B.Sc Chemistry COURSE STRUCTURE UNDER CBCS PATTERN

(For the Candidates admitted from 2015 – 2016 Academic year onwards)

SEM	Part	Course Title	Course Code	Hrs/ Week	Credit	Marks		Total
						CIA	EA	
I	I	LC-I- செய்யுள் (இக்கால இலக்கியம்), சிறுகதை, பயன்முறைத் தமிழ், தமிழ் இலக்கிய வரலாறு.	15T101a	6	3	25	75	100
	II	ELC-I- English for Communicative Competence	15H101	6	3	25	75	100
	III	CC I--General Chemistry – I	15Y101	4	4	25	75	100
		CC-II*-Practical-I- Volumetric analysis	15Y102L	3	-	-	-	-
		AC-I-Allied Mathematics-I	15Y103A	5	4	25	75	100
		AC-II-Allied Mathematics–II	15Y104A	4	4	25	75	100
	IV	VE-Value Education	15VEDa	2	1	-	100	100
II	I	LC-II- செய்யுள் (பக்தி,இடைக்கால இலக்கியம்)தமிழ்ச் செம்மொழி வரலாறு, மொழிபெயர்ப்பியல், தமிழ் இலக்கிய வரலாறு	15T202a	6	3	25	75	100
	II	ELC-II- English for Proficiency	15H202	6	3	25	75	100
	III	CC-II*- Practical-I- Volumetric analysis	15Y102L	3	4	25	75	100
		CC-III- General Chemistry – II	15Y205	6	4	25	75	100
		AC-III- Allied Mathematics–III	15Y206A	5	4	25	75	100
	IV	EVS-Environmental Science	15EVS	2	1	-	100	100
		SKBC-I- Chemistry of Consumer Products	15XY21	2	2	-	100	100
III	I	LC-III- செய்யுள் (காப்பியங்கள்),புதினம்,தமிழ் இலக்கிய வரலாறு	15T303	6	3	25	75	100
	II	ELC-III- English for Employability	15H303	6	3	25	75	100
	III	CC-IV-General Chemistry – III	15Y307	5	4	25	75	100
		CC-V*-Practical-II- Micro qualitative	15Y308L	3	-	-	-	-

		analysis						
		AC-IV-Allied Physics-I	15Y309A	5	4	25	75	100
		AC-V*-Allied Physics Practical	15Y310L	3	-	-	-	-
	IV	SKBC-II- Industrial Chemistry	15XY32	2	2	-	100	100
	V	GS-Gender Studies (Self study)	15GS	-	1	-	100	100
IV	I	LC-IV- செய்யுள் (பழந்தமிழ் இலக்கியம்), நாடகம், தமிழ் இலக்கிய வரலாறு, கட்டுரை வரைவியல்	15T404	6	3	25	75	100
	II	ELC-IV- English through Literary Texts	15H404	6	3	25	75	100
	III	CC-V*-Practical-II-Micro qualitative analysis	15Y308L	3	4	25	75	100
		CC-VI-General Chemistry – IV	15Y411	6	4	25	75	100
		AC-V*-Allied Physics Practical	15Y310L	3	4	25	75	100
		AC-VI-Allied Physics-II	15Y412A	6	4	25	75	100
	IV	SSC-Soft Skills Course	15SSC	-	2	-	100	100
V	III	CC-VII-Inorganic Chemistry I	15Y513	5	5	25	75	100
		CC-VIII-Organic Chemistry- I	15Y514	5	5	25	75	100
		CC-IX-Physical Chemistry – I	15Y515	5	5	25	75	100
		CC-X*-Gravimetric and Organic analysis	15Y516L	3	-	-	-	-
		CC-XI*-Physical Chemistry Experiments and organic preparations	15Y517L	3	-	-	-	-
		EC - 1 – Analytical Chemistry	15Y518	5	5	25	75	100
		NMEC– Agricultural Science	15Y5N	4	4	-	100	100
VI	III	CC-X*-Practical-III-Gravimetric and organic analysis	15Y516L	3	5	25	75	100
		CC-XI*-Practical-IV-Physical Chemistry Experiments and organic preparation	15Y517L	3	5	25	75	100
		CC-XII-Inorganic Chemistry – II	15Y619	6	5	25	75	100
		CC-XIII-Organic Chemistry – II	15Y620	6	5	25	75	100
		CC-XIV-Physical Chemistry – II	15Y621	6	5	25	75	100
		EC II- Polymer Chemistry	15Y622	6	5	25	75	100
	IV	Comprehensive Course	15YC	-	4		100	100
	V	EXTENTION ACTIVITIES	15EA		1			
		Grand total		**180**	**140**	**750**	**3050**	**3800**

CODE:15T101a	LC-I-செய்யுள் (இக்கால இலக்கியம்), சிறுகதை,பயன்முறைத் தமிழ், தமிழ் இலக்கிய வரலாறு	SEM:I

அலகு – 1

மரபுக்கவிதைகள் பாரதியார் பாடல்கள் - பக்திப் பாடல்கள், தமிழ்த்தாய், கண்ணம்மா என் காதலி, **பாரதிதாசன் பாடல்கள் -** தமிழின் இனிமை, நீங்களே சொல்லுங்கள்?, சிறுத்தையே வெளியே வா, **பொன்னடியான்** - அறத்தால்..., மாணவனே!, **சாமி.பழனியப்பன்** - சமுதாயமும் நூலகங்களும் **தமிழேந்தி -** சுற்றுச் சூழல் கெடுவதுவோ?, சாதனை வேண்டும்.

அலகு – 2

புதுக்கவிதைகள் அப்துல் ரகுமான் - மறுபக்கம், **இன்குலாப்** - கொள்ளைக்காரர்கள் எப்படி இருக்கிறார்கள்?, **தணிகைச்செல்வன்** - தாய், **மு.மேத்தா -** தேசப்பிதாவிற்கு ஒரு தெருப்பாடகனின் அஞ்சலி, **தமிழன்பன்** - நல்லாள் நகும், **வாலி** - பாரதிதாசன், - **வைரமுத்து** - திருத்தி எழுதிய தீர்ப்புகள், **தாமரை** - தொலைந்து போனேன், **யுகபாரதி -** சொல்வதெனில், **நா.முத்துக்குமார் -** அக்காவின் கடிதம், **நாட்டுப் புறப் பாடல்கள்** - பக்திப் பாடல்கள், தாலாட்டுப் பாடல்கள், காதல் பாடல்கள், தொழிற் பாடல்கள் - ஒப்பாரிப் பாடல்கள், தெம்மாங்குப் பாடல்கள்.

அலகு – 3 சிறுகதை

சிறுகதை மலர் - பிரமி பதிப்பகம், திருச்சி-21. (2017-2018 கல்வியாண்டுக்கு).

அலகு – 4 பயன்முறைத் தமிழ்

எழுத்தியல் - எழுத்துப் பிழைகளும், திருத்தங்களும் - இன எழுத்துக்கள் வேறுபாடுகள் - தமிழில் பிறமொழிச் சொற்கள் - வலிமிகுதல், வலி மிகாமை.

பாடநூல் - பயன்பாட்டுத் தமிழ் (இலக்கணக் கையேடு), தமிழ் நாதன் பதிப்பகம், சென்னை – 110.

அலகு – 5 தமிழ் இலக்கிய வரலாறு

தற்காலம் - மரபுக் கவிதை-புதுக்கவிதை – தோற்றமும் வளர்ச்சியும், ஹைகூ கவிதை, நாட்டுப்புறப் பாடல்கள், மறுமலர்ச்சி காலக் கவிஞர்கள் - சிறுகதை – தோற்றமும் வளர்ச்சியும், தமிழ்உரைநடை வளர்ச்சி.

CODE:15H101	ELC-I- English For Communicative Competence	SEM:I

Objectives

To expose students to effective communication in the form of prose, biographies and short stories

To familiarize students with various forms and functions of the English language

UNIT I

1.**The Gift of Language** – *J.G.Bruton*

2.**My Visions for India** – *A.P.J.Abdul Kalam*

3.**Unlock Your Own Creativity** – *Roger Von Oech*

UNIT II

1.**Mahathma Gandhi** – *Francis G.Hutchins*

2.**Mother Teresa** – *John Frazer*

3.**Indira Nooyi** – *An Article*

UNIT III

1.**Science and Religion** – *S.Radhakrishnan*

2.**Technology with a Human Face** – *E.F.Schumacher*

3.**And Now E-teachers** – *Robin Abreu*

UNIT IV

1.**Vanishing Animals** – *Gerald Durrell*

2.**Climate Change and Human Strategy** – *E.K.Federov*

3.**The Old Folks at Home** – *Alphonse Daude*

UNIT V

1.**The Tempest (Retold by Charles Lamb**) – *William Shakespeare*

2.**The Cop and the Anthem** – *O.Henry*

3.**Marriage is a Private Affair** – *Chinua Achebe*

CODE:15Y101	CC-I- GENERALCHEMISTRY-I	SEM: I

Objectives

1. *To know the arrangement of elements in the periodic table and the periodic properties.*
2. *To understand the different kinds of chemical forces in molecules.*
3. *To know the method of naming organic compounds*
4. *.To learn various methods of preparation of hydrocarbons*

UNIT 1: Atomic Structure, the Elements, and the Periodic Table

1.1 Electronic configuration: Bohr theory, duel nature of electrons, Heisenberg uncertainty principle, the Schrodinger equation, significance of wave functions, normalization of wave function, radial and angular wave functions, Pauli's exclusion principle, Hund's rule, sequence of energy levels (aufbau principle).

1.2 Periodicity: Periodic law and arrangement of elements in the periodic table: IUPAC nomenclature and group number, horizontal, vertical, and diagonal relationships in the periodic table.

1.3 General properties of atoms: size of atoms and ions-atomic radii, ionic radii, covalent radii; trend in ionic radii, ionization potential, electron affinity; electronegativity-(Pauling scale) definitions; oxidation states and variable valency. Isoelectronic relationship: inert-pair effect; standard reduction potentials, electrochemical series.

UNIT 2: Chemical bonding

2.1 Properties of ionic compounds, factors favoring the formation of ionic compounds- ionization potential, electron affinity, and electronegativity.

2.2 Lattice energy: definition, Born-Lande equation (derivation not required), factors affecting lattice energy, Born-Haber cycle-enthalpy of formation of ionic compound and stability.

2.3 Covalent character in ionic compounds-polarization and Fajan's rules; effects of polarization-solubility, melting points, and thermal stability of typical ionic compounds.

Unit 3: Nomenclature, Classification and Basic Properties

3.1 IUPAC nomenclature, Classification of organic compounds, Hybridization(Methane, Ethane, Ethylene and acetylene)

3.2 Cleavage of bonds: homolytic and heterolytic cleavages. Stability of reaction intermediates, carbocation, carbanion and free radicals.

3.3 Aromaticity and resonance structures, Huckel's rule.

3.4 Inductive, inductomeric, electromeric, mesomeric, resonance, hyperconjugation and steric effects.

Unit 4: Alkanes and Cycloalkanes

4.1 Preparation of alkanes: Wurtz reaction, reduction or hydrogenation of alkenes, Corey- House method, petroleum refining

4.2 Reactions: Mechanism of halogenation, free radical substitution, sulphonation, nitration, oxidation, cracking and aromatisation.

4.3 Cycloalkanes: Preparation using Wurtz reaction, Dieckmann's ring closure and reduction of aromatic hydrocarbons. Mechanism of substitution and ring-opening reactions.

4.4 Baeyer's strain theory and theory of strainless rings.

UNIT – 5 Gaseous State

5.1 The perfect gas equation of state – Boyle's law, Charle's law and Avogadro's principle.

5.2 Real gas equation –critical temperature – compression factor - Virial equations of state –Vanderwaals equation of state- Boyle temperature - joule –Thomson effect- Linde refrigerator.

5.3 Molecular velocities-Root mean square, average and most probable velocities-Max well-Boltzmann distribution of molecular velocities (No derivation).

Text Books

1. *J.D.Lee,Concise Inorganic Chemistry, 5th ed., Blackwell Science , London 1996.*
2. *D.F.Shriver and P.W.Atkins, Inorganic Chemistry, 3rd ed., W.H.Freeman and Co, London 1999.*
3. *B.R.Puri, L.R.Sharma, K.C.Kalia, Principles of Inorganic Chemistry, ShobanLal Nagin Chand and Co.,Delhi, 1996.*

References:

- *Puri B.R, Sharma L.R, Kalia K.K, Principles of Inorganic chemistry (23 edition) New Delhi, shoban lal Nagin chand&co (1993).*
- *B.S.Baul, Arun Bahl, A text book of organic chemistry (10th edition) s.chand and company ltd, New Delhi (2001).*
- *B.S.Bahl, C.D Tuli, Arun bahl, Essential of physical chemistry,(16th edition) S.Chand&campany ltd, new Delhi (2001).*
- *Gopalan.R, Subramanian P.S Rengarajan.K-Elements of analytical chemistry (3rd edition) sultan chand&sons New Delhi (2004).*

Code:15P103A	AC-I – ALLIED MATHEMATICS - I	SEM:I

Objectives

On Successful completion of this paper the students will gain the knowledge about the concepts of Binomial, Exponential, Logarithmic Series, Matrices & Trigonometry.

Unit 1-Summation of Series

Binomial, Exponential, Logarithmic series Summation of series Approximations in Binomial Series (problems only).

Unit 2-Matrices

Types of matrices Characteristics equation - Eigen value Eigen vectors Cayley Hamilton's theorem (without proof), Problems.

Unit 3-Trigonometry

Expansions for cosnθ and sinnθ Expansions of sinθ and cosθ in ascending power of θ - Expansion of tanθ - Expansions of $\cos^n\theta$ and $\sin^n\theta$

Unit 4-Curvature and Radius of Curvature

Curvature and radius of curvature - Cartesian formula for radius of curvature Radius of curvature in polar co-ordinates.

Unit 5-Successive Differentiation and Partial Differentiation

Successive differentiation Standard form of n^{th} derivatives Leibnitz theorem with their Applications. Partial Differentiation: Maxima and Minima of fnctions of several variables.

Text Book

*A. Abdul Rasheed, Allied Mathematics, Mc Graw Hill Education, 2006 Unit-1 Ch 1 (ξ**1.2.1**-1.**4.1**),Unit-2 Ch 3 (ξ**2.1**,**3.3**,**3.4**),Unit-3 Ch 5 (ξ**5.1-5.3**),Unit-4 Ch 6 (ξ6.1-6.3),Unit-5 Ch 6 (ξ6.4, 6.5.1,6.5.2)*

References

- ✓ ***T.K. Manicavachagom Pillay, T. Natarajan, S. Ganapathy,*** *Algebra, S.V. Publication,1999.*
- ✓ ***T. K. Manicavachagom Pillay****, Trigonometry, S.V. Publication, 1999.*
- ✓ ***P.R.Vittal****, Allied Mathematics, Margham Publications, Third Revised Edition , 2002.*

Code:15P104A	AC-II – ALLIED MATHEMATICS - II	SEM:I

Objectives

On successful completion of the paper the students will gain knowledge about the concepts of differentiation, Integration and Fourier series.

Unit 1-Finite Differences

Finite differences- Newton's forward & backward Difference formula for Interpolation and Lagrange's interpolation.(Problems only)

Unit 2-Reduction Formula

Reduction Formula for $\sin^n x$, $\cos^n x$ and $\sin^m x \cos^n x$-Properties of definite integrals.

Unit 3-Multiple Integrals

Double Integrals- Triple Integrals- Change of Order of Integration, Simple problems only.

Unit 4-Fourier Series

Definition of Fourier Series - Fourier coefficients - Odd and Even functions in evaluating Fourier coefficients - Half Range Fourier Sine and Cosine series - Simple problems only.

Unit 5-Statistical Distributions

Discrete & Continuous distribution: Binomial, Poisson & Normal Distributions, Mean, Variance, Re-currence Relation, Additive Property, Moment Generating function of these distributions, Properties of Normal distribution- (problems based on Normal distribution only)

Text Book(s)

*1.**A. Abdul Rasheed**, Allied Mathematics, Mc Graw Hill Education,2006 Unit-1 Ch 4,Unit-2 Ch 7(ξ 7.5,7.6),Unit-3 Ch 8 (ξ 8.1-8.3),Unit-4 Ch 9*
*2.**S.C. Gupta,** Fundamentals of Statistics, Himalayan Publishing House , Sixth revised edition, 2004. Unit-5 Ch 14*

References

- ✓ ***P.R.Vittal ,** Allied Mathematics, Margham Publications,Third Revised Edition, 2002.*
- ✓ ***B.S. Grewal,** Higher Engineering Mathematics, Khanna Publishers,36th Edition, 2002.*
- ✓ ***S. S. Sastry**, Introductory Methods of Numerical Analysis, PHI, 1995.*

அலகு 1

வாழ்வியல் கல்வி – திறன் மேம்பாடும் உயர் பண்புகளும்

கல்வி, வாழ்வியல் கல்வியின் நோக்கம் - வாழ்வியல் கல்வியின் பரிணாம வளர்ச்சி - வாழ்வியல் கல்வியின் கூறுகள் - **சுய முன்னேற்றம்** - திறன் மேம்பாடு - **உயர்பண்புகள்** - தன்மதிப்பீடும் சுயபரிசோதனையும் - பாலினச் சமத்துவத்தை உளமாரப் பின்பற்றுதல் - மாற்றுத் திறனாளிகள், மனவளம் குன்றியோர், வயதில் பெரியவர்கள், அனுபவசாலிகள், சான்றோர்கள், குடும்ப உறுப்பினர்கள், அருகில் வசிப்பவர்கள், சுற்றத்தார், உடன் பணியாற்றுவோர் இவர்களுக்கு மதிப்பளித்தல் - **நற்பண்புகளும் நடத்தை உருவாக்கமும்** - உண்மை - ஆக்கத்திறன் - தியாகம் - நேர்மை - கட்டுப்பாடு - உதவி செய்யும் மனப்பான்மை- - சகிப்புத்தன்மை - **அறிவியல் கண்ணோட்டம்**

அலகு 2

தேசிய, உலக முன்னேற்றத்திற்கான வாழ்வியல் கல்வி

தேசம், சர்வ தேசங்கள் குறித்த எண்ணங்கள் - நமது நாடு - அரசமைப்பு - மக்காளாட்சித் தத்துவம் - சமதர்மம் - மதச்சார்பின்மை - சமத்துவம் - சமூக நீதி, தனியுரிமை - சுதந்திரமும் சகோதரத்துவமும் **சமூகப் பண்புகள்** - இரக்கம் மற்றும் நேர்மை, சுயகட்டுப்பாடு,

Code:15VED	**VE -Value Education (வாழ்வியல் கல்வியும் மனித உரிமைகளும்)**	**Sem:I**

உலகளாவிய சகோதரத்துவம் - **தொழில் சார் பண்புகள்** - அறிவு வேட்கை - தொழிலில் நேர்மை - முறைமை - காலந்தவறாமையும் நம்பிக்கையும் - **மதம் சார்ந்த பண்புகள்** - சகிப்புத்தன்மை, மெய்யறிவு, நன்னடத்தை - **அழகியல் பண்புகள்** - இலக்கியம், நுண்கலைகள் ஆகியவற்றைப் பயில்தல், சுவைத்தல், மனதாரப் பாராட்டுதல் மதித்தல், பாதுகாத்தல், தேசிய ஒருமைப்பாடும் சர்வதேசப் புரிதலும்.

அலகு 3

அறப்பண்புகள் மற்றும் வாழ்வியலில் உலகளாவிய பெருவளர்ச்சிகள் ஏற்படுத்தும் தாக்கங்கள்

பன்பண்பாட்டு முரண்பாடுகளின் தாக்கங்கள் - எல்லை தாண்டிய கல்வி - தொழில் சார்ந்த அறை கூவல்களும் சமரச இணக்கமும் - பொருளியல் சிந்தனைகள் - மக்கள் தொடர்புச் சாதனங்கள் - இளமை உணர்ச்சி வேக நடத்தையின் நவீன அறைகூவல்கள் - இல்லறமும் நல்லுணர்வும் - ஒப்பீடும் போட்டி இடுதலும் - நேர்மறை, எதிர்மறை எண்ணங்கள் - அகந்தை - சினம் - சுயநலம் - அறைகூவல்கள்

அலகு 4

உடல், உள்ள நலமும் நோய் தீர்க்கும் செயல்பாடுகளும்

உணவுப் பழக்கமும் உணவு முறைகளும் - பொருந்தும் உணவுகள் - பொருந்தா உணவுகள் - மனக் கட்டுப்பாடு - மனத்திண்மை - எளிய உடற்பயிற்சி - தியானம் - மனம், ஆன்மா சார்ந்த விளைவுகள் - யோகா - நோக்கங்கள் - வகைகள் - முறைகள் - ஆசனங்கள் - ஆசைகளை ஒழுங்குபடுத்துதல் - கவலை நீக்குதல் - சினம் தணிதல் - நெடுநீர், மறதி, சோம்பல் தவிர்த்தல் - தூக்கம் முறைப்படுத்துதல் - துக்கம், இழப்புகளை எதிர்கொள்ளல் - புகை, மது முதலானவைகளின் தீங்கு உணர்தல்- வாழ்த்துகளின் பயன்கள்

குறிப்பு : இந்த அலகு உடற்பயிற்சி – தியானம் - யோகா செய்முறைப் பயற்சிகளுடன் கூடியது.

அலகு 5 மனித உரிமை, மனித உரிமை கருத்துக்கள்

தேசிய மற்றும் பன்னாட்டுக் கண்ணோட்டங்கள் - மனித உரிமையின் பரிணாமம் - மனித உரிமையின் பரந்த வகைப்பாடுகள் வாழ்தற்கான உரிமை, சுதந்திரம், கண்ணியத்துடன் வாழ்வதற்கான உரிமைகள் - கலாச்சாரம் மற்றும் கல்விக்கான உரிமைகள் - பொருளாதார உரிமைகள் - அரசியல் உரிமைகள் - சமூக உரிமைகள் - பெண்கள் மற்றும் குழந்தைகளின் மனித உரிமை - சமூகப் பழக்கங்களும் அரசியலமைப்புப் பாதுகாப்புகளும்.

CODE:15T202	**LC-II- செய்யுள் (பக்தி,இடைக்கால இலக்கியம்)தமிழ்ச் செம்மொழி வரலாறு, மொழிபெயர்ப்பியல், தமிழ் இலக்கிய வரலாறு**	**SEM:II**

அலகு - 1

தேவாரம் - திருஞானசம்பந்தர் திருவையாறு திருமுறைப் பதிகம் -3 “புலனைந்தும் பொறிகலங்கி” எனத் தொடங்கும் பதிகம், **திருமந்திரம் -** 10 பாடல்கள் ஒன்றவன்... (பாடல் எண் - 1), தீயினும்... (பாடல் எண் - 8), பிறப்பிலி... (பாடல் எண் - 25), வானின்று... (பாடல் எண் - 30), அப்பனை... (பாடல் எண் - 36), கல்லா அரசனும்... (பாடல் எண் - 238), வேட நெறி... (பாடல் எண் - 240), வேந்தன் உலகை... (பாடல் எண் - 245), அழுதூறும்...(பாடல் எண் - 248), தன்னையறியாது...(பாடல் எண் - 255). **நாலாயிரத் திவ்வியப் பிரபந்தம் -** குலசேகர ஆழ்வார் பெருமாள் திருமொழி – “ஊனேறு செல்வத் துடற்பிறவி”

எனத்தொடங்கும் பாடல் முதல் 11 பாடல்கள் (677-687), **திருவிளையாடல் புராணம் -** திருநாட்டுச் சிறப்பு 20 பாடல்கள், **திருஅருட்பா** - பிள்ளைச் சிறு விண்ணப்பம் 3394 முதல் 3409 வரை 16 பாடல்கள்.

அலகு – 2

கலிங்கத்துப் பரணி - காடு பாடியது, **தமிழ் விடு தூது** - 179 ஆவது கண்ணி முதல் 198 ஆவது கண்ணி முடிய 20 கண்ணிகள், **குற்றாலக் குறவஞ்சி** – எங்கள் மலையே 5 பாடல்கள், **முக்கூடற்பள்ளு 07 பாடல்கள் - நாட்டுவளம் -**கோட்டு வளங்...(பாடல் எண் - 16), மேடை யேறித்தன்... (பாடல் எண் - 17), கறைபட் டுள்ளது... (பாடல் எண் - 21), மீதுயர்ந் திடுங்.... (பாடல் எண் - 25), **நகர்வளம்** - கொண்டல் கோபுரம்... (பாடல் எண் - 19) கோதி மாமணி...(பாடல் எண் - 23) கார் பூத்த வண்ணனார்... (பாடல் எண் - 28)

அலகு - 3 தமிழ்ச் செம்மொழி வரலாறு

செம்மொழி விளக்கம் - செம்மொழி வரலாறு - உலகச் செம்மொழிகள் - இந்தியச் செம்மொழிகள் - செம்மொழிக்கான தகுதிகள் அல்லது செம்மொழிப் பண்புகள் - தமிழ்ச் செம்மொழி நூல்கள்.

பாடநூல் - தமிழ்ச் சொம்மொழி வரலாறு – முனைவர் மு.சாதிக்பாட்சா, இராஜா பப்ளிகேசன், திருச்சி-23.

அலகு - 4 மொழிபெயர்ப்பியல்

ஒரு மடல்(கடிதம்) அல்லது ஒரு பத்தி ஆங்கிலத்திலிருந்து தமிழில் மொழிபெயர்த்தல்.

பாடநூல் - மொழிபெயர்ப்பியலும் மொழிபெயர்ப்புகளும் - மகிழினி பதிப்பகம், சென்னை- 106.

அலகு - 5 தமிழ் இலக்கிய வரலாறு

சமயமும் தமிழும், சிற்றிலக்கியங்கள், பக்தி இலக்கியங்கள், முத்தொள்ளாயிரம், சித்தர்கள், உரையாசிரியர்கள், இலக்கண நூல்கள், நிகண்டுகள்.

CODE:15H202	ELC-II– English for Proficiency	SEM:II

Objectives

To expose students to the wisdom and experience written in the form of prose, biographies and short stories

To familiarize students with various forms and functions of the English language

UNIT I

1.**The Beauty Industry** – *Aldous Huxley*

2.**A Talk on Advertisement** – *Herman Wouk*

3.**On Seeing Films** – *Anonymous*

UNIT II

1.**Charlie Chaplin**– *From his Biography*

2.**Subash Chandra Bose** – *M.L Ahuja*

3.**Isaac Newton** – *Colin Swatridge*

UNIT III

1.**The Need for Excellence** – *N.R.Narayana Murthy*

2.**Travel by Train** – *J.B.Priestly*

3.**Tight Corners** – *E.V.Lucas*

UNIT IV

1.**Letter to Bapu from Generation Next** – *Chetan Bhagat*

2.**Human Rights and Legal Responsibilities** – *Nani A.Palkhivala*

3.**Cellphone Epidemic** – *Claudia I.Haas*

UNIT V

1.**Three Days to see** – *Helen Keller*

2.**The Four Brothers** – *Walter De La Mare*

3.**A Different Kind of Learning** – *Jade Snow Wong*

CODE:15Y102L	CC - II*- PRACTICAL – I VOLUMETRIC ANALYSIS	SEM:II

I. Acidimetry – Alkalimetry

Estimation of Hydrochloric acid

Estimation of Sodium hydroxide

II. Permanganimetry

Estimation of Ferrous iron in Mohr's salt

Estimation of Oxalic acid

II.Dichrometry

Estimation of Ferrous iron

Estimation of Ferric iron – by using both internal and external indicators

IV.Iodo and Iodimetry

Estimation of copper

Estimation of potassium permanganate

Estimation of arsenious oxide

V. Complexometry

Estimation of Mg using EDTA.

Estimation of Ca using EDTA

Text Books:

- *V.Venkateswaran, R.Veeraswamy and A.R.Kulandaivelu, Basic principles of practical chemistry sultan chand& sons, New Delhi, 2nd edition, 1977.*

References:

- ✓ *V.Venkateswaran, R.Veersamy and A.R.Kulandivelu*
- ✓ *Basic principles of practical chemistry, sultan Chand &sons,second Edition (1997)*
- ✓ *FurnissB.S.etal, Vogel's text book of practical organic chemistry (7th edition) London ELBS-Longman (1984).*

CODE:15Y205	CC-III - GENERALCHEMISTRY-II	SEM:II

Objectives:

To understand the modern theoretical treatment of chemical bonding.

To learn the principles of quantum chemistry.

To learn about the alkenes and alkynes

To understand colloids and its properties

UNIT I: The Covalent Bond

1.1 Lewis theory-the octet rule and its exception, electron dot structural formula; Sidgwick- Powell theory-prediction of molecular shapes; Valance Bond theory-arrangementofelectrons in molecules, hybridization of atomic orbitals and geometry of molecules.

1.2 VSEPR model-effect of bonding and nonbonding electrons on the structure of molecules, effect of electronegativity, isoelectronic principle, illustration of structures byVESPR model-NH_3, SF_4, ICl_4-, ICl_2-, XeF_4, XeF_6.

1.3 MO theory: LCAO method, criteria of orbital overlap, types of molecular orbitals-σ, π-and δ-MOs; combination of atomic orbitals to give σ- andπ-MOs and their schematic illustration; qualitative MO energy level diagram of homo- and heterodiatomic molecules-H_2,He_2,O_2, CO, NO bond order and stability of molecules.

Unit II: Alkenes

2.1 Alkenes: General methods of preparation, dehydrogenation, dehydrohalogenation, dehydration, Hoffmann and Saytzeff rules, cis and trans eliminations.

2.2Reactions: Mechanism of electrophilic and free radical addition, addition of hydrogen, halogen, hydrogen halide (Markownikoff's rule), hydrogen bromide (peroxide effect), sulphuric acid, water, hydroboration, ozonolysis, dihydroxylation with KMnO 4, allylicbromination by NBS.

2.3Dienes: Stability of dienes (conjugated, isolated and cumulative dienes) General methods of preparation, mechanism of dehydrohalogenation.

2.4 Reactions: Mechanism of 1, 2- and 1, 4-additions, Diels-Alder reactions. Polymerization: addition polymerization, Ziegler Natta catalysed polymerization.

Unit III: Alkynes andHomocyclic Aromatic Hydrocarbons

3.1Alkynes: Preparation: Mechanism of dehydrohalogenationand dehydrogenation.

3.2 Reactions: Acidity of alkynes, formation of acetylides, Mechanism of addition of water, hydrogen halides and halogens, oxidation, ozonolysis and hydroboration/oxidation.

3.3Benzene: Extraction, industrial and laboratory preparations, purification.

3.4Properties: Electrophilic substitution reactions, Nitration, sulphonation, halogenation, Friedel Crafts alkylation and acylation with mechanisms.Disubstitution reactions of aromatic compounds, orientation and reactivity.

Unit – IV Colloidal and Liquid States

4.1 Colloidal state: True solution and colloids – types of colloids peptisation, coagulation - Applications – reverse osmosis – desalination of sea water – dialysis – delta formation – artificial rain – clarification of water (addition of polyvalent electrolytes), detergent action of soap – sewage disposal – Cottrell's precipitator.

4.2Liquid state – Liquid crystal –classification, structure, properties and applications.

4.3Gels and Emulsions.

Unit-V: Fundamentals of quantum chemistry.

5.1Quantum theory and atomic spectra-Bohr's model of atom-limitations of Bohr's model-Somerfield's atom model.

5.2Photoelectric effect-Compton effect-Debroglie equation-Heisenberg's Uncertainty principle,

5.3Schrordinger wave equation-.Eigen values-Eigen function-significance of Ψ &Ψ^2.Particle in a one dimensional box.

Text Books

- *J. D. Lee, Concise Inorganic Chemistry , 5th ed., Blackwell Science, London, 1996.*
- *D. F. Shriver and P. W. Atkins, Inorganic Chemistry , 3rd ed., W. H. Freeman and Co, London, 1999.*

- *H. J. Arnikar, Essentials of Nuclear Chemistry , 4th ed., New Age International, New Delhi, 1995.*
- *B. R. Puri, L. R. Sharma, K. C. Kalia, Principles of Inorganic Chemistry, ShobanLalNagin Chand and Co., Delhi, 1996.*

***References**:*

- *Puri B.R, Sharma L.R, KaliaK.k, Principles of Inorganic chemistry (23 edition) New Delhi, shobanlalNaginchand&co (1993).*
- *B.S.Baul, ArunBahal, A text book of organic chemistry (10^{th} edition) s.chand and company ltd, New Delhi (2001).*
- *B.S.Bahl, C.D Tuli, Arunbhal, Essential of physicalchemistry,(16^{th}edition) S.Chand&campany ltd, New Delhi (2001).*

Code:15Y206A	AC - III-ALLIED MATHEMATICS - III	Sem:II

Objectives

On successful completion of this paper the students will gain knowledge about the concepts of Ordinary Differential Equations, Partial Differential Equations, Laplace Transforms, Vector Differentiation and Vector Integration.

Unit 1-Ordinary Differential Equations

Ordinary Differential Equations of first order but of higher degree-Equations solvable for x,y,p - Clairaut's Equations (simple cases only)-Second order differential equations with constant coefficients - Finding Particular integrals when the RHS is of the type of e^{kx}, sinkx, coskx, X^k, $e^{kx}f(x)$.

Unit 2-Partial Differential Equations

Formation of Partial Differential Equations of first order by eliminating arbitrary constants & arbitrary functions-Definition of kinds of solutions-Four standard forms and Lagrange's methods,.P.D.E reducible to standard forms

Unit 3-Laplace Transforms

Definition of Laplace transform - Laplace Transforms of e^{at}, cosat, coshat, t^n, e^{-at} f(t), $f'(t)$, $f''(t)$- First shifting theorem - Inverse Transforms relating to the above standard forms-Solving differential Equation using Laplace transforms (second order only).

Unit 4-Vector Differentiation

Vector and scalar fields - Gradient, Divergence, Curl of vector - Laplacian Operator -Vector Identities (statement only) - Directional derivative.

Unit 5-Vector Integration

Line integrals - Surface integrals - Volume integrals - Gauss divergence, Stoke's Theorem and Green's theorem (without proof) and their applications.

Text Book

A. Abdul Rasheed, Allied Mathematics, Mc Graw HillEducation,2006,Unit-1 Ch 10 (ξ 10.1-10.4),Unit-2 Ch 11,Unit-3 Ch 12,Unit-4 Ch 13,Unit-5 Ch 14.

References

- ✓ ***P. R. Vittal*** *, Allied Mathematics, Margham Publications, Third Revised Edition, 2002.*
- ✓ ***M.K Venkataraman ,*** *Engineering Mathematics, NPC, 1998.*
- ✓ ***P. Kandasamy, K. Thilagavathy, K. Gunavathy,*** *Engineering Mathematics , S. Chand, 1987.*

Code:15EVS	EVS -Environmental Science	Sem:II

Objectives

To create awareness among the students about our environment, its values, and the need for protecting it for the well being of mankind in the months and years to come.

UNIT - I

Multidisciplinary nature of Environmental Science – Definition – Scope and importance. Natural resources: Land resources: Lands as resources and their uses – land degradation, soil erosion. Forest resources: Importance of forest resources - Major and minor forest produces – Need for afforestation – Water resources: Availability of surface and ground water – Importance of water conservation – Food resources: World food problems and possible solutions. Effect of modern agriculture.

UNIT - II

Mineral resources: Their availability and uses – environmental effects of extracting. Energy resources: Growing energy needs – renewable and non-renewable energy sources – Use of alternate energy sources – Case studies – Equitable use of resources for sustainable life styles.

UNIT-III:

Ecosystem: Concept – Structure and function of Grass land, Pond and Forest ecosystem – Food chains, food webs and Ecological pyramids. Biodiversity: Definition – Genetic, Species and Ecosystem diversity – Biogeographical classification of India – Values of Biodiversity – Biodiversity at global, national and local levels – India as a mega-diversity nation – Hotspots of Diversity – Threats to Biodiversity – Endangered and Endemic species of India – *In situ* and *Ex situ* conservation of biodiversity.

UNIT-IV:

Environmental pollution: Definition, Causes, effects and control measures of Air, Water, Soil, Marine, Noise, Thermal and Nuclear

pollution – Solid Waste Management: Causes, effects and management of urban and industrial wastes

UNIT-V:

Social issues and environment: Effects of deforestation, Construction of Dams, Mineral mining on environment – Natural disasters and their management: Floods, Earthquake, Cyclone and Landslides – Conflicts over water – Advantages of rainwater harvesting and watershed management – Climate change, global warming, acid rain, ozone depletion. Environmental ethics – Case studies – Population explosion – Effects of population explosion on environment –Various acts and legislations, environment and human health, human rights, HIV/AIDS, women and child welfare. Role of individual in preservation of environment.

List of Reference Books

- ✓ *Anon. 2000. Environmental Studies (U.G.C Syllabus), Periyar E.V.R College, Tiruchirapalli.*
- ✓ *Asthana, D.K., Meera, A. 2006. A Text Book of Environmental Studies for under graduate students. S.Chand & Company Ltd., New Delhi.*
- ✓ *Benny Joseph. 2005. Environmental Studies. Tata McGraw-Hill Publishing Company Ltd., New Delhi.*
- ✓ *Kumaraswamy, K., Alagappa Moses, A. and Vasanthy, M. 2004. Environmental Studies (A Text Book for all under graduate students). Bharathidasan University, Tiruchirapalli.*

CODE:15XY21	SKBC-I – CHEMISTRY OF CONSUMER PRODUCTS	SEM:II

Unit I: Household materials

1.1Manufacturing process – composition and uses of safety matches.

1.2 Agarbathis, naphthalene balls, wax candles, shoe polish, writing/ fountain pen ink, chalk crayons and gum paste.

Unit II: Soaps

2.1 Soaps – introduction – types – hot process – batch process – continuous process –manufacture of soap by continuous process.

2.2 Toilet and transparent soaps, laundry soaps – oils to be used in soaps – cleaning action of soaps.

Unit III: Paints and varnishes

3.1 Paints: Introduction – manufacture – setting of the paint.

3.2 Pigments: Definition –classification. Varnishes: Introduction – types – manufacture – solvents and thinner.

3.3 Paint and varnish industry in India.

Unit IV: Detergents

4.1 Detergents: Introduction – principal groups of synthetic detergents.

4.2 Classification of surface active agents – biodegradability of surfactants – anionic detergents – oxo process – Alfol process – Welsh process – cationic detergents.

Unit V: Shave lotion and shampoo

5.1 Shave lotion: Introduction – factors for growth of shave lotion industries – uses –formulation with process.

5.2 Hair shampoo: Introduction – properties – uses and application – raw materials – types – protein and egg shampoo, herbal shampoo, vitamin shampoo, anti-dandruff shampoo – manufacturing process – flow sheet.

Reference books

Units I to IV:

- *B.K.Sharma, Industrial Chemistry, Goel Publishing House, 6th edition, 1994.*

Unit V:*P.K.Chattopadhyay, Modern Technology of Soaps, Detergents and Toiletries, 2nd edition, 2005.*

CODE:15T303	LC-III- செய்யுள் (காப்பியங்கள்),புதினம்,தமிழ் இலக்கிய வரலாறு	SEM:III

அலகு - 1

1. சிலப்பதிகாரம் - கனாத்திறன் உரைத்த காதை (80 வரிகள்)
2. மணிமேகலை – ஆபுத்திரன் திறன் அறிவித்த காதை (115 வரிகள்)

அலகு - 2

1. கம்பராமாயணம் - இரணியன் வதைப் படலம் (56 பாடல்கள்)
2. பெரியபுராணம் - இளையான் குடி மாறனார் புராணம் (27 பாடல்கள்)
3. சீறாப் புராணம் - பாந்தள் வசனித்தப் படலம் - (18 பாடல்கள்)

அலகு - 3

1. இராவண காவியம் - தமிழகக் காண்டம் - (தலைமக்கள் படலம்-28 பாடல்கள்)
2. இயேசு காவியம் - (உவமை வழிச் செய்தி முழுவதும்)

அலகு – 4 புதினம்

பாடநூல்

சக்கை, கலைச் செல்வி, என்.சி.பி.எச். வெளியீடு, சென்னை – 600 098.

அலகு – 5 தமிழ் இலக்கிய வரலாறு

காப்பியங்கள் - ஐம்பெருங்காப்பியங்கள், ஐஞ்சிறு காப்பியங்கள், பிறகாப்பியங்கள் நாவல் - தோற்றம், வளர்ச்சி,-அயல் நாடுகளில் தமிழ்.

CODE:15H303	ELC-III–English for Employability	SEM:III

Objectives

To expose students to the language items tested in the competitive examinations

To familiarize students with different forms of multiple choice and descriptive type questions

UNIT I

Spellings

Vocabulary – Synonyms and Antonyms

UNIT II

Spotting Errors

Errors and How to Avoid Them

UNIT III

Reading Comprehension

Jumbled Sentences

UNIT IV

Words often confused

Idioms and Phrases & Phrasal Verbs

Dialogue Writing

UNIT V

Public Speaking

Interview skills and Group Discussion

Letter Writing & CV Writing

Report Writing

General Paragraph and Essay Writing

The text book is compiled by the Members of the Dept of English.

CODE:15Y307	CC-IV - GENERAL CHEMISTRY- III	SEM:III

Objectives:

To know the nature of compounds formed by s- and p-block elements.

To know the various reagents of Boron and carbon group elements.

To understand the photo chemistry.

UNIT 1: S-Block Elements

1.1 Chemical properties of the metals: reaction with water, air, nitrogen; uses of s-block metals and their compounds.

1.2 Compounds of s-block metals: oxides, hydroxides, peroxides, superoxide-preparation and properties; oxo salts-carbonates, bicarbonates, nitrates; halides and polyhalides; anomalous behavior of Li and Be, extraction of beryllium.

1.3 Complexes of s-block metals: complexes with crown ethers, biological importance, organometallic compounds of Li and Be.

UNIT II: Boron and Carbon Group Elements

2.1 Group 13 (boron group): extraction of B and Si; types of compounds;Reaction of B with other elements, water, air, acids, and alkali.

2.2 Compounds of boron with oxygen: boron sesquioxide, borates, borax, sodium peroxoborates.Boronhydrides-reaction with ammonia, hydroboration, structure of boranes; borohydrides and their uses.

2.3 Aluminium-amphoteric behavior, aluminates. Group 14 (carbon group): Catenation and heterocatenation, allotropy of carbon; carbides- salt-like Carbides, interstitial
carbides, covalent carbides.

2.4 Silicates-ortho-, pyro-, cyclic-, chain-, sheet-, three dimensional silicates and their properties and structures; silicates in technology-alkali silicates, ceramics, glass.

Unit III: Aliphatic and aromatic halides

3.1 Preparation of aliphatic and aromatic halides: Free radical mechanism,Addition and substitution reactions.

3.2 Reactions: Nucleophilic substitutions, SN_1, SN_2 and SNAr mechanisms, stereochemistry and reactivity, effects of structure, substrate, solvent, nucleophile and leaving groups.

3.3 Eliminations: E1 and E2 mechanisms, evidences, orientations and Stereochemistry.

Unit –IV ELECTRICAL AND MAGNETIC PROPERTIES OF MOLECULES

4.1 Induced dipole moment – polarizability polarization of a molecule in an electric field Clausius – Mosotti equation and Debye equation (derivation not required) – measurement of dipole moment for molecules – vapour temperature method, dilute solution method. Bond moments-bond angle relationship, dipole moment and molecular structure (CO_2, NH_3, CCl_4 and o,m and p-dichlorobenzene)

4.2 Magnetic permeability, magnetic flux, density(B), magnetic field intensity(H), B and H relationship, magnetic susceptibility, magnetic moment(M),Diamagnetism,Paramagnetism,Ferromagnetism – anti ferromagnetism.

4.3 Measurements of magnetic susceptibility – Gouy method-number of unpaired electrons-spin only value for magnetic moment – application to structural problems of $K_3[Fe(CN)_6]$, $K_4[Fe(CN)_6]$ and $[Ni(CO)_4]$.

UNIT–V: Photo physical processes in electronically excited molecules

5.1 Laws of photochemistry. Jablonski energy level diagram – primary and secondaryPhotochemicalprocesses. Radiationless transition – internal conversion and inter systemcrossing. Radiative transitions – fluorescence - relation to structure. Phosphorescence –conditions for phosphorescence emission (spin-orbit coupling). Chemiluminscence.

5.2 Experimental techniques of photochemical reactions – chemicalactinometers–quantumyield. Mechanism of photosynthesis

Text Books

- *J. D. Lee, Concise Inorganic Chemistry, 5th ed., Blackwell Science, London, 1996.*
- *D. F. Shriver and P. W. Atkins, Inorganic Chemistry, 3rd ed., W. H. Freeman andCo, London, 1999.*

- *H. J. Arnikar, Essentials of Nuclear Chemistry, 4th ed., New Age International, NewDelhi, 1995.*
- *B. R. Puri, L. R. Sharma, K. C. Kalia, Principles of Inorganic Chemistry , ShobanLalNagin Chand and Co., Delhi, 1996.*

Reference Books

- ✓ *J. E. Huheey, E. A. Kieter and R. L. Keiter, Inorganic Chemistry , 4th ed., Harper Collins, New York, 1993.*
- ✓ *F. A. Cotton, G. Wilkinson, C. Murillo and M. Bochman, Advanced Inorganic Chemistry, 6th ed., John Wiley, New York, 1999.*
- ✓ *T. Moeller, Inorganic Chemistry: A Modern Introduction, Wiley, New York, 1990.*
- ✓ *Gurdeep Raj "Advanced Physical Chemistry", Goel Publishing House, Meerut, 2000.*

CODE:15Y308L	CC - V-PRACTICAL –II - INORGANIC MICRO QUALITATIVE ANALYSIS	SEM:III & VI

Objectives:

To learn the reactions of anions and cations.

To learn the micro analytical the technique in inorganic chemistry.

ANALYSIS:

1. Analysis of simple and acid radical: carbonate, sulphide, sulphate, chloride, bromide, iodide, nitrate.
2. Analysis of interfering radicals: fluoride, oxalate, borate, phosphate and their elimination.
3. Analysis of basic radicals (group wise)-lead, copper, bismuth, cadmium, antimony, iron, alumnium, zinc, manganese, nickel, cobalt, calcium, strontium, barium, magnesium, ammonium.
4. Analysis of mixture containing two cations and anions of which one will be interfering anion.
5. Demonstration experiments:

   i) Determination of calcium, magnesium, iron, sulphate, chloride, fluoride &carbonate in water.

   ii) Detection of potassium, sodium, nitrate, chloride and phosphate in soil.

Text Books:

- *V.Venkateswaran, R.Veeraswamy and A.R.Kulandaivelu, Basic principles of practical chemistry sultan chand& sons, New Delhi, 2nd edition, 1977.*

References:

- ✓ *V.Venkateswaran, R.Veersamy and A.R.Kulandivelu*
  Basic principles of practical chemistry, sultan Chand &sons, second Edition (1997)
- ✓ *FurnissB.S.etal, Vogel's text book of practical organic chemistry (7th edition) London ELBS-Longman (1984).*

Code: 15Y309A	AC –IV – ALLIED PHYSICS –I (For B.Sc., Chemsitry Students)	Sem:III

Objectives

To study the basic principles on properties of solid and liquid, waves and oscillations, mechanics, thermal and optical phenomenon.

Unit - I Properties of Matter

Elasticity: Stress –strain-Hook's law-different moduli of elasticity –Poisson's ratio – bending of beam- Young's modulus by non-uniform bending **Viscosity:** Coefficient of viscosity-Poiscuille's formula – comparison of viscosities: burette method – terminal velocity **Surface tension:** definition – unit and dimension –Molecular theory of surface tension – surface energy – Jaegar's method

Unit-II Waves and Oscillations

Simple harmonic motion- composition of two simple harmonic motions at right angles – Lissajou's figures – uses – Transverse vibration of a stretched string –Sonometer –ultrasonics- production:piezoelectric method – application and uses

Unit-III Mechanics

Gravitation fields and potentials – Newton's law of gravitation – Experimental determination of G by Boy'smethod –vatiation of 'g' with altitude, depth and latitude –Gravitational field –intensity of the field – Gravitational potential and potential energy –Kepler's law –deduction of Newton's law of gravitation from Kepler's laws.

Unit-IV Thermal Physics

Postulates of the kinetic theory of gases –Van der Walls equation of state –derivation of critical constants-Joule-Kelvin effect –Joule-Thomson porous plug experiment-liquefaction of gases: Linde's process – laws of thermodynamics –Heat engine –entropy-change of entropy in reversible and irreversible processes.

Unit-V

Physical optics: Introduction –Interference in thin films. Diffraction:determination of wavelength of light using transmission grating. Polarization: Introduction –Polarization by reflection –optical activity –Laurent's Half shade polarimeter

Book for Study:

1. R.Murugeshan, Allied Physics,S.Chand & Co., Ltd., New Delhi, Revised edition, 2005. (Unit I, II, IV and V)
2. D.S.Mathur, “Mechanics” S.Chand& Company Ltd., New Delhi (2003).(Unit-III)

Book for Reference:

1. D.S.Mathur, Properties of Matter, S.Chand & Co., New Delhi.
2. P.K.Srivastava, Mechnaics, New Age International Publishrs, New Delhi 1997.

3.

CODE: 15Y310L	AC -V - ALLIED PHYSICS PRACTICAL	SEM:III

(Any Fifteen experiments)

1. Young's Modulus – Non uniform bending
2. Surface tension – drop weight method
3. Comparison of viscosities of two liquids- Burette method
4. Specific heat capacity of a liquid- Newton's law of cooling
5. Sonometer- verification of laws
6. Newton's rings- Determination of radius of curvature
7. Spectrometer- Refractive index of prism
8. Spectrometer- Grating at normal incidence
9. Carey foster's bridge- specific resistance of a coil
10. Metre bridge- determination of resistance
11. Potentiometer – ammeter calibration
12. Characteristics of PN junction diode
13. Characteristics of Zener diode
14. Bridge rectifier
15. Transistor characteristics –CE configuration
16. Logic gates using IC'S
17. NAND gate as a Universal gate
18. NOR gate as a Universal gate
19. De Morgan's theorem
20. Verification of Boolean algebra

CODE: 15XY32	SKBC – I - INDUSTRIAL CHEMISTRY	SEM:III

Objectives :

To enable a student to understand:

(i) The generation of energy from various types of fuels.

(ii) Use of chemicals in improvement of agricultural crops

(iii)Methods employed for purification of water for industry and home

(iv) Pollution occurring from various sources and resulting toxic effects

UNIT-1 : Industrial fuels

1.1 Energy

Sources: non-renewable, classification of fuels: solid, liquid and gaseous. Calorific valueof fuels and its determination.

1.2 Solid fuels

Coal: types – properties and uses – lignite, sub-bituminous coal, bituminous coal andanthracite. Coking and non-coking coal.

1.3 Liquid fuels

Refining of crude petroleum and uses of fractions. Hydrodesulphurisation. Cracking:thermal and catalytic (fixed bed and fluidised bed catalysis). Octane number. Productionand uses of tetraethyl lead, ETBE and MTBE.

1.4 Gaseous fuels

Natural gas and gobar gas: production, composition and uses.,Gobar electric cell.

UNIT-2 : Chemistry and agriculture

2.1 Fertilizers

NPK, representation,superphosphate, triple superphosphate, uses of mixed fertilizers.Micronutrients and their role, biofertilizers, plant growth hormones.

2.2 Pesticides

Classification of pesticides with examples.Insectides; stomach poisons, contactinsecticides, fumigants. Manufacture and uses ofinsecticides. DDT, BHC (gammaxane:Conformation of gamma isomer) pyrethrin.Herbicides: Manufacture of 2,4-D and 2,4,5-T

Fungicides: Preparation of Bordeaux mixture. Mention of lime-sulphur, creosote oil andformula.

UNIT-3: Water treatment

3.1 Introduction

Sources of water. Hardness of water-temporary or carbonate hardness, permanent hardnessor non-carbonate hardness. Units of hardness, disadvantages of hard water – In domestic, in industry and in steam generation in boilers. Effect of iron and manganese in water.Estimation of hardness – EDTA method.

3.2 Water softening methods

Industrial purposeLime – soda process, Zeolite process; Ion-exchange - Demineralisation– deionisationprocess. Mixed – bed deionisation.

Domestic purposeRemoval of suspended impurities. Removal of microorganism – Chlorination. Breakpoint chlorination. Reverse osmosis. Desalination. Waste water treatment

UNIT-4:Pollution and chemical toxicology

4.1 Pollution: Air pollution - Acid rain. Greenhouse effect (global warming), ozone layerdepletion - photochemical oxidants. Control of air pollution. Water pollution – organicpollutants, Chemical oxygen demand (COD), Biological oxygen demand (BOD), total organic carbon. International standards for water and air quality and regulations

4.2 Chemical toxicology: Effect of toxic chemicals on enzymes. Lead, mercury and cyanidepollution and their biochemical effects. Carbon monoxide, sulphur dioxide, oxides of nitrogen, ozone – biochemical effects.

4.3 Quality control: ISI specification. Patent: Purpose and procedures

UNIT-5:

5.1 Glass, Cement, Dyes, Paints, Special paints, Lubricants and greases,Refractories, Abrasives, Plastics.

5.2 Perfumes and flavoring industries, Fermentation, Explosives, Ceramic, Petrochemicals.

Text Books

- *Norrisshrever. and joseph a. Brink, jr.Chemical process industries, 4th ed.;Mcgraw – hill Kogakusha, ltd: 1977.*
- *George t. Austin. Shreve's chemical process industries, 5th ed.; Mcgraw – hill: 1984.*

- *Subbarao, n. S. Biofertilizers in agriculture; oxford and ibh publishing co.: New delhi,1982.*
- *Jain, p. C. And jain, m. Engineering chemistry, 10th ed.; dhanpatrai and sons:Delhi, 1993*

Reference books

- ✓ *Kamaraj, P. jeyalakshmi, R. And Narayanan, V. Chemistry in engineering and technology;sudhandhira publications: Chennai, 2001.*
- ✓ *Kuriakose, j. C. And rajaram, j. Chemistry in engineering and technology. Vol2.;tata mcgraw hill: new delhi, 1988.*
- ✓ *De,a.k. Environmental chemistry 2nd ed.; wiley eastern Ltd., 1987.*
- ✓ *Stanley e. Mahanen, introduction to industrial chemistry*
- ✓ *Jugal, Kishore, Agrawal, Practicals in Engineering Chemistry; Oxford and IBHPublishing Co., New Delhi, 1976.*

CODE: 15GS	GS-GENDER STUDIES (Self study)	SEM:III

Objectives

To make boys and girls aware of each other's strengths and weakness.

To develop sensitivity towards both genders in order to lead an ethically enriched life.

To promote attitudinal change towards a gender balanced ambience and women empowerment.

Unit - I: Concepts of Gender

Sex – Gender- Biological Determination – Patriarchy -Feminism- Gender Discrimination- Gender Division of Labour – Gender Stereotyping- Gender Sensitivity – Gender Equity – Gender Equality- Gender Mainstreaming – Empowerment.

Unit – II: Women's Studies vs Gender Studies

UGC's Guidelines –VII to XI Plans – Gender Studies: Beijing Conference and Convention on the Elimination of All forms of Discrimination against Women (CEDAW) - Exclusiveness and Inclusiveness

Unit – III: Areas of Gender Discrimination:

Family – Sex ratio – Literacy - Health – Governance- Religion- Work Vs Employment –Market-Media –Politics –Law – Domestic Violence-Sexual Harassment – State Policies and Planning.

Unit – IV: Women Development and Gender Development

Initiatives- International Women's Decade – International Women's Year –National Policy for Empowerment Year 2001 – Mainstreaming Global Policies.

Unit – V: Women's Movement and Safeguarding Mechanism in India

National Commission for Women (NCW) – All Women Police Station- Family Court- Domestic Violence Act – Prevention of Sexual Harassment at Work Place- Supreme Court Guidelines – Maternity Benefit Act –Pre-natal Diagnostic Act - Hindu Succession Act 2005- Eve Teasing Prevention Act – Self Help Group -73rd and 74 th Amendment Act for PRIS.

Book for Study

- *N.Manimekalai and S.Suba –Gender Studies- Bharathidasan University- Trichirappalli-620024.*

Reference Books

- ✓ *V.S. Gurusamy- Empowerment of Women in India – New Century Publications-New Delhi-First Edition-2008*

Code: 15T404	LC-IV-Tamil - செய்யுள் (பழந்தமிழ் இலக்கியம்), நாடகம், தமிழ் இலக்கிய வரலாறு, கட்டுரை வரைவியல்	Sem:IV

அலகு – 1

குறுந்தொகை – 05 பாடல்கள்

1. "நள்ளென் றன்றே ....." (பாடல் எண்- 6)
2. "கழனி மாஅத்து விளைந்துகு ...." (பாடல் எண் -8)
3. "கான மஞ்ஞை ..." (பாடல் எண் - 38)
4. "யாயும் யாயும் ....." (பாடல் எண் - 40)
5. "கடும்புனல் தொடுத்த ..." (பாடல் எண் - 103)

ஐங்குறுநூறு – மருதம் - வேழப் பத்து -10 பாடல்கள்

அகநானூறு - 05 பாடல்கள்

1. "அன்னாய வாழிவேண் டன்னை ...." (பாடல் எண் - 68)
2. "சிலம்பிற் போகிய ..." (பாடல் எண் - 302)
3. "பெரும் பெயர் மகிழ்ந பேணா ..." (பாடல் எண் - 306)
4. "நீலத் தன்ன நீர்பொதி ..." (பாடல் எண் - 314)
5. "சாரல் யாஅத்து உயர்சினை ..." (பாடல் எண் - 337)

புறநானூறு - 05 பாடல்கள்

1. "நளியிரு முந்நீர் ஏணியாக ..." (பாடல் எண் 35)
2. "பாணன் சூடிய..." (பாடல் எண் 141)
3. "உற்றுழி உதவியும்...." (பாடல் எண் 183)
4. "கேட்டன் மாத்திரை யல்லதி யாவதும்...." (பாடல் எண் 216)
5. "யாதும் ஊரே..." (பாடல் எண் 192)

அலகு – 2

திருக்குறள் 2 அதிகாரங்கள் -- ஊக்கமுடைமை , அவையடக்கம்

இனியவை நாற்பது – 10 பாடல்கள்

1. கற்றல் சான்றோரைச் சார்தல் - (பாடல் எண் 1)
2. அன்பும் நிலவும - (பாடல் எண் -9)
3. குழந்தை அவையஞ்சாமை–(பாடல் எண்-12)
4. கற்றது உரைத்தல் பழகுதல் (பாடல் எண் -16)
5. துறவிகளின் இயல்பு - (பாடல் எண்-18)
6. புறங்கூறாமை (பாடல் எண் - 19)
7. வழங்கல் நல்லோராய் வாழ்தல் (பாடல் எண் -22)
8. செய்ந்நன்றி அடைக்கலம் வெளவாமை (பாடல் எண் -30)
9. இரவுப்பயணம், நற்பேச்சு வேண்டா நட்பு (பாடல் எண் -34)
10. கல்விக்கு நிகரான இனியது இல்லை (பாடல் எண் - 40)

நல்வழி – 10 பாடல்கள் (பாடல்

1. காலம் அறிந்து செய்க (பாடல் எண் -4)
2. பேராசை கூடாது – (பாடல் எண் - 6)
3. குடிபிறந்தார் வறுமையிலும் உதவுவார் (பாடல் எண் -9)
4. சிவாய நமவென்று - (பாடல் எண் - 15)
5. உயர் நோக்கம் இன்மை – (பாடல் எண் -19)
6. வஞ்சனை யில்லார்க்கு வாழ்வு சிறக்கும் - (பாடல் எண்- 21)
7. மன அமைதி வேண்டும் - (பாடல் எண் -28)
8. பொருள் இருக்கும் போதே அறம் செய்க (பாடல் எண்-32)
9. வன்சொல்லும் இன்சொல்லும் - (பாடல் எண்-33)
10. உண்மை நிலை – (பாடல் எண் 38)

திரிகடுகம்– 10 பாடல்கள்

1. “கல்லார்க்கு இன்னாய...”(பாடல் எண் - 3)
2. “தொல்லவையுள் தோன்றுங் ...”(பாடல் எண் - 8)
3. “பெருமை யுடையா...” (பாடல் எண் - 9)
4. “கணக்காயர் இல்லாத...”(பாடல் எண் – 10)
5. “விளியாதான் கூத்தாட்டுக்...”(பாடல் எண் – 11)
6. “ஆசை பிறன்கட்...”(பாடல் எண் – 20)
7. “சிலசொற் பெருந்தோள்....”(பாடல் எண் - 47)
8. “காவோ டறக்குளந்...”(பாடல் எண் – 70)
9. “கயவரைக் கையிகந்து ...” (பாடல் எண் - 77)
10. “பத்திமை சான்ற...”(பாடல் எண் - 100)

அலகு – 3 நாடகம்

பாடநூல் - பிசிராந்தையார் - பாரதிதாசன், தமிழ் நாதன் பதிப்பகம், சென்னை – 110

அலகு – 4 தமிழ் இலக்கிய வரலாறு

சங்க காலம் - சங்க இலக்கியங்கள், சங்க காலம் பொற்காலம்,சங்க மருவிய காலம் - கீழ்க்கணக்கு நூல்கள் தொல்காப்பியம்,அகத்தியம், பிற்காலப் புலவர்கள், நாடகம் தோற்றம் வளர்ச்சி.

அலகு – 5 கட்டுரை வரைவியல் - பொதுக்கட்டுரை

பாடநூல் - பொதுக்கட்டுரைகள், மகிழினி பதிப்பகம், சென்னை-106.

பாடநூல்கள்

செய்யுள் திரட்டு (நான்கு பருவங்கள்), தமிழ்த்துறை வெளியீடு.

தமிழ் இலக்கிய வரலாறு, - பேரா.சி.கி.இலட்சுமணன்,கிருஷ்ணா வெளியீடு, திருச்சி. (2015-2016, 2016-2017 கல்வியாண்டுக்கு)

தமிழ் இலக்கிய வரலாறு, மு.அருணாசலம், இராஜா வரதராஜா, அருண் பதிப்பகம், திருச்சி-1. (2017-2018 கல்வியாண்டுக்கு).

Code:15H404	ELC-IV- English Through Literary Texts	Sem:IV

Objectives

To expose students to the creative use of the English language and make them appreciate it

To familiarize students with various forms and styles of writing in English

UNIT I --- British Poetry

1. **Incident of the French Camp** – *Robert Browning*
2. **Ozymandias** – *P.B.Shelley*
3. **Lotus Eaters** – *Alfred Tennyson*

UNIT II --- Indian Poetry in English

1.**Where the Mind is Without Fear** – *Rabindranath Tagore*
2.**Very Indian Poem in Indian English** – *Nissim Ezekiel*
3.**On Killing a Tree** – *Gieve Patel*

UNIT III --- American Poetry

1.**Brahma** – *Ralph Waldo Emerson*
2.**Stopping by Woods on a Snowy Evening** – *Robert Frost*
3.**Strange Meeting** – *Wilfred Owen*

UNIT IV --- Poetry from the Third World and Indian Fiction

Australia – *A.D.Hope*
Telephone Conversation – *Wole Soyinka*
Five Point Someone – *Chetan Bhagat*

UNIT V --- One Act Plays

The Rising of the Moon *by Lady Gregory* *(One-act play)*
Little Man *by John Galsworthy* *(One-act play)*
Seven Slaves – *A.Ball (One-act play)*

CODE: 15Y411	CC - VI - GENERAL CHEMISTRY-IV	SEM:IV

UNIT 1: Nitrogen and Oxygen Group Elements

1.1 Group 15 (nitrogen group): metallic and nonmetallic character of group 15 elements;hydrides and halides of group 15 elements-hydrazine, hydroxylamine, phosphene; ammonium nitrate, sodium bismuthate-properties and uses; sulphides of phosphorus (P_4S_3 and P_4S_{10}).

1.2 Oxides of group 15 elements: oxides of nitrogen-dinitrogen tetroxide, dinitrogenpentoxide; oxides of phosphorus, arsenic, and bismuth-trioxides, pentoxides.

1.3 Oxoacids of nitrogen: nitrous acid, nitric acid, hyponitrous acid, hydrazoic acid, pernitricacid; oxoacids of phosphorus-orthophosphorous acid, metaphosphorous acid, hypophosphorous acid; orthophosphoric acid, di-, tri-, and tetrapolyphosphoric acids; salts of phosphorus acids-dihydrogen- and monohydrogenphosphites, hypophosphites; salts of phosphoric acids- dihydrogen- and monohydrogen phosphates, normal phosphates, polyphosphates, metaphosphates; properties and uses of phosphites and phosphates; phosphate fertilizers.

1.4 Group 16 (oxygen group): structure and allotropy of elements, ozone, oxides-normal oxides, peroxides, suboxides, basic oxides, amphoteric oxides, acidic oxides, neutral oxides.

1.5 Oxides of sulphur-S_2O, SO_3; oxoacids of sulphur-thionic acid series, peroxoacidseries,oxohalides-thionyl compounds, sulfuryl compounds(Methods of preparation and properties).

UNIT II: Halogens

2.1 Group 17 (halogens): ionic-, covalent-, bridging halides, reactivity of halogens, and reduction of halogens by thiosulfate.

2.2 Halogen oxides: oxygen difluoride, dioxygendifluoride, dichlorine monoxide, chlorine dioxide, dichlorinehexoxide, dichlorineheptoxide; bleaching powder-estimation of available chlorine; bromine dioxide, iodine pentoxide.

2.3 Oxoacids of halogens: hypohalous acid HOX, halous acid HXO_2, halic oxide HXO_3, perhalic acid HXO_4, strength of oxoacids.

2.4 Interhalogen compounds: ClF, ICl; ClF_3, BrF_3, IF_3; ClF_5, BrF_5, IF_5; poly halides.

2.5 Psuedohalogens:cyanide, thiocyanate, and azide-structure and properties.

UNIT-III: HydroxyDerivatives

3.1 Aliphatic alcohols: Preparation by hydroboration, oxidation, Reduction of carbonyl compounds, epoxidation, and Grignard synthesis.

3.2 Reactions with reference to C-OH bond cleavage and O-H bond cleavage, iodoform test.

3.3 Phenols: Nomenclature, physical properties, hydrogen bonding.

3.4 Preparation: Industrial source, preparation from diazonium salts and sulphonic acids.

3.5 Reactions: acidity, ether formation, ester formation, mechanism of ring substitution,nitration, sulphonation, halogenation, Friedel-Craft's reaction, nitrosation, coupling reactions, Kolbe's reaction and Riemer-Tiemen reaction.

Unit –IV: Chemical Kinetics

4.1 Definition – concentration versus time curves to determine rate – rate laws for zero, first, second and third order reactions (same concentration) – rate constant – units of rate constants – order and molecularity – derivation of expressions for rate constants for zero, first, second and third order reactions – half life period- pseudo first order reaction, methods of determination of order of reactions integration, graphical, half-life and Ostwald's isolation methods.

4.2 Temperature dependence of reaction rates – Arrhenius parameters and calculations – Theories of reaction rates-simple collision theory – limitations ARRT – thermodynamics derivation of rate constant.

4.3 Steady state approximation-Lindemann's hypothesis of unimolecular reactions.

UNIT V: Catalysis

5.1 Homogeneous catalysis:Reactions in gases and in solutions (Acid, base and Wilkinson's catalysts). Kinetics ofenzyme catalysis: MichaelisMenton equation. Factors affecting enzymecatalysis.

5.2 Heterogeneous catalysis Langmuir adsorption isotherm. Its application to slightly, strongly, and moderatelyadsorbed systems. Theory of heterogeneous catalysis on the basis of Langmuir adsorption– Uni- and bimolecular reactions on solid surfaces.

Text Books

- *B.R. Puri, L.R. Sharma and K.C. Kalia, "Principles of Inorganic Chemistry", Milestonepublishers, New Delhi, 2007.*

- *P.L. Soni, H.M. Chawla "Text Book of Organic Chemistry", Sultan Chand &Sons,New Delhi, 2004.*
- *B.R. Puri, L.R. Sharma and Madan S. Pathania "Principles of Physical Chemistry", Vishal Publishing Co., Jalandhar, 2005.*

Reference Books

- ✓ *R.L. Madan and G.D. Tuli, "Inorganic Chemistry" S.Chand Co., Ltd., New Delhi,2003.*
- ✓ *ArunBahi and B.S. Bahi,"Advanced Organic Chemistry" S.Chand Co., Ltd., New Delhi,2005.*
- ✓ *Gurdeep Raj, "Advanced Physical Chemistry", Goel Publishing House, Merrut, 2000.*
- ✓ *V.B. Patania,"Chemical Kinetics", Campus Publications, New Delhi, 2004.*
- ✓ *R.T. Morrison and R.N. Boyd, "Organic Chemistry", Prentice Hall, New Delhi, 2000.*

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Code: 15Y412A	AC –VI – ALLIED PHYSICS –II (For B.Sc., Chemsitry Students)	Sem:IV

Objectives

To get the knowledge on electrostatics, current atom, nuclear basic and digital electronics

Unit - I Electrostatics

Basic concepts – Coulomb's law – Electric field –Ekectruc fuekd due to a point charge – lines of force – electric flux – gauss's law and its proof –Applicastions of gauss law: uniformly charged sphere – Capacitance of a conductor -principle of capacitor capacitors in series and parallel – Energy stored in a charged capacitor.

Unit-II Current Electricity and electromagnetic induction

Current and current density –Ohm's law –Krchoff's laws and its applications: Wheatstone's network-Care foster bridge. Introduction – Faraday's law –self induction –self inductance of a long solenoid – determination of self inductance by Raleigh's method –Mutual induction –Experimental determination of mutual inductance.

Unit-III Atomic Physics and Nuclear Physics

Vector atom model –quantum numbers associated with the vector atom model –The Pauli Exclusion principle –Magnetic dipole moment due to orbital motion of the electron –The stern and Gerlach experiment-The liquid drop model –mass effect –binding energy – ionization chamber – uses –Nuclear fission – energy released in fission –chain reaction –atom bomb-Nuclear fusion- source of solar energy

Unit-IV Basic Electronics

Zener diode -experiment to study the characteristics of zener diode – Light Emitting Diode –transistor – Characteristis – common emitter configuration -Transistor amplifier –osicllators – condition for oscillators – phase shift oscillators.

Unit-V Digital Electronics

Binary numbers –Number base conversions –Octal and Hexa decimal numbers –digital logic gates –Boolean algebra –Basic definitions – Basic theorems and properties of Boolean algebra –Universality of Nand

and NOR gate –De Morgan's theorem –Half adder and Full adder – Half subtractor and Full subtractor

Book for Study:

1. R.Murugesan, Electricity and Magnetism, SChand and Co., New Delhi, 1995. (Unit I,II)
2. R.Murugeshan, Allied Physics,S.Chand & Co., Ltd., New Delhi, Revised edition, 2005. (Unit III, IV and V)

Book for Reference:

1. Brijlal, Subramaniam, Electricity and Magnetism Ratan Prakashan Mandir Education and University Publishers, Agra,(2000
2. K.K.Tewari. Electricity and Magnetism S.Chand and Co. New Delhi (2005)
3. M.Morris Mano. Digital Logic and Computer Design Prentice Hall of India Private Limited, New Delhi 1996.
4. K.mehta, Rohit Mehta, Principles of Electronics, S.Chand & Company, New Delhi Eleventh Edition 2008.

Code: 15SSC	SSC-SOFT SKILLS COURSE	Sem-IV

Objectives:

"Soft skills" or behavioral skills are those that are crucial to an employee's ability to work "smarter". A survey of employers has revealed a list of specific "soft skills" that they believe as essential for employees. The skills most frequently mentioned for fresh entrant engineers are English communication, knowing how to learn; competence in reading, writing, effective listening and oral communication skills; grammar and vocabulary; and initiative; interpersonal skills; the ability to work in teams, Knowledge of industry.

Unit I

Importance of Spoken English: Indian and Global Context; Native and NonNative Accents of English and Issue of Intelligibility

• Aspects of English Pronunciation: Individual sounds: Vowels and Consonants+

Unit II

• Features of Connected Speech: Word Stress, Rhythm and Intonation

• Fluency in Spoken English: Rate of Speaking, Volume of Voice, Pitch, Articulation, Clarity of Expression, Lack of Hesitation, Confidence

• Speaking Politely in English: Use of Can, Could, May, Might, Will, Would, Expressing Requests, Gratitude, Compliments, Agreement, Disagreement

Unit III

Definition and Functions of Communication, Types of Communication:

Interpersonal (Dyadic), Group Communication, Mass Communication

• Maxims of Good Conversation

Unit IV

• Characteristics of Competent Speaker
• Styles of Speaking
• Interview and Group Discussion

Unit V

• Speaking with Confidence: Speech Anxiety, Ways to Overcome Speech Anxiety, Building Credibility as a Speaker: Competence, Character, CharismaSituational Conversations: Meeting People, Greetings, Introducing Yourself, Introducing People, Saying Thanks.

CODE: 15Y513	CC - VII - INORGANIC CHEMISTRY-I	SEM:V

Objectives:

To learn about the various concepts in coordination chemistry.

To gain knowledge about binary compounds and organometallic compounds.

UNIT-I COORDINATION CHEMISTRY-I

1.1 Introduction: ligands-monodentate, bidentate, and polydentate ligands; coordination sphere;coordination number; nomenclature of mononuclear and dinuclear complexes; chelateeffect.IUPAC nomenclature.

1.2 Werner theory – Sidgwick theory – EAN rule – Valance bond theory- postulates, sp^3,dsp^2,sp^3d^2, and d^2sp^3hybridisation with examples and drawbacks of VBT.

1.3 Crystal field theory-splitting of t_{2g} and e_g levels, CFSE, octahedral and tetrahedral splitting, with examples and limitations. Molecular orbital theory-postulates, application to octahedral complexes only

UNIT-II COORDINATION CHEMISTRY-II

2.1 Isomerism – stability of complexes – factors affecting the stability of complexes.

2.2 Unimolecular and bimolecular nucleophilic substitution reactions in octahedral and square planar complexes- Trans effect and its applications.

2.3 Spectral characteristics of metal complexes – types of absorption spectra – the spectrum of d^1 ionand d^4 ion.

UNIT-III COORDINATION CHEMISTRY-III

3.1 Metal complexes in analytical chemistry -estimation of nickel using DMG and aluminiumusing oxime. Structure of EDTA and its complexes. – Chelates –conditions for chelation-importance of chelates

3.2 Metal complexes in medicinal chemistry-metal complexes in therapy-metal complexes in Industrial processes-complexation and electroplating.

3.3 Biologically important coordination compounds- chlorophyll, hemoglobin, vitaminB_{12}-their structure and application (elucidation is not required)

UNIT-IV: ORGANOMETALLIC COMPOUNDS

4.1 Nomenclature of organometallic compounds, 16- and 18-electron rule.Metal carbonyls-mono and poly nuclear carbonyls of Ni,Fe,Co and Mn -synthesis,reactions,structureand uses.

4.2 Nitrosyl compounds – classification, preparation, properties and structure of nitrosyl chloride and sodium nitroprusside.

4.3 Metal olefins – cyclopentadienes (Ferrocene)-synthesis, structure and bonding.Wilkinson's catalyst and alkene hydrogenation, hydroformylation, Monsanto acetic acidprocess, Ziegler-Natta catalyst and polymerization of olefins.

UNIT-V:BINARY COMPOUNDS AND BIOCHEMISTRY OF NONMETALS

5.1 Binary compounds-hydrides, borides, carbides and nitrides – classification,preparation and uses.

5.2 Biochemistry of non-metals-nonmetals in structural uses-biomineralisation-biological role of Some trace nonmetals- fluorine, (luorosis) chlorine, bromine, and iodine (hypo and hyper thyroidism).

Text Books

- *B.R. Puri, L.R. Sharma and K.C. Kalia, "Principles of Inorganic Chemistry", Milestonepublishers, New Delhi, 2007.*
- *R.L. Madan and G.D. Tuli, "Inorganic Chemistry" S.Chand Co., Ltd., New Delhi,2003.*

Reference Books

- ✓ *R.D. Madan, "Modern Inorganic Chemistry", S.Chand& Co., New Delhi, 2003.*
- ✓ *J.D. Lee "Concise Inorganic Chemistry", E.L.B.S., 2001*
- ✓ *GurdeepChatwal and M.S. Yadav", Coordination Compounds", Himalayan Publications, 2003.*
- ✓ *Gurdeep Raj, "Advanced Inorganic Chemistry", Goel publishing, Meerut, 2002.*
- ✓ *Kamalesh Bansal, "Coordination Chemistry", Campus Publications, New Delhi,2003.*
- ✓ *Asim.K.Das,"Bioinorganic Chemistry",books&Allied(P) ltd* kolkata'2007.

CODE: 15Y514	CC - VIII - ORGANIC CHEMISTRY- I	SEM:V

Objectives:

To learn the chemistry of carbonylacid and heterocyclic compounds.

To learn the stereochemistry of organic compounds.

Unit I: Stereochemistry-I

1.1 Conformational isomerism: Conformers, dihedral angle, torsional strain.

1.2 Conformational analysis of ethane and n-butane, conformers of cyclohexane (Chair, boat and skew boat forms), axial-equatorial positions and their interconversions, conformers of mono and disubstitutedcyclohexanes, 1,2 and 1,3 interactions.

1.3 Geometrical isomerism: Cis-trans, syn-anti and E-Z notations, methods of distinguishing geometrical isomers using melting point, dipole moment, dehydration, cyclisation and heat of hydrogenation.

UNIT II: Stereochemistry-II

2.1 Optical isomerism, optical activity, optical and specific rotations, conditions foroptical activity, asymmetric centre, chirality, achiral molecules, meaning of (+)and(-) and D and L notations, elements of symmetry, racemization, methods of racemization(by substitution and tautomerism), methods of resolution (mechanical, seeding, biochemical and conversion to diasteromers), asymmetric synthesis (partial andabsolute synthesis), Walden inversion.

2.2 Projection Formula, Fischer, flying wedge, sawhorse and Newmann projection formulae –notation of optical isomers - Cahn-Ingold-Prelog rules, R and S notations for opticalisomers with one and two asymmetric carbon atoms, erythro and threo representations.

2.3 Optical activity in compounds not containing asymmetric carbon atoms namely biphenyls,allenes and spiranes.

Unit-III: Reactions of carbonyl compounds.

3.1 Carbonyl polarization-Reactivity of Carbonyl group.

3.2 Mechanisms of Aldol, Perkin, Knoevenagal and Benzoin condensation.Mechanisms of Claisen and Cannizaro reaction.

3.4 Mechanisms of reduction (sodium borohydride, Lithium aluminum Hydride and Wolf Kishnerreductions,Brich reduction).

3.5 Photochemistry of carbonyl compounds-Norrish-I and Norrish-II types.

Unit-IV: Acid and Acid derivatives.

4.1 Ionization of carboxylic acids-Acidity constant-comparison of acid strengths of substituted halo acids-Acid strength of substituted Benzoic acids-Hammett equation.

4.2 Dicarboxylic acids: preparation and properties of oxalic acids, malonic acid, succinic acid.Unsaturateddicarboxylic acids-Maleic acids, Fumaric acid-preparation, properties and uses.

4.3 Malonic and acetoacetic ester-characteristics of reactive methylene group- synthetic uses of acetoacetic ester.

Unit-V: Polynuclear hydrocarbons and heterocyclic compounds.

5.1 Polynuclear hydrocarbons-Naphthalene, anthracene and phenanthrane-Isolation, properties and uses.

5.2 Heterocyclic compounds-Aromatic Characteristics of heterocyclic compounds. Preparation, properties and uses of Furan,

pyrrole and Thiophene. Structure, synthesis and reactions of pyridine and piperidine.

5.3 Synthesis and reactions of Quinoline, Isoquinoline and indole with special references to Skraup, Bischler-Napieralski and Fischer - Indole synthesis.

Text Books:

- *ArunBahi and B.S. Bahi,"Advanced Organic Chemistry" S.Chand Co., Ltd., New Delhi,2005.*
- *R.T. Morrison and R.N. Boyd, "Organic Chemistry", Prentice Hall, New Delhi, 2000.*

References:

- ✓ *Bahl and ArunBahl, Advanced Organic Chemistry, S.Chand& co-New Delhi (1995).*
- ✓ *P.L.Soni and H.M. Chawla, text boox of organic Chemistry, sultan chand, New Delhi, 28th Edition. 1995.*
- ✓ *P.S.Kalsi, stereochemistry conformation and mechanism(16th edition), Weilley Eastern Limited, New Delhi.*

CODE: 15Y515	CC – IX - PHYSICAL CHEMISTRY - I	SEM:V

Objectives:

To study the first, second and third law of thermodynamics.

To learn different phase equilibra and group theory

Unit-I: First law of thermodynamics.

1.1 Definition of system, surrounding, isolated, closed, open, homogeneous and heterogeneous system. State of a system –extensive and intensive properties. Thermodynamics process-Cyclic, Reversible, Irreversible, isothermal and adiabatic process. Difference between reversible and irreversible process-state and path functions. Concept of work and heat. Work of expansion at constant pressure and free expansion.

1.2 The Zeroth law and first law of thermodynamics –statements. Definition of internal energy enthalpy and heat capacity –Relation between C_p and C_v-calculation of W,Q, dE, dH for expansion of ideal gas under reversible isothermal and adiabatic conditions.

1.3 Joule's law-Joule-Thomson effect. $\mu_{J.T}$ and its relation with thermodynamic quantities and inversion temperature – temperature dependence ofΔH- Kirchoff's equation.

Unit-ll: Second law of the thermodynamics:

2.1 Need for the II- law – Different statements – Heat engine – Carnot's cycle and its efficiency – Carnot's thermodynamic scale of temperature.

2.2 Concept of entropy – entropy as a state function – entropy as a function of P,V& T- Entropy change in phase changes – Entropy of mixing – entropy as a criterion of spontaneous and equilibrium processes in isolated system.

2.3 Gibbs (G) and Helmholtz (A) function - A and G as criteria for thermodynamic equilibrium and spontaneity Variation of A and G with P,V and T.- Gibbs – Helmholtz equation and its applications-Maxwell's relations. Thermodynamic equations of state.

Unit-lll: Applications of ll -Law of thermodynamics & Third law:

3.1 Equilibrium constant and free energy change – Reaction isotherm – vant Hoff's equation – van'tHoff'sisochors – clapeyron and Classius – Clapeyron equation and applications. Thermodynamic interpretation of Le-Chatelier's principle (concentration, temperature, pressure and addition inert gases.

3.2 Equilibrium between different phases – System of variable composition – Partial molar quantities – Chemical potential in an ideal mixture – Gibb's – Duhem equation

3.3 Need for the lll- law – Nernst heat theorem – Evaluation of absolute entropy form heat capacity data – Exception to the third law (Ortho-para hydrogen and CO_2 only).

Unit-lV: Phase equilibria.

4.1 Meaning of the terms – Phase, component and degree of freedom – Derivation of Gibb's phase rule – equilibrium in one component systems – Water and sulphur.

4.2 Phase equilibrium of two component systems – Solid-Liquid equilibria – simple eutectic systems Bi-Cd and Pb-Ag system. Desilverisation of lead.

4.3 Compound formation with congruent melting point (Mg-Zn) and incongruent melting points (Na-K), NaCl – water system – freezing mixtures – Gas-Solid equilibria – ($CuSO_4$– H_2O system) – Efflorescence and Deliquescesce.

Unit-V: Solutions

5.1 Henry's law and its limitations. Activity activity co-efficient in liquids. Duhem – Margule's equation and its application to fractional distillation of binary miscible liquids – Azeotropes (HCl-H_2O system).

5.2 Partiaaly miscible liquid pairs, Phenol – Water, Troethylamine – water system.

5.3 Immiscible liquid pqirs – Principles and application of steam distillation – Nernst distribution law – Derivation and applications.

Text Books:

- *P.K.Bhatacharya, Chemical Application of Group theory, Himalaya Publishing House, Mumbai(1998).*
- *B.S.Bahl, G.D. Tuli, AurnBahl, Essentials of Physical Chemistry , S.Chand& Company Ltd, New Delhi, 16th Ed., 2001.*

- *Gurdeep Raj, Advanced physical chemistry, Goel publishing house, Meerut,28th Edn.,2002.*

References:

- ✓ *.K.Bhatacharya, Chemical Application of Group theory, Himalaya Publishing House, Mumbai(1998).*
- ✓ *B.S.Bahl, G.D. Tuli, AurnBahl, Essentials of Physical Chemistry , S.Chand& Company Ltd, New Delhi, 16th Ed., 2001.*
- ✓ *Gurdeep Raj, Advanced physical chemistry, Goel publishing house, Meerut,28th Edn.,2002.*
- ✓ *B.R.Puri& L.R. Sharma, Principles of physical chemistry (16th edition), shobanLalNaginchand&Co., New Delhi (2000).*

Code: 11Y516L	CC - X - PRACTICAL-III- GRAVIMETRIC AND ORGANIC ANALYSIS	Sem:V & VI

Objectives:

To learn different types of Gravimetric estimations.

To study the different techniques in the analysis of organic compounds.

GRAVIMETRIC ANALYSIS

i. Estimation of calcium as calcium Oxalate monohydrate.
ii. Estimation of barium as barium sulphate.
iii. Estimation of barium as barium Chromate.
iv. Estimation of lead as lead sulphate.
v. Estimation of lead as lead Chromate.
vi. Estimation of magnesium as magnesium oxinate

ORGANIC ANALYSIS

Characterization of organic compounds by their functional groups and conformation by preparation of derivatives.

Demonstration experiment.

Extraction of Rose oil from Rose (soxhlet extraction)

Text Books:

- *V.Venkateswaran, R.Veersamy and A.R.KulandiveluBasic principles of practical chemistry, sultan Chand &sons, second Edition (1997)*

References:

- ✓ *V.Venkateswaran, R.Veersamy and A.R.KulandiveluBasic principles of practical chemistry, sultan Chand &sons, second Edition (1997)*
- ✓ *FurnissB.S.etal, Vogel's text book of practical organic chemistry (7^{th} edition) London ELBS-Longman (1984).*

CODE: 11Y517L	CC - XI - PRACTICAL-IV PHYSICAL CHEMISTRY EXPERIMENTS AND ORGANIC PREPARATIONS	SEM:V & VI

Objectives:

To learn different physical chemistry experiment and organic preparations.

PHYSICAL CHEMISTRY EXPERIMENT:

1. **Distribution law:**

Partition co-efficient of Iodine between carbon tetra chloride and water.

2. **Kinetics:**

Acid catalyzedhydrolysis of an ester (Methyl acetate or Ethyl acetate).

3. **Molecular weight:**

Rast's method: Naphthalene, m- dinitro benzene and diphenyl as solvents.

4. **Heterogeneous equilibrium:**

a) Critical solution temperature of phenol-water system –effect of impurity (2%NaCl or2%Succinic acid solutions).

b) Simple eutectic systems: Naphthalene- Biphenyl, Naphthalene-Diphenylamine.

c) Determination of transistion temperature: (sodium acetate, sodium thiosulphate, $SrCl_2.6H_2O$ and $MnCl_2.4H_2O$)

5. **Electro chemistry:**

a)Conductivity:

(I) Cell constatnt (II)Equivalent conductivity(III)Conductometric Titrations

A) Strong Acid Vs Strong baseB) Weak Acid Vs Strong base

b)Potentiometry:

(I)P^H Determination

(II)Potentiometic titrations.(Acid Base and Redoxtitrations)

ORGANIC PREPARATIONS:

Preparation involving oxidation, reduction, hydrolysis, Nitration, sulphonation, halogenations and diazotisation.

Applied Experiments

UV spectroscopy (only demonstration)

Text Books:

- *V.Venkateswaran, R.Veerasamy and A.R .Kulandaivelu. Basic principles of practical chemistry, sultan chand, &sone second Edition.(1997)*
- *K.K.Sharma and O.Sharma, An introduction to practical chemistry, vani education books, second edition(1982)*

References:

- ✓ *V.Venkateswaran, R.Veerasamy and A.R .Kulandaivelu. Basic principles of practical chemistry, sultan chand, &sone second Edition.(1997)*
- ✓ *K.K.Sharma and O.Sharma, An introduction to practical chemistry, vani education books, second edition(1982)*
- ✓ *ARTHUR I. VOGEL, elementary practical organic chemistry Qualitative organic analysis, CB publishers and distributors*.

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CODE: 15Y518	ELECTIVE -I- ANALYTICAL CHEMISTRY	SEM:V

Objectives:

To learn the error analysis and laboratory hygiene and safety

To study the theory of different analytical techniques

Unit-l: LABORTORY HYGIENE AND SAFETY:

1.1 Storage and handling of chemicals- Corrosive, flammable, explosive, poisonous, carcinogenic and toxic chemicals.

1.2 First AidTecnicques:Acid in eye, alkali in eye, acid burns, alkali burns, bromine burns, poisoning, inhalation of toxic vapours, cut by glasses and burns.

1.3 Data Analysis: Errors in chemical analysis – Types of errors. Determinate errors, personal errors, instrumental errors, correction of determinate errors- indeterminate errors. Precision, accuracy and rejection of data, significant figures –Mean – Mean deviation and standard deviation. Curve fitting, Method of least squares.

Unit-ll: SEPARATION TECHNIQUES:

2.1 Precipitation – principle – solvent Extraction – Continuous extraction and soxhlet extractor.

2.2 Chromatography:Chromatography – Types – General principles involved in adsorption, partition and ion exchange, paper thin layer, column, gas liquid chromatography, Electro chromatography.

2.3 Purification techniques: Desiccants, Vacuum drying, distillation – fractional distillation, steam distillation, Azeotropicdistillation, Crystallization and sublimation – principles and techniques.

Unit-lll: THERMOANALYTICAL METHODS:

3.1 Thermogravimetric analysis and differential thermal analysis – principle and instrumentation. Characteristics of TGA ($CaC_2O_4.H_2O$). Factors affectingTGA and DTA curves.-Thermometric titration of HClVsNaOH.

3.2 GravimeticAnalysis: Characteristics of precipitation agent – choice of precipitants – specific and selective precipitant. Condition of Precipitation. Types of precipitates –Purity of Precipitates. Co-precipitation and post precipitation. Precipitation from homogeneous solution.

3.3 Digestion and washing of precipitate. Ignition of the precipitate. Use of sequestering agents. Electro gravimetric Analysis and polarography.

Unit-lV: COLORIMETRIC ANALYSIS:

4.1 Laws of Colorimetry – Instrumentation, Nessler's and photoelectric colorimetric method – operation and applications. Estimation of Ni, Cu and Fe.

4.2 Techniques in Kinetics:Principles and techniques used to follow the kinetics of ordinary and fast – photo chemical reactions.

4.3 OrganicEstimations:Principles and methods to estimate glucose, ascorbic acid, phenol, aniline, ketone, oils and fats. Iodine value, saponification value, RM value and acetyl value.

Unit-V: COMPUTER APPLICATON IN CHEMISTRY:

5.1 The block diagram of a PC – Algorithms and flow charts

5.2 Introduction to 'C'- Features of C language – Question mark operator – Control statement - switch statement – Go to statement – Loops.

5.3 Examples of simple chemistry programs.

1. Conversion of Celsius temperature to Kelvin temperature.
2. Application of Beer Lambert Law.
3. Molecular weight from atomic weights.
4. Use of question mark operator – Work of isothermal or adiabatic expansion of ideal gases.
5. Calculation of molecular weights of different organic compounds from formulas and data on atomic weights of C,H,S,O and halogens.
6. Calculation of molar heat capacity.
7. Calculation of first order rate constant.
8. Calculation on Enthalpy of a reaction.

Text Books:

- *R.Gopalan ,P.S. Subramaniyan and K.Rengarajan, Elements of Analytical chemistry, sultan chand& sons, New Delhi(1995).*
- *B.K.Sharma, Instrumental methods of Chemical analysis, Goel Publishing House,m Meerut (1999).*

References:

- ✓ *R.Gopalan ,P.S. Subramaniyan and K.Rengarajan, Elements of Analytical chemistry, sultan chand& sons, New Delhi(1995).*
- ✓ *B.K.Sharma, Instrumental methods of Chemical analysis, Goel Publishing House,m Meerut (1999).*
- ✓ *K.V.Raman, Computers in Chemistry, Tata McGraw Hill Co.,New Delhi(1993).*
- ✓ *E.Balagurusamy s, C programming, Tata McGraw Hill Co.,New Delhi(1997).*

CODE: 15Y5N	NMEC- AGRICULTURAL SCIENCE	SEM:V

Objectives:

To learn the characteristics of soil plant nutrients.

To study pest management, fungicides and herbicides.

Unit-I: Soil formation.

Origin of earth-Geological formation of india-soil forming rocks and minerals. Classification –Weathering of ricks and minerals-processes of weathering and factors affecting them. Soil formation-factors of soil formation soil forming processes-profile development-Definition of soil-soil composition.

Unit-II: properties of soil.

Soil chemical properties-soil colloids-inorganic colloids-clay minerals-Amorphous –Ion exchange reactions-Organic colloids-soil organic matter-Decomposition-Humus formation-significance on soil fertility, soil reaction-Biological properties of soil-Nutrient availability.

Unit-III: Fertilizers.

Fertilizer-Definition-Fertilizer recomendmation based on soil testing-Nitrogenenous fertilizer-Effect of nitrogen on plant growth and development. Phosphate fertilizer – Effect of phosphorous on plant growth and development-functions of potassium on plant growth-Mixed fertilizer-Micro nutrients and their role in plant life.

Unit-IV: Pest management and control.

Pesticides-Formulations-Emulsifiable concentrate, water miscible liquids, wettable powders, dusts, granules, classification of pesticide-mode of action-characteristics-uses- impact of pesticides on environment-safety measures in the analysis and handling of pesticides.

Unit-V: Fungicides and herbicides.

Fungicide-Inorganic-sulphur compounds-Organic-Dithiocarbamates. Herbicides-Inorganic herbicides-Arsenic compounds, Cyanamide-Cyanides-chorates and sulphamates. Organic herbicides and nitro compounds

References:

- *N.C.Brady, The nature and properties of soil, Eurasia publishing house (p)Ltd,9th Ed., 1984.*
- *T.D.Biswas, and S,K.Mukerherjee, Text book of soil science, Asia publishing house, Madras (1987)*
- *A.J.Darin, A Text book of soil science,Asia publishing house, Madras (1970)*

Text Book

- ✓ *N.C.Brady, The nature and properties of soil, Eurasia publishing house (p)Ltd,9th Ed., 1984.*
- ✓ *T.D.Biswas, and S,K.Mukerherjee, Text book of soil science, Asia publishing house, Madras (1987)*
- ✓ *A.J.Darin, A Text book of soil science,Asia publishing house, Madras (1970)*

CODE: 11Y619	CC – XII-INORGANIC CHEMISTRY-II	SEM:VI

Objectives

To know the principles of radioactivity and nuclear chemistry.

To gain knowledge about non-crystalline compounds.

To learn the nature of bonding in metals.

Unit - I Nuclear Chemistry-I

1.1 Introduction – composition of nucleus, fundamental particles and nuclear forces – Meson field theory.

1.2 Nuclear stability – n/p ratio, mass defect, binding energy (includingproblems) packing fraction and magic numbers, shell and liquid drop models.

1.3 Isotopes – detection(Aston's mass spectrograph) and separation-thermal diffusion – distillation-fractional electrolysis-chemical exchange and centrifugal methods Deviation of atomic weights from whole numbers, Isobars, Isotones,isosters and nuclear isomers.

Unit-II Nuclear Chemistry-II

2.1 Radioactivity – discovery-nature of radiations from radioactive substances-harmful effects of radiations-detection and measurements of radioactivity (Wilson cloud chamber).

2.2 Group displacement law-mechanism of radioactive decay (α, β, & γ emission)-Geiger-Nuttals Rule-rate of nuclear disintegration-half-life period-significance of half-life period-units of radioactivity.

2.3 Radioactive disintegration series (U,Th,Ac,Np)

Unit-III Nuclear Chemistry-III

3.1 Nuclear reactions- fission, spallation, projectile capture and fusion- nuclear reaction energy values (Q-values)-calculation of Q-values.

3.2 Nuclear reactors, Applications of radio isotopes – Carbon dating – Radioactive waste disposal.

3.3 Radiolysis of water and hydrated electron.

Unit-IV Metallic State

4.1 Packing of atoms in metal (bcp,ccp,hcp)

4.2 Theories of metallic bonding – electron gas, Pauling and band theories

4.3 Structure of alloys – substitutional and interstitial solid solutions – Hume Rothery ratios –crystal defects.

4.4 Semiconductors – Extrinsic and intrinsic – n-type and p-type – composition, structure and uses in electronic industry.

Unit – V Non-Crystalline Compounds

5.1 Clathrates – Quinol, water and complex clathrates structures. Interstitial compounds and non-stoichiometric compounds.

5.2 Silicones – composition, raw materials, manufacture, structures, properties and uses.

5.3 Silicates – Classification into discrete anions, one, two and three dimensional structureswith typical examples composition, properties and uses of beryl, asbestos, talc, mica, zeolites and ultramarines.

Text Books

- *B.R. Puri, L.R.Sharma and K.C. Kalia, "Principles of Inorganic Chemistry", Milestone Publishers, New Delhi, 2007.*
- *R.D. Madan and G.D. Tuli, "Inorganic Chemistry", S. Chand & Co., New Delhi, 2005*
- *P.L. Soni and Mohan Katyal, "Text Book of Inorganic Chemistry", Sultan Chand & Co.,New Delhi, 2004.*

Reference Books

- ✓ *Gurdeep Raj, "Advanced Inorganic Chemistry", Goel Publications, Meerut, 2002.*
- ✓ *J.D. Lee, "Concise Inorganic Chemistry", New Delhi, 2001.*
- ✓ *C.V.Shekar,"Nuclear Chemistry",Dominant Puplishers,NewDelhi,2014.*

CODE: 11Y620	CC –XIII-ORGANIC CHEMISTRY-II	SEM:VI

Objectives:

To learn the chemistry of nitrogen containing compounds.

To learn the chemistry of amino acids and proteins.

To learn and practice the molecular rearrangements and the reaction mechanisms.

To learn the basic aspects of heterocyclic compounds and natural products.

UNIT 1: Nitrogen Containing Compounds

1.1 Nitro compounds: aliphatic and aromatic nitro compounds, classification, generalproperties, Preparation by nitration

1.2 Reactions: reduction by chemical and electrolytic methods.Di- and tri-substitution of aromatic nitro compounds: synthesis of o-, m-, pdinitrobenzenesand trinitrobenzene.

1.3 Aromatic amines. Preparation of primary, secondary and tertiary amines. Reactions: basicity of amines, effect of substituents on basicity of aromatic amines. Somesulpha drugs.

1.4 Diazonium salts: Preparation, diazotisation reactions, replacement reactions (Sandmeyer,Gatterman and Gomberg reactions), coupling reactions.

UNIT II: Amino acids and Proteins

2.1 Amino acids – classification –Synthesis of amino acids and their identification.

2.2 Peptide bond- stereochemistry, synthesis of peptides by solution and solid phasetechniques.

2.3 Proteins – classification based on physical properties – Physiological functions of proteins. Primary and secondary structure of proteins Helical and sheet structure. Denaturation of proteins

2.4 Nucleic acids:Types of nucleic acids – DNA and RNA polynucleotide chain (structure). Components– Biological functions.

UNIT:III Phenols and Carbohydrates

3.1 Phenols: Acidic character of phenols, Explanation on the basis of resonance stabilization. Ring substitution in phenols – Orientation of phenolic group towards electrophiles titration, Reimer-

Tiemann reaction, Gattermann reaction. Sulphonation, halogenations, coupling with diazonium salts. Kolbe's reaction and Houben – Hoesh reactions. Nitro phenols, aminophenols, Dihydric and Trihydric phenols. Alpha and Beta naphthols – preparation

3.2 Carbohydrates: classification, constitution of glucose and fructose. Reactions of glucose and Fructose – Muta rotation and its mechanism,configuration of monosaccharides,Determination of ring size, Epimerisation, chain lengthening and chain shortening of aldoses. Interconversion of aldoses and ketoses.

3.3 Disaccharides – Reactions and stricture of maltose and sucrose. Polysaccharides–reactions of starch and cellulose (structural elucidation not necessary).

UNIT:IV Natural Products

4.1 Terpenes – General methods of isolation and structural determination of Geraniol, Menthol and α-terpineol.

4.2 Alkaloids: General methods of isolation and structural determination of conine, piperineand nicotine.

4.3 Vitamins: Thiamine, Riboflavine, Pyridoxine and Ascorbic acid – occurrence and biological importance. Structural elucidations of Pyridoxine.

UNIT V: Molecular Rearrangements

5.1 Classification as anionotropoic, cationotropic, free radical, inter and intramolecularrearrangement.

5.2 Pinacol-pinacolone rearrangement (mechanism, evidence for carbonium ion intermediateformation-migratory aptitude)

5.3 Beckmann, Hoffmann, Curtius and Benzilic acid rearrangements.

5.4 Claisen rearrangement (sigma tropic-evidence for intramolecular nature and allylic carbonattachment)-para Claisen, Cope and oxycope rearrangements and Fries rearrangement.

Text books

- *R. T. Morrison and R. N. Boyd, Organic Chemistry, 6th Edition, Printice-Hall Of India Limited., New Delhi, 1992.*
- *B. Y. Paula, Organic Chemistry, 3rd Edition, Pearson Education, Inc.(Singapore), New Delhi, reprint, 2002.*
- *I. L. Finar, Organic ChWemistry, 6th edn, ELBS, 1990.*

- *O. P. Agarwal, Chemistry of Organic Natural Products, Vol 1 and 2, Goel Pub. House, 2002.*
- *GurdeepChatwal, Chemistry of Organic Natural Products, Vol 1 and 2, Goel Pub. House,2002.*
- *Bahl and ArunBahl, Organic Chemistry, S. Chand and Sons, New Delhi, 2005.*

Reference Books

- ✓ *Jerry March, Advanced Organic Chemistry, 4th Edition, John Wiley and Sons, New York,1992.*
- ✓ *S. H. Pine, Organic Chemistry, 5th Edition, Mcgraw Hill International Edition, ChemistrySeries, New York, 1987.*
- ✓ *Sehan. N. Ege, Organic Chemistry, Structure and Reactivity, 3rd Edition, A.I.T.B.S., NewDelhi, 1998.*
- ✓ *Hendrickson, Cram and Hammond, Organic Chemistry (3rd Edition), Mcgraw-HillKogakusha, Limited, 1970.*
- ✓ *E. L. Eliel and S. H. Wilers, Stereochemistry of Organic Compounds, John Wiley andSons, New York, 2004.*

CODE: 11Y621	CC – XIV-PHYSICAL CHEMISTRY-II	SEM:VI

Objectives:

To learn the chemistry of electrochemical cells and electrical conductance.

To study the principles of microwave, IR, Raman, NMR and ESR spectroscopy.

Unit-I: Electrical conductance.

1.1 Electrical transport and ohm's law-conduction in metals and in electrolytic solutions-specific conductance, equivalent conductance and molar conductance-variation of equivalent conductance in the concentration.

1.2 Migration of ions-Kohlrausch's law and its application-Arrhenius theory of electrolytic dissociation and its limitations-Weak and strong electrolytes according to Arrhenius theory-Ostwald's dilution law-uses and limitations. Transport number-Hitorff's rule-Determination of transport number by Hitorff's method and moving boundary method.

1.3 Application of conductance measurements-determination α-for strong electrolytes –Ka for weak acids-solubility product of sparingly soluble salt-conductometric titration.

Unit-ll: Equilibrium in electrochemical cells.

2.1 Electrolytic and galvanic cells-reversible and irreversible cells-representation of electrochemical cells-origin of electromotive force. Nernstequation- types of electrodes-Gas/Metal ion –metal/metal ion-metal/insoluble salt and redox electrode-electrode reactions single electrode potential and computation of cell emf. Standard electrode-SHE, calomel electrode, Ag-AgCl electrode-determination of standard potential- electrochemical series and its applications.

2.2 Concentration cell with and without transport-liquid – liquid junction potential-applications of concentration cells valency of ions – solubility product-potentiometric titrations –pka determination –pH determination using hydrogen quinhydrone and glass electrode-corrosion –electro chemical theory –prevention of corrosion.

Unit-lll: Microwave and IR Spectroscopy.

3.1 Definition of spectrum. Electromagnetic radiations-interaction of electromagnetic radiations with molecules-Quantization of different of different forms of energy in molecules.

3.2 Microwave spectroscopy –condition –molecular rotation theory of microwave spectroscopy – selection rule- effect of isotopic substitution and calculation of moment of inertia and Bond length of diatomic molecules.

3.3 Infrared spectroscopy-conditions –molecular vibration-modes of vibrations in linear and nonlinear molecules (CO_2,H_2O only)-stretching and bending vibrations-selection rules, Applications of IR spectra in identifying >C=O,NO_2,-OH groups only.

Unit-lV: Raman, Mass & UV-visible spectroscopy.

4.1 Raman spectroscopy-Rayleigh and Raman scattering –strokes and Anti
strokes lines-Difference between Raman and I.R.

4.2 Mass spectroscopy- Basic principles-Molecular ion peak –Base peak-Isotopic peak-Meta stable peak –Nitrogen rule-Ring rule-Mass spectrum of CH_3CHO,CJ_3NH_2,C_6H_5-CH_3 only.

4.3 U.V-visible spectroscopy-condition-theory of electronic spectroscopy-Types of electronic transitions-Frank-Condon principle –predissociation –applications.

Unit-V: NMR and ESR spectroscopy.

5.1 NMR Spectroscopy –Magnetic and nonmagnetic nuclei-condition –principle of nuclear magnetic resonance-ring current effect-shielding mechanism – Chemical shift–Number of signals –spin-spin coupling constant (J)-splitting of signals-NMR Spectra ofCH_3-CH_2-OH, phenol and C_6H_5-O-CH_3.

5.2 ESR Spectroscopy-conditions –theory of E S R spectra –Hyperfine splitting –E S R Spectra of simple radicals CH_3, Naphthalene negative ion only.

Text books:

- *Gurdeep Raj, Advanced physical chemistry, Goel publishing house, Meerut, 28thEdn., 2002.*
- *B.R.Puri& L.R. Sharma, Principles of physical chemistry (16th edition), shobanLalNaginchand&Co., New Delhi (2000).*

References:

- ✓ *Gurdeep Raj, Advanced physical chemistry, Goel publishing house, Meerut, 28thEdn., 2002.*
- ✓ *B.R.Puri& L.R. Sharma, Principles of physical chemistry (16th edition), shobanLalNaginchand&Co., New Delhi (2000).*
- ✓ *B.S.Bahl, C.D Tuli, Arunbhal, Essential of physical chemistry,(16th edition) S.Chand&campany ltd, new Delhi (2001).*
- ✓ *Y.R. Sharma, Elementary organic spectroscopy,, S. Chand &Company Ltd., New Delhi 2000.*

CODE: 15Y622	ELECTIVE – II- POLYMER CHEMISTRY	SEM:VI

OBJECTIVES :

To give the students the importance of polymers and an exposure to polymer science.

To learn Plastics and resins.

UNIT 1: INTRODUCTION TO POLYMER (10 hours*)*

1.1 Monomers, Oligomers, Polymers and their characteristics

1.2 Classification of polymers: Natural synthetic, linear, cross linked and network; plastics,elastomers, fibres, Homopolymers and Co-polymers

1.3 Bonding in polymers: Primary and secondary bond forces in polymers; cohesive energyand decomposition of polymers.

1.4 Determination of Molecular mass of polymers: Number Average molecular mass (Mn) andWeight average molecular mass (Mw) of polymers and determination by (i) viscosity (ii) Light scattering method (iii) Gel Permeation Chromatography (iv) osmometry and ultracentrifuging.

UNIT 2 : KINETICS AND MECHANIISM FOR POLYMERIZATION

2.1 Chain growth polymerization: Cationic, anionic, free radical polymerization, Stereo regularpolymers: Ziegler Natta polymers.

2.2 Polycondensation-non catalysed, acid catalysed polymerization, molecular weightDistributionStep growth polymers

UNIT 3 : TECHNIQUES OF POLYMERIZATION AND POLYMER DEGRADATION

3.1 Bulk, Solution, Emulsion, Suspension, Melt polycondensation, solution polycondensationinterfacial and gas phase polymerization

3.2 Types of Polymer Degradation, Thermal degradation, mechanical degradation,photodegradation, Photo stabilizers.

UNIT 4: INDUSTRIAL POLYMERS:

4.1 Thermoplastics: Polyethylene, Polypropylene, polystyrene, Polyacrylonitrile, Poly VinylChloride, Poly tetrafluoro ethylene, nylon and polyester.

4.2 Thermosetting Plastics: Phenol formaldehyde and expoxide resin.

4.3 Elastomers: Natural rubber and synthetic rubber - Buna - N, Buna-S and neoprene.Conducting Polymers: Elementary ideas;examples: poly sulphur nitriles, polyphenylene, and polypyrrole and poly acetylene.

Unit-V:Plastics and Resins

5.1 Plastics and Resins Definitions. Thermoplastic and thermo setting resins.Constituents of plastics fillers, dyes, pigments plasticizers lubricants and Catalyst. Important thermoplastics, resins acrylics, polyvinyl and cellulosederivatives.

5.2 Important thermo setting resins-phenol resins amino resins epoxy resins, alkydresins and silicon resins. Adhesives – shellac resins, vegetable glues and animal glues. Textile Fibers definition and polymer requirement for fibers polyamides –nylon 66, nylon 6, and nylon 6, 10.polyesters-terylene. Cellulose acetate. Viscose rayon.

Text Books

- *V.R. Gowariker, Polymer Science, Wiley Eastern, 1995.*
- *G.S. Misra, Introductory Polymer Chemistry, New Age International (Pvt) Limited, 1996.*
- *B.S. Bahland ArunBahl, Advanced Organic Chemistry, S.Chand& co-New Delhi (1995).*
- *P.L.Soni and H.M. Chawla, text boox of organic Chemistry, sultan chand, New Delhi, 28th Edition.,1995*

Reference Books

- ✓ *F. N. Billmeyer, Textbook of Polymer Science, Wiley Interscience, 1971.*
- ✓ *A. Kumar and S. K. Gupta, Fundamentals and Polymer Science and Engineering, TataMcGraw-Hill, 1978.S.S Dara, a text books in engineering chemistry, s.chand&company Ltd., new Delhi, 3rdedition, 1992.*