanced Inorganic Chemistry - Cotton and Wilkinson - VI Edition - Wiley and Sons (1999)

9. The Organometallic Chemistry of Transition metals- Robert H. Crabtree- Wiley and Sons (2014).

10. Basic Organometallic Chemistry: Concepts, Synthesis and Applications- B. D. Gupta and A.J Elias, II Edition (2013).

11. Textbook of Inorganic Chemistry – R. Gopalan- Universities Press (2018).

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18MCH502 Semester: V

Major Title: **ORGANIC CHEMISTRY - I**

Credits: 5 Max.Marks: 75

Objective	A comprehensive knowledge and understanding on the Carbohydrates, Stereochemistry, Conformational Analysis, Carbonyl compounds and Heterocyclic chemistry.
Course Outcome: On successful completion of the course, students will be able to	
CO1	Aware of the fundamental aspects of carbohydrates.
CO2	Apply quantitative reasoning skills to stereochemistry and its influence on chemical properties.
CO3	Competent organic chemists with adequate knowledge in carbonyl compounds.
CO4	Summarize the mechanistic study in Polynuclear hydrocarbons and heterocyclic organo compounds.

UNIT: I

Carbohydrates:

1.1 Carbohydrates – Introduction - Classification – Aldoses and Ketoses, Reducing and Non-reducing Sugars - Reactions of Glucose and Fructose - Osazone formation, Mutarotation and its Mechanism - Structural elucidation of Glucose and Fructose - Pyranose and Furanose forms – Haworth's method.

1.2 Determination of Ring Size- Haworth Projection Formula - Configuration of Glucose and Fructose - Anomerism - Epimerization - Chain lengthening and chain shortening of Aldoses - Inter conversion of Aldoses and Ketoses – Uses of Glucose.

1.3 Disaccharides and Polysaccharides - Reactions and Structural elucidation of Sucrose and Maltose - Properties, Structure and Uses of Starch, Cellulose and Chitin.

UNIT: II

Stereo Chemistry:

2.1 Stereoisomerism – Definition - Classification into Optical and Geometrical isomerism. Conditions for Optical Activity – Asymmetric centre – Chirality – Achiral molecules - Elements of symmetry - Projection formulae - Fischer, Flying Wedge, Sawhorse and Newmann projection formulae - Notation of optical isomers - Cahn - Ingold - Prelog rules - R, S notation of Optical isomers with one Asymmetric carbon atoms – Erythro and Threo conventions.

2.2 Optical activities in Compounds not containing Asymmetric Carbon Atoms - Biphenyl, Allenes and Spiranes - Racemisation - Resolution - Asymmetric Synthesis (Partial and Absolute Synthesis) - Walden inversion.

2.3 Geometrical isomerism - Cis - Trans, Syn - Anti and E-Z Notations - Geometrical Isomerism In Maleic and Fumaric Acids and Unsymmetrical Ketoximes - Methods of Distinguishing Geometrical Isomers using Melting Points, Dipole Moment, Dehydration, Cyclisation, Heat of Hydrogenation and Combustion.

UNIT: III

Conformational Analysis:

3.1 Conformational analysis - Introduction of terms - Conformations, Configuration, Dihedral Angle, Torsional Strain - Differences between Conformational isomers and Configurational isomers.

3.2 Conformational analysis of Ethane, n-Butane and ethylene glycol including energy diagrams.

3.3 Conformations of Cyclohexane (Chair, Boat and Twist-Boat forms) - Axial and Equatorial bonds - Ring flipping showing Axial and Equatorial bonds Interconversions – Conformations of Methyl Cyclohexane, Dimethyl Cyclohexane and their stability - 1,2 and 1,3 - Interactions.

UNIT: IV

Active Methylene Compounds & α, β-unsaturated carbonyl compounds:

4.1 α, β-unsaturated carbonyl compounds – Structure and properties, preparation, Electrophilic and Nucleophilic additions, Michael addition, Diels Alder reaction.

4.2 Acetoacetic ester: keto-enol tautomerism, Preparation and synthetic utility of acetoacetic and cyanoacetic ester.

4.3 Malonic ester: Preparation and Synthetic applications.

UNIT: V

Carbocyles and Heterocycles:

5.1 Polynuclear hydrocarbons and their derivatives: synthetic methods include Haworth, Bardhan-Sengupta, Bogert-Cook and other useful syntheses (with mechanistic details); fixation of double bonds and Fries rule; Reactions of Naphthalene, Anthracene and Phenanthrene and their derivatives (with mechanism).

5.2 Heterocyclic compounds: 5- and 6-membered rings with one hetero atom; reactivity, orientation and important reactions (with mechanism) of Furan, Pyrrole, Thiophene and Pyridine; Synthesis of Pyrrole by Knorr synthesis, Paal-Knorr; Synthesis of Furan by Paal-Knorr synthesis, Feist-Benary; Synthesis of Thiophene by Paal-Knorr synthesis, Hinsberg; Synthesis of Pyridine by Hantzsch synthesis.

5.3 Benzo-fused 5-and 6-membered rings with one heteroatom: reactivity, orientation and important reactions (with mechanistic details) of Indole, Quinoline and Isoquinoline; Synthesis: Indole: Fischer, Quinoline: Skraup, Isoquinoline: Bischler Napieralski synthesis.

REFERENCE BOOKS:

1. Advanced Organic Chemistry by Arun Bahl and B.S. Bahl, S. Chand and Co. Ltd. (2012).
2. Textbook of Organic Chemistry by P.L. Soni and H.M. Chawla, Sultan Chand & Sons (2007).
3. Modern Organic Chemistry by M.K. Jain & S.C. Sharma, 4th Edition, Vishal Publishing & Co, (2013).
4. Organic Chemistry - I. L. Finar - Volume I and II - London:ELBS,2002.
5. Organic Chemistry by Morrison and Boyd, 7th Edition, Pearson, (2013).
6. Organic Chemistry by Stanley H Pine, 5th Edition (2008).
7. Advanced Organic Chemistry by Jagadamba Singh & L.D.S. Yadav, (2013).
8. Fundamentals of Organic Chemistry by John McMurry, 7th Edition (2011).
9. March's Advanced Organic Chemistry Reactions, Mechanism and Structure by Michael B Smith and Jerry March, 7th Edition, (2016).
10. Advanced Organic Reaction Mechanism by N. Tewari,(2015).
11. Organic Chemistry of Natural Products - Volume I and II - O. P. Agarwal - Goel Publishing House (2002).
12. Organic Chemistry by T. W. Graham Solomon, C. B. Fryhle – S. A. Dnyder – John Wiley & Sons (2014).
13. Organic Reaction Mechanisms by Ahluwalia V K. Narosa publishing house, New Delhi (2011)
14. A Text Book of Organic Chemistry by Tewari, K.S. and Vishnoi, N. K. 4th edition, Vikas Publishing 2017.

WEB RESOURCES

http://www.organic-chemistry.org/

http://www.chemguide.co.uk/orgmenu.html

http://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/intro1.htm

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18MCH503 Semester: V

Major Title: **PHYSICAL CHEMISTRY - I**

Credits: 5 Max.Marks: 75

Objective	To impart knowledge about the Solutions, Phase Rule, Colligative properties, Chemical Equilibrium, Electrochemistry and their Applications.
Course Outcome: At the end of the course, the students can able to	
CO1	Discuss about the various types of solutions and colligative properties.
CO2	Describe the heterogeneous and homogenous phase equilibrium
CO3	Explain the chemistry of electrolytic conductors, application of conductance, pH and buffer solutions

UNIT: I

Solutions:

1.1 Solutions of liquids in liquids - Raoult's law – Vapour pressure of ideal solutions – Activity of a component in an ideal solution – Chemical Potentials of ideal and non-ideal solutions - Gibbs -Duhem-Margules equation – Thermodynamics of Ideal Solutions, ΔG_{mix}, ΔV_{mix}, ΔH_{mix} and ΔS_{mix} for ideal solutions.

1.2 Vapour pressure of Non-ideal solutions – Fractional distillation of Binary liquid solutions – Partially miscible liquids - Phenol – Water, Triethylamine – Water, Aniline – Hexane and Nicotine – Water systems. Effect of impurity on CST and applications.

1.3 Solutions of Gases in liquids – Factors affecting solubility of Gas – Henry's law and its limitations.

Unit - II

Phase rule:

2.1 Definition of the terms involved in phase rule – Phase, Components and Degrees of freedom – Derivation of Gibbs phase rule.

2.2 Applications of phase rule - One component system - Water and Sulphur system – Reduced phase rule - Two components system - Simple eutectic system – Lead-silver system – Pattinsons process of Desilverization of lead – KI-water system.

2.3 Thermal analysis and cooling curves. Compound formation with congruent melting point – Zn-Mg, $FeCl_3$- Water system - Compound formation with incongruent melting point - Na-K

System. System involving salt and water; $CuSO_4$- H_2O and NaCl-H_2O system – Freezing mixtures – Deliquescence and Efflorescence.

Unit-III

Colligative properties and Chemical Equilibrium:

3.1 Colligative properties - Lowering of vapour pressure - Osmosis and osmotic pressure - Thermodynamic Derivation of Elevation of boiling point and Depression of freezing point – Determination of molar mass – Van't Hoff factor.

3.2 Chemical Equilibrium - Law of Chemical Equilibrium - Thermodynamic derivation of Law of Chemical Equilibrium. Relationship between K_p, K_c and K_x.

3.3 Van't Hoff Reaction Isotherm - Temperature Dependence of Equilibrium Constant – Van't Hoff Isochore – Pressure dependence of Equilibrium constant.

UNIT-IV

Electrochemistry – I:

4.1 Faradays laws of electrolysis – Metallic and Electrolytic conduction – Mechanism of electrolytic conduction **-** Specific conductance, Equivalent conductance and Molar Conductance - Measurement of equivalent conductance - Variation of Equivalent Conductance and Specific Conductance with Dilution – Ostwald's Dilution Law and Its Limitations.

4.2 Migration of ions - Ionic Mobility - Ionic Conductance - Transport Number and its determination – Hittorff's method and Moving Boundary method.

4.3 Debye-Huckel's theory of Strong Electrolytes - Onsagar equation (No derivation) - Verification and Limitations - Kohlrausch law and its Applications.

UNIT- V

Electrochemistry – II:

5.1 Applications of Conductance Measurements - Determination of Degree of Dissociation of Weak Electrolytes, Ionic Product of water - Solubility Product of sparingly soluble salt - Conductometric Titrations, precipitation titrations.

5.2 Concept of pH – common ion effect, Buffer solutions, Buffer action - Henderson equation - Applications of Buffer Solutions.

5.3 Hydrolysis of Salts - Expressions for Hydrolysis Constant, Degree of Hydrolysis and pH of aqueous salt solutions.

REFERENCE BOOKS

1. Principles of Physical Chemistry - B. R. Puri, Sharma and Madan S. Pathania, Vishnal Publishing Co., 2017.
2. Text Book of Physical Chemistry - P. L. Soni, O. P. Dharmarha and U. N Dash - Sultan Chand & Co., 2011.
3. Physical Chemistry - Negi and Anand – Eastern Wiley Pvt. Ltd. 2007.
4. Physical Chemistry - Kundu and Jain - S. Chand & Co., 1989.
5. Physical Chemistry - K. L. Kapoor - Macmillan - 5 vol., 2019.
6. Elements of Physical Chemistry - Glasstone and Lewis – Macmillan, .1963
7. Text book of Physical Chemistry - S. Glasstone - Macmillan (India) Ltd., 1948.
8. Fundamentals of Physical Chemistry - Maron and Landor - Collier–Macmillan, 1974.
9. Physical Chemistry - G. W. Castellan - Narosa publishing house, 2004.
10. Physical Chemistry - Walter J. Moore - Orient Longman, 1972.
11. Numerical Problems on Physical Chemistry, Amalendu Ghoshal - Books and Allied (P) Ltd., 2013.
12. Universal General Chemistry, C.N.R. Rao, Laxmi Publications, 2015.
13. Text book of Physical Chemistry – M. V. Sangaranarayanan, V. Mahadevan, Universities Press, 2011.
14. General and Physical Chemistry – Dr. A. Arunabhasan, Books of Allied (P) Ltd., - Ghoshal, 2009.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18ECH501 Semester: V

Elective Title: **SPECTROSCOPY**

Credits: 2 Max.Marks: 75

Objective	To impart knowledge about different spectroscopic techniques.
Course Outcome: At the end of the course, the students can able to	
CO1	Discuss the basic principles of UV/Visible, Microwave, IR and Raman spectroscopy.
CO2	Interpret the NMR and mass spectra of organic compounds by using the principles of NMR and Mass spectroscopy respectively.

UNIT-I

1.1. Electromagnetic radiation – Definition – regions – quantization of energies in molecules – translational, rotational, vibrational and electronic – Born Oppenheimer approximation – Atomic and molecular spectra.

1.2. Microwave Spectroscopy – theory – selection rule – Calculation of moment of inertia and bond length of diatomic molecules.

UNIT-II

2.1. UV-Visible Spectroscopy – Absorption laws, Calculations involving Beer Lambert's law – types of electronic transitions – chromophore and auxochromes – Absorption bands and Intensity – Bathochromic shift, Hypsochromic shift, Hyperchromic shift and Hypochromic shift.

2.2. UV-Visible Spectroscopy – Principle – Instrumentation – Working – Application of UV-Visible spectroscopy

UNIT-III

3.1. IR Spectroscopy – Principle – Selection rules. Types of vibrations, IR activity of diatomic, triatomic linear (CO_2) and nonlinear triatomic molecules (H_2O). IR Spectroscopy – Instrumentation – sampling techniques. Applications of IR Spectroscopy.

3.2. Raman Spectroscopy – Raman Effect – Rayleigh and Raman scattering – stokes and antistokes lines - mutual exclusion principle, comparison between Raman and IR spectroscopy.

UNIT-IV

4.1. NMR Spectroscopy – Principle, Instrumentation and Working. Chemical shift – Factors affecting chemical shift – Shielding and Deshielding – TMS as NMR standard – Number of signals – Spin-spin coupling and coupling constants.

4.2. Interpretation of NMR spectra of simple organic compounds such as Acetone, Ethyl Bromide, Anisole, Benzaldehyde and Toluene.

UNIT-V

5.1. Mass spectroscopy – Principles, Instrumentation and Working – Molecular ion peak, Base peak, Metastable peak and Isotopic peak their uses. Fragmentation – Nitrogen rule – Mac-Lafferty Rearrangement.

5.2. Interpretation of mass spectra of simple organic compounds such as Acetone, Ethyl Bromide, Anisole, Benzaldehyde and Toluene.

Reference Books:

1. Basic concept of Analytical Chemistry - S. M. Khopkar, 2008.
2. Chemical Analysis: An Instrumental Approach - A.K. Srivastava and P.C. Jain, 2015.
3. Spectroscopic Identification of Organic Compounds - R. M. Silverstein, G. C. Basseler & T. C. Morill, 2015.
4. Organic Spectroscopy - W. Kemp, 2019.
5. Spectroscopic Methods in Organic Chemistry - D Williams & I. Fleming, 2011.
6. Fundamentals of Molecular Spectroscopy - C. N. Banwell, 2017.
7. Applications of Absorption Spectroscopy of Organic Compounds - Dyer, 1978.
8. Introduction to Molecular Spectroscopy - Barrow, 1962.
9. Spectroscopy of Organic Compounds - P.S. Kalsi, 2016.
10. Instrumental Methods of Chemical Analysis - B.K. Sharma, 2014.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18ECH502 Semester: V

Elective Title: **FUEL CHEMISTRY**

Credits: 2 Max.Marks: 75

Objective	To impart knowledge about the Fuel Chemistry.
Course Outcome: At the end of the course, the students can be able to	
CO1	Discuss about the chemistry of solid, liquid and gaseous fuels.
CO2	Describe the various products of petroleum.

Unit-I

Review of energy sources:

Energy sources - renewable and non-renewable, Fuels - Introduction, Classification and their calorific values.

Unit-II

Coal:

Uses of coal (fuel and nonfuel) in various industries, its composition, carbonization of coal. Coal gas, producer gas and water gas - composition and uses. Fractionation of coal tar, uses of coal tar bases chemicals, requisites of a good metallurgical coke, Coal gasification (Hydro gasification and Catalytic gasification), Coal liquefaction and Solvent Refining.

Unit-III

Petroleum and Petrochemical Industry:

Composition of crude petroleum, Refining and different types of petroleum products and their applications. Fractional Distillation (Principle and process), Cracking (Thermal and catalytic cracking), Reforming Petroleum and non-petroleum fuels (LPG, CNG, LNG, bio-gas, fuels derived from biomass), fuel from waste, synthetic fuels (gaseous and liquids), clean fuels.

Unit-IV

Petrochemicals:

Vinyl acetate, Propylene oxide, Isoprene, Butadiene, Toluene and its derivatives Xylene.

Unit-V

Lubricants:

Classification of lubricants, lubricating oils (conducting and non-conducting) Solid and semisolid lubricants, synthetic lubricants. Properties of lubricants (viscosity index, cloud point, pore point) and their determination.

Reference Books:

1. Stocchi, E. Industrial Chemistry, Vol-I, Ellis Horwood Ltd. UK., 1990.

2. Jain, P.C. & Jain, M. Engineering Chemistry Dhanpat Rai & Sons, Delhi, 2000.

3. Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut, 1996.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18ECH503 Semester: V

Elective Title: **PHARMACEUTICAL CHEMISTRY**

Credits: 2 Max.Marks: 75

Objective	To effectively impart knowledge about various diseases and their treatment. To learn about the importance of Indian medicinal plants and to know about the different types of drugs.
Course Outcome: At the end of the course, the students can able to	
CO1	Define the basic terms used in Pharmaceutical Chemistry
CO2	Describe the potential use of medicinal plants in the treatment of diseases.
CO3	Know the use of chemical substances in medicine.

(Preparation, Synthesis and Structural determination are not required for the Compounds mentioned).

UNIT - I

1.1 Definition of the following terms: drug, pharmacophore, pharmacology, pharmacopoeia, bacteria, virus, chemotherapy and vaccine.

1.2 Causes, symptoms and drug for jaundice, cholera, malaria and filaria. First aid for accidents - antidotes for poisoning.

UNIT - II

2.1 Causes, detection and control of anaemia and diabeties. Diagnostic test for sugar, salt and cholesterol in serum and urine.

2.2 Indian medicinal plants and uses-Tulasi, Neem, Kizhanelli, Mango, Semparuthi, Adadodai and Thoothvelai.

UNIT - III

3.1 Antibacterials: Sulpha drugs-examples and actions-prontosil sulphathiazole, sulphafurazole Antibiotics-definition and action of penicillin, streptomycin, chloramphenicol - SAR of chloramphenicol only.

3.2 Antiseptics and disinfectants - definition and distinction-phenolic compounds, chloro compounds, and cationic surfactant.

UNIT – IV

4.1 Analgesics, Antipyretics and anti inflammatory agents : Definition and actions - narcotic and non narcotic- morphine and its derivatives, pethidine and methodone- salicylic derivative, paracetamol, ibuprofen - disadvantages and uses

4.2 Causes, and treatment of cancer - AIDS - AZT, DDC.

UNIT - V

5.1 Anaesthetics - definition-local and general - volatile nitrous oxide, ether, Chloroform, cyclo propane- trichloroethylene - uses and disadvantages.

5.2 Drugs affecting CNS - Definition, distinction and examples for tranquilizers, sedatives, hypnotics, psychedelic drugs - LSD Hashish- their effects.

Reference Books:

1. A Text Book of Pharmaceutical Chemistry - Jayashree Ghosh - S. Chand Company Ltd.
2. Pharmaceutical Chemistry - S. Lakshmi -Sultan Chand.
3. Pharmacology and Pharmatherapeutics - R.S. Satoskar –
   Popular Prakashan - Vol.I and Vol II.
4. Medicinal Chemistry - Asuthosh Kar - New Age International Publishers.
5. A Text Book of Synthetic drugs - O.D. Tyagi - Ammol Publications.
6. Introduction to Biological Chemistry - J. Awapara Prentice Hall.
7. A text book of Biochemistry - Ambika.S.
8. Biochemistry - A.L. Lehinger.
9. Essentials of Biological Chemistry - James Fanley - East West Press.

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18EIN502 Semester: V

Skill Based- Title: **INTERNSHIP TRAINING**

Credits: 2 Max.Marks: 75

Code	Course	L	T	P	Cr	Marks
U18EIN502	**Internship**	**0**	**0**	**0**	**2**	**100**

Objectives: Internships are educational and career development opportunities, providing practical experience in a field or discipline.

Course Outcome : At the end of the course, the student can able to

CO1	Apply knowledge of theoretical concepts, tools and resources on the project.
CO2	Analyze and solve complex problems in order to reach substantiated conclusions.

Instructions for Internships

1. **Internship –**
   - **a.** Internship with Industry/ Govt. / NGO/ PSU/ Any Micro/Small/Medium enterprise/ Online Internship
   - **b.** Inter/Intra Institutional Activities **–** Inter/ Intra Institutional Workshop/ Training/ Working for consultancy/ research project
2. **Suggested Periods –** During summer vacation after 4th semester.
3. **Duration –** 2 Weeks
4. **Proposed document to be submitted as evidence –** Internship Report and Certificate

Internship Report:

After completion of Internship, the student should prepare a comprehensive report to indicate what he has observed and learnt in the training period. The student may contact Industrial Supervisor/ Faculty Mentor for assigning special topics and problems and should prepare the final report on the assigned topics. Daily diary will also help to a great extent in writing the industrial report since much of the information has already been incorporated by the student into the daily diary. The training report should be signed by the Internship Supervisor and Faculty Mentor.

5. **Evaluation Method –** Viva-voce Examination by the Faculty mentor and Faculty from other department.

Internal: 25 marks (For attendance)

External: 75 Marks (Internship report)

The Internship report will be evaluated on the basis of following criteria:

i. Originality **(15)**.

ii. Adequacy and purposeful write-up **(15)**.

iii. Organization, format, drawings, sketches, style, language etc **(15)**.

iv. Variety and relevance of learning experience **(15)**.

v. Practical applications, relationships with basic theory and concepts taught in the course **(15)**.

Note: Internships may be full-time or part-time; it should be full-time in the summer vacation and part-time during the academic session.

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18SCH501 Semester: V

Skill Based- 3 Title: **DATA ANALYSIS AND SEPARATION TECHNIQUES**

Credits: 2 Max.Marks: 75

Objective	To learn about data analysis, purification techniques, separation of mixtures using chromatography and application of C language in chemistry.
Course Outcome: On successful completion of the course, students will be able to	
CO1	Summarize the theories of errors and illustrate error analysis.
CO2	Describe the purification of organic solids and liquids.
CO3	Explain types of chromatographic techniques and its applications.
CO4	Apply C programming language for the determination of normality, molarity, molality and pH.

UNIT-I

1.1 Data analysis – theory of errors – idea of significant figures and its importance with examples – differences between precision and accuracy – methods of expressing precision and accuracy.

1.2 Error analysis – methods to minimizing errors – problems related to mean, median, mode and standard deviation – confidence limit.

UNIT-II

2.1 Purification of organic solids –– crystallization –– fractional crystallization – sublimation – – Soxhlet extraction and its applications.

2.2. Purification of organic liquids – experimental techniques of distillation – fractional distillation – vacuum distillation – steam distillation – azeotropic distillation - use of miscible and immiscible solvents - tests for purity.

UNIT-III

3.1 Chromatography – Introduction – Classification of chromatographic method – Paper chromatography – Principle, theory – R_f, R_x, R_g values – Factors affecting R_f values, techniques and applications of paper chromatography. TLC – Principle, techniques and applications. Adsorption Column Chromatography – Principle, Experiment requirement, identification of compounds and applications.

3.2 Ion exchange chromatography-principle – Types of ion exchangers – Factors affecting ion exchangers – Principle, Instrumentation and techniques of ion exchange chromatography and applicaions of ion exchange chromatography in the separation of rare earth metals and the separation of Cl^- and Br^- ions.

UNIT-IV

4.1 HPLC and GC- Principle, instrumentation, types of detectors used and applications

4.2 GC-MS and LC-MS-Principle, instrumentation, types of detectors used and applications

UNIT-V

5.1 Introduction to computer and its application in chemistry – characteristics of a computer – types of computer – block diagram of a digital computer – the art of programming – general features of a programming language – algorithm and flow charts.

5.2 Introduction to C – structure of a C programme – character set of C data types – identifiers – reserved words – variables – constants – keywords – escape sequence – type conversion C operation (basic aspects only). Application of computer in chemistry – determination of molarity, normality and molality of solutions – calculation of pH.

Reference Books:

1. Elements of Analytical Chemistry - R. Gopalan, P.S. Subramanian, K. Rengarajan - S. Chand and sons (2004).

2. Fundamentals of Analytical Chemistry - D.A. Skoog and D.M. West - Holt Reinhard and Winston Publication - VIII Edition (2014).

3. Principles of Instrumental Methods of Analysis - D.A. Skoog and Saunders - College publications - V edition (1998).

4. Analytical Chemistry - S.M. Khopkar - New Age International. II Edition (1998)

5. Instrumental Methods of Chemical Analysis – Chatwal - Anand-Himalaya Publishing house - (2000).

6. Analytical Methods: Interpretation, Identification, Quantification by R. Gopalan and K.S. Viswanathan- Universities Press (2018)

7. Analytical Chemistry S.Usharani, Macmillan India Limited (2008)

8. Instrumental Methods of Chemical Analysis – Sham K Anand and Gurdeep R Chatwal-Himalaya Publishing House- V Edition (2014)

9. Gini Courter and Annette Marquis, Microsoft Office 2000, BPB Publications, New Delhi, (1999).

10. Julia Kelly, Using Microsoft Excel 2000, Prentice-Hall of India, New Delhi, (1999).

11. Robert de Lavie, A spreadsheet workbook for Quantitative Chemical Analysis, McGraw-Hill, Inc. New Delhi (1997).

12. K.V. Raman, Computers in Chemistry, Tata McGraw-Hill Ltd., New Delhi, (2013).

13. V.K. Srivastava and K.K. Srivastava, Introduction to Chromatography: Theory and Practice, S. Chand and company, New Delhi, 1991.

14. R.M. Roberts, J.C. Gilbert, L.B. Rodewald, and A.S. Wingrove, Modern Experimental Organic Chemistry, 4th edition, Holt Saunders International Edition.

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18MCH601 Semester: VI

Major Title: **INORGANIC CHEMISTRY – II**

Credits: 5 Max.Marks: 75

Objective	To generate keen interest and thinking in understanding the nuclear, bioinorganic, transition and industrial chemistry.
Course Outcome: On successful completion of the course, students will be able to	
CO1	Calculate nuclear binding energy and relate it to the stability of the nucleus.
CO2	Describe the applications of nuclear chemistry in various fields.
CO3	Learn the chemistry of semiconductors and biologically important elements
CO4	Explain the comparative aspects of 'd' and 'f' block elements and their extraction from ores.

UNIT-I

1.1 Nuclear Chemistry: Introduction - composition of nucleus – Gravitons, V-Particles, Quarks, Mesons and Pions- nuclear forces operating between the nucleons - N/P ratio, curves, stability belts - the whole number rule and packing fraction - isotopes, isobars, isotones and isomers- Nuclear Isomerism.

1.2 Nuclear binding energy - Mass defect - simple calculations involving mass defect and binding energy per nucleon - magic numbers - liquid drop model - shell model.

UNIT-II

2.1 Natural radioactivity - Detection and measurement of radioactivity - radioactive series including neptunium series - group displacement law - Rate of disintegration and half - life period - Average life period.

2.2 Artificial radioactivity - induced radioactivity - uses of radioisotopes - hazards of radiations - nuclear fission - nuclear energy - nuclear reactors – Breeder Reactors- Nuclear Reactors in India- nuclear fusion - thermo nuclear reactions - energy source of the sun and stars.

UNIT-III

3.1 Metallic bond – Band Theory - MO theory - semiconductors – intrinsic and extrinsic semiconductors – applications of semiconductor- superconductors.

3.2 Bioinorganic chemistry - Biological aspects of Fe, Zn, Mg, Co, Cu and Mo – Biological functions of Na, K, Ca, and P - toxicity of some heavy metals like Cd, Hg and Cr.

UNIT-IV

4.1 Comparative study of Ti, V, Cr, Mn and Fe group metals - ores, oxidation states, magnetic properties and colour – extraction of titanium and chromium.

4.2 Lanthanide series - occurrence, elements, oxidation states, magnetic properties, colour and spectra - lanthanide contraction - causes, consequences – Actinide series – occurrence, synthesis of some transuranium elements – oxidation states. Extraction of U and Th.

UNIT-V

5.1 Industrial chemistry - Fuel gases - calorific value - composition and sources - formation of water gas, semi water gas, carburetted water gas, producer gas, oil gas, natural gas, LPG and bio gas (manufacture not required)

5.2 Composition and setting of cement - manufacture of cement - examples for pigments - constituents of paints and their functions - type of glasses - manufacture of glass.

REFERENCE BOOKS:

1. Inorganic Chemistry - P.L. Soni - Sultan Chand (2013).

2. Inorganic Chemistry - B.R. Puri, L.R. Sharma and K.C. Kallia - Vallabh Publications (2017).

3. Selected Topics in Inorganic Chemistry - W.U. Malik, G.D. Tuli and R.D. Madan - S. Chand Publications (2009).

4. Inorganic Chemistry - J.E. Huheey, Harper and Collins - NY IV edition (2006).

5. Concise Inorganic Chemistry - J.D. Lee – Wiley Publishers- V edition (2008).

6. Industrial Chemistry - B.K Sharma – Krishan Prakashan Publications- XVII Edition (2014).

7. Inorganic Chemistry- Catherine Housecroft and Alan G. Sharpe- Pearson Publishers- IV Edition (2012).

8. Advanced Inorganic Chemistry - Cotton and Wilkinson - VI Edition - Wiley and Sons (1999)

9. The Organometallic Chemistry of Transition metals- Robert H. Crabtree- Wiley and Sons (2014).

10. Basic Organometallic Chemistry: Concepts, Synthesis and Applications- B. D. Gupta and A.J Elias, II Edition (2013).

11. Textbook of Inorganic Chemistry – R. Gopalan- Universities Press (2018).

12. Bioinorganic Chemistry- K. Hussain Reddy – New Age International (2007).

13. Essentials of Nuclear Chemistry- H.J. Arnikar- New Age International (2011).

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18MCH602 Semester: VI

Major Title: **ORGANIC CHEMISTRY – II**

Credits: 5 Max.Marks: 75

Objective	To kindle interest in students in learning Bio-organic chemistry through the introduction of topics such as Proteins, Nucleic acids, Terpenes, Alkaloids etc. To generate Keen Interest and Thinking in Understanding the Mechanisms of Molecular Rearrangements and Synthetic Applications of Benzene Diazonium Chloride, Grignard Reagents and Diazomethane.
Course Outcome: On successful completion of the course, students will be able to	
CO1	Outline the direct and indirect uses of photo chemistry and photochemical reactions.
CO2	Choose organometallic compounds to make C-C bond and to know about rearrangements.
CO3	Justify the chemistry of amino acids and peptides.
CO4	Synthesis and uses of alkaloids and terpenoids.

UNIT – I

Organic Photochemistry:

1.1 General principles – Singlet states, triplet states, Fate of excited molecules Jablonski diagram, inter–system crossing, internal conversion.

1.2 Photochemistry of carbonyl compounds - Norrish type I and Norrish type II reactions - Photo oxidation, photo reduction –Paterno Buchi, di - pi methane rearrangement.

1.3 Photochemistry of conjugated dienes, Decomposition of nitrites - Barton rearrangement.

UNIT-II

Organometallic Reagents and Rearrangements:

2.1 Organometallic reagents in organic synthesis- Grignard, organo lithium, organo copper, organo zinc and organo cadmium compounds.

2.2 Rearrangements-Classification– Wagner-Meerwein rearrangement, Pinacol-Pinacolone, Dienone-Phenol, Baeyer-Villiger, Hoffmann, Curtius, Lossen, Beckmann and Schmidt rearrangements.

2.3 Fries rearrangement, Claisen, Cope and Oxy-Cope rearrangements.

UNIT- III

Amino acids and Polypeptides:

3.1 Amino acids – Classification - Essential and Non- Essential amino acids – Acidic, Basic and Neutral Amino Acids – Alpha, Beta and Gamma - Amino acids - Preparation of alpha amino acids – Gabriel's Phthalimide synthesis, Strecker synthesis and Erlenmeyer Azlactone synthesis - Glycine, Alanine and Tryptophan.

3.2 General properties of Amino acids - Reactions of Amino acids due to Amino group and Carboxyl group – Zwitter ions - Isoelectric point.

3.3 Peptides - Synthesis - Bergmann Method - Structural Determination of Polypeptides - End Group Analysis – N-Terminal and C-Terminal Amino Acids Determination.

UNIT- IV

Proteins and Nucleic Acids:

4.1 Proteins – Definition – Classification based on Physical Properties, Chemical Properties and Physiological Functions – Primary and Secondary Structure of Proteins – Helical and Beta Sheet Structures (Elementary Treatment Only) – Denaturation of Proteins.

4.2 Nucleic acids – Nucleoproteins – Definition – Types of Nucleic Acids – RNA and DNA – Nucleoside, Nucleotide, Degradation of Nucleotide Chain – Components of RNA and DNA.

4.3 Differences between DNA and RNA – Structures of Ribose and 2- Deoxyribose – Double Helical Structure of DNA – Biological functions of Nucleic Acids – Elementary ideas on Replication and Protein Synthesis.

UNIT-V

Chemistry of Natural Products:

5.1 Carotinoids & Flavonoids: Synthesis and uses of α and β-carotein, Quercetin and Anthocyanidins.

5.2 Alkaloids – Classification – Isolation of alkaloids – General methods of Determination of structure of Alkaloids - Synthesis and Structural Elucidation of Piperine, Coniine and Nicotine.

5.3 Terpenoids – Definition - Classification - Isoprene rule - Synthesis and Structural elucidation of Citral, Menthol and Alpha- pinene.

REFERENCE BOOKS

1. Advanced Organic Chemistry by Arun Bahl and B.S. Bahl, S. Chand and Co. Ltd. (2012).
2. Textbook of Organic Chemistry by P.L. Soni and H.M. Chawla, Sultan Chand & Sons (2007).
3. Modern Organic Chemistry by M.K. Jain & S.C. Sharma, 4th Edition, Vishal Publishing & Co, (2013).
4. Organic Chemistry - I. L. Finar - Volume I and II - London:ELBS, (2002).
5. Organic Chemistry by Morrison and Boyd, 7th Edition, Pearson, (2013).
6. Organic Chemistry by Stanley H Pine, 5th Edition (2008).
7. Advanced Organic Chemistry by Jagadamba Singh & L.D.S. Yadav, (2013).
8. Fundamentals of Organic Chemistry by John McMurry, 7th Edition (2011).
9. March's Advanced Organic Chemistry Reactions, Mechanism and Structure by Michael B Smith and Jerry March, 7th Edition, (2016).
10. Advanced Organic Reaction Mechanism by N. Tewari,(2015).
11. Organic Chemistry of Natural Products - Volume I and II - O. P. Agarwal - Goel Publishing House (2002).
12. Organic Chemistry by T. W. Graham Solomon, C. B. Fryhle – S. A. Dnyder – John Wiley & Sons (2014).
13. Organic Reaction Mechanisms by Ahluwalia V K. Narosa publishing house, New Delhi (2011)
14. A Text Book of Organic Chemistry by Tewari, K.S. and Vishnoi, N. K. 4th edition, Vikas Publishing 2017.

WEB RESOURCES

http://www.organic-chemistry.org/

http://www.chemguide.co.uk/orgmenu.html

http://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/intro1.htm

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18MCH603 Semester: VI

Major Title: **PHYSICAL CHEMISTRY – II**

Credits: 5 Max.Marks: 75

Objective	To impart knowledge about Electrochemistry, Surface Chemistry, Photochemistry, Chemical Kinetics and Theories of reaction rates.
Course Outcome: At the end of the course, the students can able to	
CO1	Explain the construction of Electrochemical cell.
CO2	Describe the fundamentals of surface chemistry, photochemistry, chemical kinetics and theories of reaction rates.

UNIT- I

Electrochemistry – III:

1.1. Electrochemical cells – Representation of Electrochemical cell - Reversible and Irreversible Cells – EMF of a Cell and its Measurement - Standard Weston Cadmium Cell – Determinations of ΔH, ΔG and ΔS of a cell reaction.

1.2. Derivation of Nernst equation for Electrode Potential and Cell emf –Types of reversible electrodes - Standard Hydrogen Electrode and Calomel Electrode.

1.3. Single electrode potential, signs of electrode potential - Standard Electrode Potential - Electrochemical Series and its Applications.

UNIT- II

Electrochemistry – IV:

2.1. Concentration cells – Types of Concentration cells – EMF of concentration cells - Liquid Junction Potential – concentration cells with Transference and Without Transference.

2.2. Applications of Concentration cells - Valency of mercurous ion, Solubility Product - Activity Co-efficient of electrolytes - Determination of pH using Hydrogen, Quinhydrone and Glass electrodes.

2.3. Potentiometric titrations – Neutralization, redox and precipitation titrations – Lead storage battery.

UNIT- III

Chemical Kinetics:

3.1. Rate of the reaction, Rate law – Order and Molecularity – First order reaction - Derivations of rate constant and half-life period - Study of kinetics of acid catalyzed hydrolysis of ester.

Second order reaction – Derivation of rate constant and half-life period. Study of alkaline hydrolysis of ester zero order reactions.

3.2. Methods of Determination of order of a reaction. Effect of Temperature on reaction rate - Arrhenius equation – Evaluation of Arrhenius parameters. Bimolecular Collision Theory and its limitations– Lindmann's theory of Unimolecular Reactions.

3.3. ARRT - Thermodynamic treatment of ARRT – Eyring equation - Comparison of Collision Theory and ARRT.

UNIT- IV

Surface Chemistry:

4.1. Concept of Adsorption – Characteristics of adsorption – Physisorption and Chemisorption –Applications of Adsorption.

4.2. Adsorption of Gases by Solids – Adsorption Isotherms - Freundlich adsorption isotherm - Langmuir theory of adsorption – limitation – BET Isotherm (No Derivation).

4.3. Catalysis –Characteristics - Homogeneous catalysis – mechanism – Enzyme catalysis – Michaelis-Menton Equation – Heterogeneous catalysis – Adsorption theory.

UNIT- V

Photochemistry:

5.1. Introduction – Difference between thermal and photochemical reaction – Beer-Lamberts - Laws of photochemistry - Grothus-Draper law, Stark-Einstein's law – Primary and Secondary processes – Quantum yield.

5.2. Qualitative description of Fluorescence, Phosphorescence, Chemiluminescence and Photosensitized Reactions.

5.3. Some photochemical reactions – comparison of H_2-Cl_2 and H_2-Br_2 reactions with reference to quantum yield (Derivation of rate equations not required).

REFERENCE BOOKS

1. Principles of Physical Chemistry - B. R. Puri, Sharma and Madan S. Pathania, Vishnal Publishing Co., 2017.
2. Text Book of Physical Chemistry - P. L. Soni, O. P. Dharmarha and U. N Dash - Sultan Chand & Co., 2011.
3. Physical Chemistry - Negi and Anand – Eastern Wiley Pvt. Ltd. 2007.
4. Physical Chemistry - Kundu and Jain - S. Chand & Co., 1989.
5. Physical Chemistry - K. L. Kapoor - Macmillan - 5 vol., 2019.
6. Elements of Physical Chemistry - Glasstone and Lewis – Macmillan, .1963

7. Text book of Physical Chemistry - S. Glasstone - Macmillan (India) Ltd., 1948.
8. Fundamentals of Physical Chemistry - Maron and Landor - Collier–Macmillan, 1974.
9. Physical Chemistry - G. W. Castellan - Narosa publishing house, 2004.
10. Physical Chemistry - Walter J. Moore - Orient Longman, 1972.
11. Numerical Problems on Physical Chemistry, Amalendu Ghoshal - Books and Allied (P) Ltd., 2013.
12. Universal General Chemistry, C.N.R. Rao, Laxmi Publications, 2015.
13. Text book of Physical Chemistry – M. V. Sangaranarayanan, V. Mahadevan, Universities Press, 2011.

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18ECH601 Semester: VI

Elective Title: **POLYMER CHEMISTRY**

Credits: 2 Max.Marks: 75

Objective	To know about the polymers, polymerization techniques, properties and their applications.
Course Outcome: At the end of the course, the students can able to	
CO1	Classify commercial polymers based on their structure, application and polymerization methods
CO2	Discuss the polymerization techniques, reaction and molecular weights of polymers.
CO3	Describe the about rubbers, commercial and advance polymers.

UNIT-I

1.1. Polymers – Basic Concept, Classification of polymers on the basis of structures and applications. Distinction among plastics, elastomers, and fibers.

1.2. Glass transition temperature (*Tg*) - Definition, factors affecting *Tg*, Relationship between *Tg* and molecular weight.

UNIT-II

2.1. Molecular weight of polymers – Number average, Weight average – Determination – Sedimentation and viscosity - Average molecular weights, Molecular weights and degree of polymerization.

2.2. Polymer Reactions – Hydrolysis, Hydrogenation, Addition, Substitution, Cross linking and Cyclisation.

UNIT-III

3.1. Polymerization – Addition and Condensation – Techniques: Bulk, Solution, Suspension and Emulsion Polymerization.

3.2. Polymer Processing – Molding, Compression and Injection Molding – Calendaring.

UNIT-IV

4.1. Preparation, Properties and Uses of the following – Polyethylene, Polyvinyl chloride, Polytetrafluoroethylene (Teflon), Polystyrene.

4.2. Preparation, Properties and Uses of the following – Nylon, Polyethylene terephthlate, Polyurethane, and Polycarbonates.

UNIT-V

5.1. Rubber – Natural Rubber – Drawbacks of Natural Rubber – Vulcanization – Comparison of Raw and Vulcanized Rubber – Synthetic Rubber – Preparation, Properties and Uses of Styrene Butadiene Rubber (SBR).

5.2. Preparation, Properties and Uses of Conducting polymers – polyacetylene, polyaniline, polypyrrole, polythiophene – Biopolymers and its Applications.

Reference Books:

1. Text Book of Polymer Science, Bill Meyer F.W. Jr. John Wiley & Sons 1984.

2. Polymer Science, Gowarikar. V.R. Viswanathan, N.V. Jayader Sreedhar. Wiley Eastern Ltd., New Delhi, 2005

3. Polymer Chemistry, Sharma. B.K Goel Publishing House, Meerut- 1989.

4. Polymer Chemistry. Arora M.G. Vadar M.S. - Anmol publications (P) Ltd., New Delhi 1989.

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18ECH602 Semester: VI

Elective Title: **GREEN CHEMISTRY**

Credits: 2 Max.Marks: 75

Objective	To impart knowledge about the Green Chemistry.
Course Outcome: At the end of the course, the students can able to	
CO1	Discuss about the principles of green chemistry.
CO2	Describe the application of green chemistry in real cases.

Theory:

Introduction- Definitions of Green Chemistry. Brief introduction of twelve principles of Green Chemistry, with examples, special emphasis on atom economy, reducing toxicity, green solvents, Green Chemistry and catalysis and alternative sources of energy, Green energy and sustainability

The following Real world Cases in Green Chemistry should be discussed:

- Surfactants for carbon dioxide – Replacing smog producing and ozone depleting solvents with CO_2 for precision cleaning and dry cleaning of garments.
- Designing of environmentally safe marine antifoulant.
- Right fit pigment: Synthetic azo pigments to replace toxic organic and inorganic pigments.
- An efficient, green synthesis of a compostable and widely applicable plastic (poly lactic acid) made from corn.

Practical:

- Preparation and characterization of biodiesel from vegetable oil.
- Extraction of D-limonene from orange peel using liquid CO_2 prepared from dry ice.
- Mechano-chemical solvent free synthesis of azomethine.
- Solvent free, microwave assisted one pot synthesis of phthalocyanine complex of copper(II).

Reference Books:

1. Anastas, P.T. & Warner, J.K. *Green Chemistry- Theory and Practical*, Oxford University Press (1998).
2. Matlack, A.S. *Introduction to Green Chemistry*, Marcel Dekker (2001).
3. Cann, M.C. & Connely, M.E. *Real-World cases in Green Chemistry*, American Chemical Society, Washington (2000).
4. Ryan, M.A. & Tinnesand, M. *Introduction to Green Chemistry*, American Chemical Society, Washington (2002).
5. Sharma, R.K.; Sidhwani, I.T. & Chaudhari, M.K. *Green Chemistry Experiments: A monograph* I.K. International Publishing House Pvt Ltd. New Delhi, Bangalore.
6. Lancaster, M. *Green Chemistry: An introductory text* RSC publishing, 2nd Edition.
7. Sidhwani, I.T., Saini, G., Chowdhury, S., Garg, D., Malovika, Garg, N. Wealth from waste: A green method to produce biodiesel from waste cooking oil and generation of useful products from waste further generated *"A Social Awareness Project", Delhi University Journal of Undergraduate Research and Innovation*, **1(1)**: 2015.

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18ECH603 Semester: VI

Elective Title: **APPLIED CHEMISTRY**

Credits: 2 Max.Marks: 75

Objective	To impart Knowledge about Petrochemicals, Paper Technology, Sugar Industry, Explosives, Photography and Diary Chemistry.
Course Outcome: At the end of the course, the students can able to	
CO1	Explain the refining process of petroleum and differentiate between Thermal and Catalytic Cracking.
CO2	Describe the properties and process involved in paper technology.

Objective:

- To impart Knowledge about Petrochemicals, Paper Technology, Sugar Industry, Explosives, Photography and Diary Chemistry,

UNIT I

1.1 Petroleum - Origin – Composition of Petroleum - Inorganic, Engler and Modern theories – Classification – Refining (Simple Refinery) – Cracking – Thermal and Catalytic – Knocking – Octane Rating – Antiknock Compounds – Cetane Rating – Synthetic Petrol – LPG.

1.2 Gobar Gas – Production – Feasibility and Importance of Biogas with special reference to Rural India.

1.3 Petrochemicals – Elementary study – Definition - Chemicals from Natural Gas, Petroleum, Light naphtha and Kerosene – Origin – Composition - Synthetic Gasoline.

UNIT II

2.1 Paper technology – Introduction – Manufacture of pulp – Various raw materials used for the preparation of pulp - Preparation of Sulphite pulp, Soda pulp and Rag pulp.

2.2 Various processes - Beating, Refining, Filling, Sizing and Colouring.

2.3 Manufacture of Paper – Calendering – Uses.

UNIT III

3.1 Sugar industry - Sugar industries in India – Sugarcane and sugar beet - Manufacture of cane sugar – Extraction of juice – Concentration – Separation of crystals.

3.2 Recovery of Glucose from Molasses – Defection – Sulphitation – Carbonation – Testing and Estimation of Sugar – Double Sulphitation Process.

3.3 Preparation of Bagasse – Use of Bagasse for Manufacture of Paper and Electricity - 80 Preparation of Alcohol from Molasses - Preparation of Absolute Alcohol - Manufacture of Wine, Beer, Methylated Spirit and Power Alcohol.

UNIT IV

4.1 Explosives – Primary, Low and High Explosives – Single compound explosives - Binary explosives – Plastic explosives – Dynamites – Blasting explosives - Preparation and Uses of Lead Azide, Nitroglycerine, Nitrocellulose, TNT, Cordite, Picric Acid and Gun Powder – Introduction to Rocket Propellants.

4.2 Photography – Chemical Principle – Preparation of Sensitive Emulsion – Exposure – Developing – Fixing and Printing – Colour photography – Xerographic copying.

4.3 Coal – Classification by rank – Proximate and Ultimate analysis – Low and High Temperature Carbonisation – Otto-Hoffmann's by-product - Distillation of Coal Tar.

UNIT V

5.1 Milk – Definition – Physico-Chemical properties of milk - Constituents of milk and Their Physico-chemical Properties.

5.2 Chemical change taking place in Milk due to Processing Parameters - Boiling, Pasteurisation, Sterilisation and Homogenisation.

5.3 Definition and Composition of Creams, Butter, Ghee and Ice Creams - Milk Powder - Definition, Need for making powder - Principles involved in Drying process - Spray drying and Drum drying.

Reference Books

1. Fundamental Concepts of Applied Chemistry - Jayashree Ghosh - 1st Edition, S. Chand & Co. Ltd, New Delhi, 2006.

2. Milk and Milk Products - Clarence Henry Eckles, Willes Barnes Combs, Harold Macy - 4th Edition, Tata McGraw Hill Publishing Company Ltd, Reprint 2002.

3. Industrial Chemistry - B. K. Sharma - 13th Edition, Goel Publishing House, 2008.

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18SCH601 Semester: VI

Skill Based-4 Title: **AGRICULTURE AND LEATHER CHEMISTRY**

Credits: 2 Max.Marks: 75

Objective	To kindle interest in students in learning about soil, fertilizers, manures, fungicides, pesticides and rodenticides. To impart knowledge on leather processing and effluent treatment.
Course Outcome: On successful completion of the course, students will be able to	
CO1	Define the formation of soil and its properties.
CO2	Explain the need and importance of fertilizers and manures for improving soil fertility and productivity.
CO3	Discuss pesticides and its related problems in ecology.
CO4	Express the various steps involved in the manufacture of leather and tannery effluent.

UNIT-I

Soil Chemistry:

1.1. Introduction: Formation of Soil. Classification of soil - properties of soil – soil water, soil air, soil temperature, soil minerals, soil texture, soil oil, soil colloids.

1.2. Soil Acidity - Causes of acidity - soil alkalinity. Soil pH -Determination of soil pH - Buffering of soils - Amending the soil - Reclamation of acid soil - Liming agents.

UNIT-II

Soil Fertility and Productivity:

2.1. Essential elements for plant growth – macro and micro nutrients for plant growth. Manures – Characteristics of manures – importance of manures. Organic Manures – Several kinds of organic manures - Farmyard Manure - Compost - Oil cakes - Bone meal - Meat meal - Fish meal - Blood meal and green Manures.

2.2. Fertilizers - Classification of fertilizers - Requisites of a good fertilizers - Nitrogenous fertilizers - Phosphatic fertilizers - super Phosphate of lime - Triple super phosphate - NPK fertilizers - ill effects of fertilizers.

UNIT-III

Pesticides:

3.1. Introduction to Pesticides – definition - Classification of pesticides–Insecticides and its classification – Stomach poison – Contact poison and fumigants – Organic insecticides – DDT – Gammahexane – Malathion – Parathion.

3.2. Fungicides – Herbicides – Rodenticides – Pesticides in india – Adverse environmental effects of pesticides.

UNIT-IV

Leather Chemistry:

4.1. Introduction - Constituents of Animal Skin - Preparing skins and hides - Cleaning and soaking - Liming and degreasing.

4.2. Manufacture of Leather - Leather Tanning - Vegetable Tanning - Chrome Tanning and Mineral Tanning - Dyeing and Fat liquoring - Leather finishing - oil tanning - by products.

UNIT-V

Tannery effluents Treatment:

5.1. Tannery effluents - Pollution and its control - Water pollution and Air pollution – Composition of Tannery effluents.

5.2. Treatment – Screening – Primary and Secondary treatment – Filtration, Ultra filtration – RO – Evaporation - Waste management – Effluent waste management.

Reference Books:

1. Industrial Chemistry by B.K. Sharma. Goel Publishing House, Meerut, 2014.
2. Inorganic Chemistry - B.R. Puri, L.R. Sharma and K.C. Kallia - Vallabh Publications (2003).
3. Applied Chemistry by K.Bagavathi - Sundari, MJP Publishers (2006).
4. Fundamental concept of Applied Chemistry by Jayashree Ghosh, S. Chand Company Ltd., (2006)
5. Chemical treatment of hides a leather by J. Partridge Noyes, Park Ridge, N.J.
6. Agricultural Chemistry Vol I &Vol II edited by B.A. Yagodin - New Century books (P) Ltd.,
7. The nature and properties of soils - IX Edition - Nyle.C.Bready - S.Chand Company Ltd.,
8. Soils and soil fertility - Louis M.Thompson - and Frederick. R.Troch– TataMc. Graw hill.
9. Text book of Soil Science - T.D. Biswas and S.K. Mukerijee - II Edition.
10. Fundamental of Leather Science - Wood roffe Publications of CLRI - Chennai.
11. Nature and properties of soils - Harry, O. Buckman.
12. Applied chemistry by Dr. P. N. Sudha, Supra associates – Vellore.

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Syllabus for B.Sc. Chemistry effective from the year 2018-2019

Year:	**III Year**		Subject Code: **U18CEA601**	Semester:	**VI**
Part - V		Title:	**EXTENSION ACTIVITIES**		
Credits:	**1**			Max. Marks:	**100**

All extra-curricular activities like NSS, NCC, Sports, YRC, RRC, Blood Donation, etc., and other co-curricular activities like MOOC, Value-Added Courses, Usage of Library, etc., are considered as part of the Extension Activities under Part V of the Programme.

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18MCHP61 Semester: VI

Major Practical -3 Title: **GRAVIMETRIC ESTIMATION**

Credits: 3 Max.Marks: 75

Objective	To know about quantitative estimation of inorganic substances using gravimetric analysis.
Course Outcome: At the end of the course, the students can be able to	
CO1	Develop skills required for the quantitative estimation of inorganic substances using gravimetric analysis.
CO2	Understand the principles and steps involved in the gravimetric analysis.

1. Estimation of sulphate as barium sulphate.
2. Estimation of barium as barium sulphate.
3. Estimation of barium as barium chromate.
4. Estimation of lead as lead chromate.
5. Estimation of calcium as calcium oxalate monohydrate.
6. Estimation of Nickel as Nickel Dimethyl Glyoxime.

Reference Books for Practicals:

1. Analytical Methods: Interpretation, Identification and Quantification- R. Gopalan and K.S. Viswanathan- Universities Press (2018).
2. Advanced Experimental Inorganic Chemistry- V.K. Ahluwalia and Sunita Dhingra- Manakin Press (2015).
3. Skoog and West's Fundamentals of Analytical Chemistry – P. James Holler and Stanley R. Crouch – Cengage Publishers (2014)

SCHEME OF VALUATION FOR PRACTICAL EXAMINATIONS

Internal assessment: 25 Marks

INTERNAL ASSESSMENT	**Marks**
Two Tests	10
Attendance / Regularity	10
Results accuracy	05
Total	**25**

External assessment: 75 Marks Total: 100 marks

Record : 15 Marks

Procedure : 10 Marks

Error upto

2 %	: 50
2.1 – 3 %	: 40
3.1 – 4 %	: 30
4.1 – 5 %	: 20
>5 %	: 10

a. Among the duplicate results, the value more favorable to the candidate must be taken.

b. When no duplicate result is given deduct 5 marks.

c. If the two results differ by more than 2 % deduct 5 marks.

d. For each independent arithmetical error deduct 1 mark.

e. For incomplete or wrong calculation deduct 20 %.

f. For no calculation deduct 40 %.

4. g. If the experiment is not completed due to an accident, award 5 marks.

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18MCHP62 Semester: VI

Major Practical -4 Title: **ORGANIC QUALITATIVE ANALYSIS AND PREPARATIONS**

Credits: 3 Max.Marks: 75

Objective	To know about qualitative estimation of organic compounds containing one functional group and characterization with a derivative and to synthesize simple organic compounds.
Course Outcome: At the end of the course, the students can be able to	
CO1	Understand the reactivity of various functional groups of organic compounds.
CO2	Develop skills to synthesize organic compounds.

Analysis of organic compounds containing one functional group and characterization with a derivative.

Reactions of the following functional groups:

Aldyhyde, ketone, carboxylic acid (mono and di), ester, carbohydrate (reducing and non-reducing), phenol, aromatic primary amine, amide, nitro compound, diamide and anilide.

Organic Preparations:

Acylation:

1. Acetylation of salicylic acid or aniline.
2. Benzoylation of aniline or phenol.

Nitration:

3. Preparation of m-dinitrobenzene
4. Preparation of p- nitroacetanilide

Halogenation:

5. Preparation of p-bromoacetanilide
6. Preparation of 2,4,6-tribromophenol

Diazotisation /coupling:

7. Preparation of methyl orange

Oxidation:

8. Preparation of benzoic acid from toluene or benzaldehyde.

Hydrolysis:

9. Hydrolysis of ethyl benzoate (or) methyl salicylate (or) Benzamide.

Reference Book for Practicals:

1. Vogel's text book of chemical analysis

2. Practical Chemistry - A.O. Thomas - Scientific book center, Cannanore.

3. Practical Chemistry - 3 Volumes -S. Sundaram and others.

4. Vogel's text book of practical organic chemistry – Longman.

SCHEME OF VALUATION FOR PRACTICAL EXAMINATIONS

Internal assessment: 25 Marks

INTERNAL ASSESSMENT	**Marks**
Two Tests	10
Attendance / Regularity	10
Results accuracy	05
Total	**25**

External assessment: 75 marks Total: 100 marks

Record : 15 Marks
Preparation : 15 (quantity: 10 & quality: 5)
Analysis : 45
Preliminary reaction : 4
Aliphatic/ Aromatic : 4
Saturated/ Unsaturated : 4
Tests for elements : 9
Functional groups : 10
Confirmatory tests : 10
Derivative/Coloured reaction : 4

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Syllabus for B.Sc., Chemistry effective from the year 2018-2019

Year: III Year Subject Code: U18MCHP63 Semester: VI

Major Practical -5 Title: **PHYSICAL CHEMISTRY EXPERIMENTS**

Credits: 3 Max.Marks: 75

Objective	To know about chemical kinetics, chemical equilibrium, electrochemistry and heterogeneous equilibria.
Course Outcome: At the end of the course, the students can be able to	
CO1	Understand physical aspects of chemical compounds.
CO2	Determine the rate constant, molecular weight, CST, transition temperature and conductivity.

1. Kinetics

Determination of the order of the following reactions.

a). Acid catalysed hydrolysis of an ester (methyl or ethyl acetate)

b). Iodination of acetone.

2. a) Molecular weight of a solute - Rast's method using naphthalene, or diphenyl as solvents.

b) Determination of Kf of solvent

3. Heterogeneous equilibria:

a) *Phenol-water system – CST

b) Effect of impurity – 2% NaCl or succinic acid solutions on phenol water system - determination of the concentration of the given solution

4. Determination of the transition temperature of the given salt hydrate.

$Na_2S_2O_3$. $5H_2O$, CH_3COONa. $3H_2O$, $SrCl_2$. $6H_2O$, and $MnCl_2$. $4H_2O$

5. Electrochemistry

Conductivity

a) Determination of cell constant and equivalent conductivities of solutions of two different concentrations.

b) Conductometric titration of a strong acid against a strong base.

c) Conductometric titration of a strong acid against a weak base.

6. Potentiometric titration of a strong acid against a strong base.

7. Colorimetry - determination of unknown concentration using Photoelectric colorimeter.

8. Determination of pKa of acetic acid using pH Meter.

*need not be given in examination.

Students must write short procedure / formula with explanation in ten minutes for evaluation during the university practical examination.

SCHEME OF VALUATION FOR PRACTICAL EXAMINATIONS

Internal assessment: 25 Marks

INTERNAL ASSESSMENT	**Marks**
Two Tests	10
Attendance / Regularity	10
Results accuracy	05
Total	**25**

External assessment: 75 Marks Total: 100 Marks

Record : 15 Marks

Experiment : 45 Marks

Manipulation, Tabulation and Calculation: 15 Marks

1) Kinetics

Graph : 10 Marks

Below a factor of 10 : 35

By a factor of 10 : 25

More than a factor of 10 : 15

2) Molecular weight

Error upto 10 % : 45

20 % : 35

30 % : 25

> 30 % : 15

3) Effect of electrolyte on CST

Graph : 10

Error upto 10 % : 35

20 % : 25

30 % : 15

> 30 : 10

4) Transition temperature

Graph : 10

Error upto 2˚C difference : 35

7˚C difference : 25

> 7˚C difference : 15

5) Conductance

Cell constant	: 20 marks
Error Upto 10 %	: 20
Upto 15 %	: 15
>15 %	: 10

Equivalent conductance	: 25 marks
Error Upto 10 %	: 25
Upto 15 %	: 15
>15 %	: 10

6) Conductometric titration

Graph	: 10
Upto 2 %	: 35
2.1 to 3 %	: 30
3.1 to 4 %	: 25
4.1 to 5 %	: 20
> 5%	: 15