A.V.V.M. SRI PUSHPAM COLLEGE (AUTONOMOUS), POONDI

Programme: B. Sc.
Department: Chemistry

Syllabus Revision 2017-2018

S.No.	Components	Number of courses having changes
1.	Part - I	04
2.	Part - II	03
3.	Part - III	09
4.	Part - IV	-
	TOTAL	16

Total Number of Courses : 43

Total Number of Courses having changes : 16

Percentage of Revision : 37.2 %

Note:

The content of the syllabus which has been revised is highlighted.

B.Sc., CHEMISTRY (2017- 2018)

Sl. No	SEM	Category	Paper Code	Title of the Paper	Maximum Marks			Minimum Marks for passing			Hours Week	Credits
					CIA	E.E.	Total	CIA	E.E.	Total		
1	I	Part –I	17U1CHT1/H1	Tamil – I / Hindi – I	25	75	100	10	30	40	6	3
2		Part - II	17U1CHE1	English - I	25	75	100	10	30	40	6	3
3		Core	17U1CHC1	General Chemistry – I	25	75	100	10	30	40	7	5
4			17U1CHCP1	Volumetric Analysis practical	40	60	100	16	24	40	3	3
5		Allied	17U1CHMAA1/ 17U1CHZOA1	Allied Mathematics –I Allied Zoology–I	25 25	75 75	100 100	10 10	30 30	40 40	5/ 5	3/ 4
			17U2CHMAA2/ 17U2CHZOAPL	Allied Mathematics -II (NS) Allied Zoology Practical (NS)	- -	- -	- -	- -	- -	- -	3/ 3	-
6		ES	17U1CHES	Environmental Studies	-	100	100	-	40	40	-	1
7	II	Part – I	17U2CHT2/H2	Tamil – II / Hindi – II	25	75	100	10	30	40	6	3
8		Part – II	17U2CHE2	English – II	25	75	100	10	30	40	6	3
9		Core	17U2CHC2	General Chemistry – II	25	75	100	10	30	40	6	5
10			17U2CHCP2	Organic qualitative analysis and physical constants	40	60	100	16	24	40	3	3
11		Allied	17U2CHMAA2/ 17U2CHZOAP	Allied Mathematics – II (NS) Allied Zoology-Practical (NS)	25 40	75 60	100 100	10 16	30 24	40 40	3/ 3	4/ 2
12			17U2CHMAA3 17U2CHZOA2	Allied Mathematics – III Allied Zoology – II	25 25	75 75	100 100	10 10	30 30	40 40	5/ 6	3/ 4
13		VBE	17U2CHVE	Value Based Education	25	75	100	10	30	40	-	-
14		SBE	17U2CHS1	Skill Based Education I Textile Processing	25	75	100	10	30	40	1	1
15	III	Part –I	17U3CHT3/H3	Tamil – III / Hindi – III	25	75	100	10	30	40	6	3
16		Part – II	17U3CHE3	English – III	25	75	100	10	30	40	6	3
17		Core	17U3CHC3	General Chemistry - III	25	75	100	10	30	40	5	5
18		Core	17U3CHC4	Agricultural Chemistry	25	75	100	10	30	40	3	3
		Core Practical	17U4CHCP3	Inorganic Qualitative Analysis Practical (NS)	-	-	-	-	-		2	-
19		Allied	17U3CHPHA1	Allied Physics – I	25	75	100	10	30	40	5	4
		NS	17U4CHPHAP	Allied Physics Practical (NS)	-	-	-	-	-	-	3	-
20		GS	17U1CHGS	Gender Studies	-	100	100	-	40	40	-	-

Sl. No	SEM	Category	Paper Code	Title of the Paper	Maximum Marks			Minimum Marks for passing			Hours Week	Credits
					CIA	E.E.	Total	CIA	E.E.	Total		
21	IV	Part –I	17U4CHT4/H4	Tamil – IV / Hindi – IV	25	75	100	10	30	40	6	3
22		Part – II	17U4CHE4	English – IV	25	75	100	10	30	40	6	3
23		Core	17U4CHC5	General Chemistry – IV	25	75	100	10	30	40	6	5
24			17U4CHCP3	Inorganic Qualitative analysis practical (NS)	40	60	100	16	24	40	3	3
25		Allied	17U4CHPHA2	Allied Physics – II	25	75	100	10	30	40	5	4
26			17U4CHPHAPL	Allied Physics Practical (NS)	40	60	100	16	24	40	3	2
27		SBE	17U4CHS2	Skill Based Education-II Practical on Textile Processing	25	75	100	10	30	40	1	1
28	V	Core	17U5CHC6	Organic Chemistry – I	25	75	100	10	30	40	5	6
29			17U5CHC7	Physical Chemistry – I	25	75	100	10	30	40	5	6
30			17U5CHC8	Inorganic Chemistry -I	25	75	100	10	30	40	5	6
31			17U5CHCP4	Physical Chemistry Practical	40	60	100	16	24	40	3	4
32		Major Elective-I	17U5CHEL1A 17U5CHEL1B	Pharmaceutical Chemistry Polymer Chemistry	25	75	100	10	30	40	4	4
33		Major Elective-II	17U5CHEL2A 17U5CHEL2B	Analytical Chemistry Bio Chemistry	25	75	100	10	30	40	5	3
34		SSD	17U5CHSSD	Soft Skill Development	-	-	-	-	-	-	1	-
35		NME	17U5CHNME	Non - Major Elective Chemical aspects in Agriculture	25	75	100	10	30	40	2	1
36	VI	Core	17U6CHC9	Organic Chemistry – II	25	75	100	10	30	40	5	6
37		Core	17U6CHC10	Physical Chemistry –II	25	75	100	10	30	40	5	6
38		Core	17U6CHC11	Inorganic Chemistry – II	25	75	100	10	30	40	5	5
39		Core Practical	17U6CHCP5	Gravimetric and Organic preparation practical	40	60	100	16	24	40	5	5
40		Major Elective-III	17U6CHEL3A 17U6CHEL3B	Industrial Chemistry / Food Chemistry	25	75	100	10	30	40	4	4
41		Major Elective-IV	17U6CHEL4A 17U6CHEL4B	Dye Chemistry / Clinical Chemistry	25	75	100	10	30	40	4	3
42		GK	17U6CHGK	General Knowledge	-	100	100	-	40	40	1	-
43		CN	17U6CHCN	Comprehensive Test	-	100	100	-	40	40	1	1
				Extension Activities	-	-	-	-	-	-	-	1
				Total			**4300**				**180**	**140**

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
I	**17U1_T1**	**இக்கால இலக்கியம்** **(செய்யுள் , உரைநடை, சிறுகதை, புதினம், நாடகம்)**	**6**	**3**

கூறு: 1 செய்யுள் **நேரம்: 18**

1. இராமலிங்க அடிகளார் - திருவருட்பா - இறைத் திருக்காட்சி —1—10
2. பாரதியார் - தேசியகீதம் : பாரத தேசம் — எங்கள் நாடு,
3. பாரதிதாசன் - புதிய உலகம்: உலக ஒற்றுமை —பேரிகை, தளைஅறு, மானுட சக்தி
4. பட்டுக்கோட்டை கல்யாண சுந்தரம் -காடு வெளையட்டும் பெண்ணே ,
5. நாமக்கல் கவிஞர் - என்றுமுளதென்றமிழ் ,
6. கவிமணி : ஒற்றுமையே ,உயர்வு நிலை—நாட்டுக்குழைப்போம்

கூறு: 2 உரைநடை **நேரம்: 18**

1. கேட்டிவி - இராகபாவம் (1 முதல் 15 வரை)
2. கேட்டிவி - பயணங்கள் தொடரும்

கூறு: 3 சிறுகதை **நேரம்: 18**

1. கேட்டிவி - குரல் கொடுக்கும் வானம்பாடி (1 முதல் 10 வரை)
2. கேட்டிவி - மனோரஞ்சிதம் முழுவதும்

கூறு: 4 புதினம் **நேரம்: 18**

கு.வெ. பாலசுப்பிரமணியன் - காளவாய்

கூறு: 5 நாடகம் , இலக்கிய வரலாறு **நேரம்: 18**

1. கலைவாணன் — கு.சா.கிருஷ்ணமூர்த்தி(NCBH வெளியீடு)
2. சிறுகதை, புதினம், நாடகம், கவிதை, உரைநடை

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
II	**17U2_T2**	**இடைக்கால இலக்கியம் – பயன்முறைத் தமிழ் –இலக்கண வரலாறு**	**6**	**3**

கூறு: I **நேரம்: 18**

1. திருஞானசம்பந்தர் - தேவாரம் - கோளறு திருப்பதிகம்
2. திருநாவுக்கரசர் -தேவாரம் -தனித்திருக் குறுந்தொகை - மாசில்வீணையும் - 1—10 பதிகம்
3. சுந்தரர் -தேவாரம் - திருநொடித்தான்மலைப் பதிகம் —தானெனை முன்படைத்தான்
4. மாணிக்கவாசகர் - திருவாசகம் - திருப்பொன்னூசல்

கூறு: 2 **நேரம்: 18**

1. குலசேகராழ்வார்: திருவித்துவக்கோட்டம்மான் : 1—10 பாடல்கள்
2. நம்மாழ்வார் - திருவாய் மொழி -இரண்டாம்பத்து —1—10 பாடல்கள்
3. ஆண்டாள் - நாச்சியார் திருமொழி —வாரணமாயிரம் 1—10 பாடல்கள்
4. திருமங்கையாழ்வார் - சிறிய திருமொழி —1—10 பாடல்கள்

கூறு: 3 **நேரம்: 18**

1. திருமூலர் - திருமந்திரம் - அட்டாங்க யோகம் —1—10 பாடல்கள்
2. குமரகுருபரர் - மீனாட்சியம்மை பிள்ளைத் தமிழ்: வருகைபருவம்
3. திரிகூடராசப்பக் கவிராயர் - குற்றாலக் குறவஞ்சி - நாட்டு வளம்
4. வீரமாமுனிவர் - திருக்காவலூர்க் கலம்பகம் — முதல் 5 பாடல்கள்
5. குணங்குடி மஸ்தான் சாகிபு - ஆனந்தக் களிப்பு —முழுதும்

கூறு: 4 பயன்முறைத் தமிழ் **நேரம்: 18**

வாக்கிய அமைப்பு - புணர்ச்சி வகைகள் - வலிமிகும், வலி மிகா இடங்கள் - எழுத்துப்பிழை நீக்கம் லகர, ளகர, ழகர வேறுபாடுகள் - சொற்களைப் பிரித்துப் பொருள் காணும் முறை - நிறுத்தற் குறியீடுகள் - சரியான தமிழ் வடிவம் அறிதல்.

சொல்லியல் - சொல் வகை - இலக்கண வகை - இலக்கிய வகை - பெயர்ச்சொல் - இடுகுறி - காரணம் - அறுபொருட் பெயர் (பொருள், இடம், காலம், சினை, குணம், தொழில்) - வினைச்சொல் - இடைச் சொல் - உரிச்சொல் - முற்று - எச்சம் - விகுதிகள் - இடைநிலை - தன்வினை - பிறவினை - தெரிநிலை வினை - குறிப்பு வினை-வழுவமைதி.

கூறு: 5 இலக்கண வரலாறு **நேரம்: 18**

இலக்கண வரலாறு - தமிழ்த் துறை வெளியீடு.

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
III	**17U3_T3**	**காப்பியங்கள், கட்டுரைகள், இலக்கிய வரலாறு**	**6**	**3**

கூறு: 1 காப்பியங்கள் 1 **நேரம்: 18**

1. சிலப்பதிகாரம் - புகார்க் காண்டம்—மனையறம்படுத்த காதை
2. மணிமேகலை - ஆதிரை பிச்சையிட்ட காதை
3. சீவக சிந்தாமணி - மண்மகள் இலம்பகம்
4. கம்பராமாயணம் - மிதிலைக் காட்சிப் படலம்

கூறு: 2 காப்பியங்கள் 2 **நேரம்: 18**

1. பெரிய புராணம் -மெய்ப்பொருள் நாயனார் புராணம் —முழுதும்
2. அரிசந்திரபுராணம் —மயான காண்டம்
3. தேம்பாவணி - திருமணப் படலம்—1—10 பாடல்கள்
4. சீறாப்புராணம் -நபி அவதாரப் படலம் —1—10 பாடல்கள்

கூறு: 3 கட்டுரைத் தொகுப்பு **நேரம்: 18**

கட்டுரைத் தொகுப்பு - தமிழ்த்துறை வெளியீடு

கூறு: 4 பொதுக்கட்டுரை, மொழிபெயர்ப்புப் பயிற்சி **நேரம்: 18**

பயிற்சிக் கட்டுரைகளும் கடிதங்களும் -பாவை வெளியீடு

கட்டுரைப் பயிற்சி - 10 மதிப்பெண்

மொழிபெயர்ப்புப் பயிற்சி - 5 மதிப்பெண்

கலைச்சொல்லாக்கம்

கூறு: 5 **நேரம்: 18**

அ. இலக்கிய வரலாறு

பக்தி இலக்கியங்கள் - காப்பிய இலக்கியங்கள் - சிற்றிலக்கியங்கள்

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
IV	**17U4_T4**	**சங்க இலக்கியம் – அற இலக்கியம் – செம்மொழி – இலக்கிய வரலாறு**	**6**	**3**

கூறு: 1 **நேரம்: 18**

குறுந்தொகை

1. குறிஞ்சி - (பா.எ.:3) 2. முல்லை - (பா.எ.94)
3. மருதம் - (பா.எ.45) 4. நெய்தல் - (பா.எ.:49)
5. பாலை - (பா.எ.:41)

நற்றிணை

1. குறிஞ்சி - (பா.எ. 32) 2. முல்லை - (பா.எ. 81) 3. மருதம் - (பா.எ. 210)
4. நெய்தல் - (பா.எ. 226) 5. பாலை - (பா.எ.229)

கலித்தொகை

1. பாலை - (பா.எ. 6) 2. குறிஞ்சி - (பா.எ. 38)

அகநானூறு

1. குறிஞ்சி : - (பா.எ. 68) 2. மருதம் - (பா.எ. 86)

கூறு: 2 **நேரம்: 18**

ஐங்குறுநூறு

குறிஞ்சி - தோழிக்கு உரைத்த பத்து: பாடல் எண்கள் —111—120

புறநானூறு

பாடல் எண்கள் 8,17,20,95,141,159,184,186,188,206

பதிற்றுப்பத்து

ஏழாம் பத்து —பாடல் எண். 1

பரிபாடல்

எட்டாம் பாடல் : செவ்வேள்

கூறு: 3 **நேரம்: 18**

நெடுநல்வாடை முழுவதும்

திருக்குறள் : வான்சிறப்பு, பெருமை, காதற் சிறப்புரைத்தல்

கூறு: 4 **நேரம்: 18**

செம்மொழி வரலாறு

மொழி - விளக்கம் - மொழிக்குடும்பங்கள் - உலகச் செம்மொழிகள் - இந்தியச் செம்மொழிகள் - செம்மொழித் தகுதிகள் - வரையறைகள் - வாழும் தமிழ்ச்செம்மொழி - தொன்மை - தமிழின் சிறப்புகள் - தமிழ்ச் செம்மொழி நூல்கள்.

கூறு: 5 **நேரம்: 18**

அ. இலக்கிய வரலாறு

சங்க இலக்கியங்கள், பதினெண்கீழ்க்கணக்கு நூல்கள்

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
I	**17U1--E1**	**PART — II PROSE, POETRY AND COMMUNICATION SKILLS**	**6**	**3**

Objective

- To initiate the Students to understand English through Prose, Poetry and Basic Communicative Grammar.

Unit — I

Shakespeare - Shall I compare thee to a Summer's Day?

John Milton – On His Blindness.

William Wordsworth – The Solitary Reaper

P.B.Shelley – Song to the Men of England.

Robert Frost – The Road not Taken

Nissim Ezekiel - Night of the Scorpion

Unit — II

1) The Running Rivulets of Man,
2) Parliament is Marking Time,
3) The Lady in Silver Coat,
4) Mr. Applebaum at Play.

Unit — III

1) The Feigning Brawl of an Imposter,
2) Thy Life Is My Lesson,
3) Solve The Gamble,
4) The Stoic Penalty.

Unit — IV

1) Nobility In Reasoning,
2) Malu the Frivolous Freak,
3) Bharath! Gird Up Your Loins!
4) Honesty is the Cream Of Chastity

Unit — V

Parts of Speech, Nouns, Pronouns, Conjunctions, Adjectives, Articles, Verbs, Adverbs, Interjection – sentence.

References Book:

A Melodious Harmony – Sri.KTV, Rajendra Publishing House, Poondi, 2017.

Flying Colours – Prof. K.Natarajan, New Century Book House (P) LTD., 2017.

Semester	Subject Code	Title Of The Paper	Hours Of Teaching/ Week	No. of Credits
II	**17U2--E2**	**PART — II EXTENSIVE READERS AND COMMUNICATIVE SKILLS**	**6**	**3**

Objective

- To impart language and communicative skills through short stories, one act plays and communicative grammar

Unit — I

Shakespeare – The Seven Stages of Man

Long Fellow – A Psalm of Life

Nissim Ezakiel - Enterprise

William Wordsworth – The world is too much with us

Unit — II

Anton Chekov – The Proposal

J.B.Priestly - Mother's Day

Unit - III

William Faulkner - A Rose for Emily

P. Lankesh - Bread

Katherine Mansfield - The Doll's House

Unit — IV

Tense, Question Tag, Dialogue Writing, Paragraph Writing, Adjectives, Adverb

Unit — V

Voices, Degrees of Comparison, Direct and Indirect

Book Prescribed:

Unit I , II, III , Voices of vision in English (Vol. I & II), Board of Editors, Pavai Printers (P) Ltd., Chennai, 2016.

Unit IV & V – Communicative grammar by the Department of English, Poondi, 2017.

Semester	Subject Code	Title Of The Paper	Hours Of Teaching / Week	No. of Credits
III	**17U3--E3**	**PART - II** **SHAKESPEARE, EXTENSIVE READERS AND COMMUNICATIVE SKILLS**	**6**	**3**

Objective

- To introduce the language of the world renowned dramatist and novelist to enhance the vocabulary and communicative skills of the learners.

Unit — I

Funeral Oration – Julius Caesar

Trial for a Pound of Flesh – The Merchant of Venice

Unit — II

He Kills Sleep – Macbeth

The gulling scene of malvalio – Twelfth Night

Unit — III

Romeo and Juliet

In Love is a "Midsummer Madness" – Tempest

Unit — IV

R.L. Stevenson – Treasure Island

Unit — V

Note making, Hints Developing, Expansion of Ideas and Proverbs, Clauses and sentence, Structure simple, Compound and Complex.

Book Prescribed:

Unit – I, II & III: Selected scenes from Shakespeare, Prof.K.Natarajan, Pavai Printers (p) Ltd., 2017.

Unit IV: Treasure Island Abridged by E.F. Dodd

Unit V: Communicative Grammar by Department of English, Poondi, 2017.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
I	**17U1CHC1**	**General Chemistry – I**	**7**	**5**

Unit - I

Atomic structure: Shapes of atomic orbitals, - principal, azimuthal, magnetic and spin quantum numbers and their significance-Pauli's exclusion principle, Aufbau Principle, (n+l) rule Hund's rule, stability of half-filled and completely filled orbitals.

Periodic properties: Description - - variation of atomic volume, atomic & ionic radii, ionisation potential, electron affinity , electronegativity and metallic characters along the periods and in groups -factors influencing the periodic properties. Pauling's and Mulliken's Scales of electro negativity. classification of elements as s-,p-,d- and f- block elements.

Unit - II

Basic concepts in organic chemistry: Sigma and pi bonds– Concept of hybridization – Structure of organic molecules based on sp^3, sp^2 and sp hybridization. Covalent bond properties of organic molecules*:* Bond length, bond energy, bond polarity, dipolemoment - inductive, mesomeric, electromeric, resonance and hyperconjugative effects. Naming of alkanes (up to 10 carbon systems) – functional groups - mono functional and bi-functional compounds - Structural isomerism with appropriate examples.

Unit - III

Alkanes: sources of alkanes – General methods of preparations - chemical properties with mechanism of free radical substitution for halogenation.

Cycloalkanes: Preparation and properties – ring opening reactions - conformational study of ethane ,n-butane and cyclohexane - relative stability of cycloalkanes – Bayer's Strain theory & its limitations.

Unit - IV

Atomic structure and basic quantum mechanics: Electromagnetic radiation - characteristics of wave - Black body radiation and Planck's quantum theory - photo electric effect– Compton effect - De Broglie hypothesis and de Broglie equation - Davisson and Germer experiment. Heisenberg's uncertainty principle -. Schrödinger wave equation . Physical significance of Ψ(psi) function. –Nodal planes and nodal points in atomic orbitals.

Unit - V

TITRIMETRIC METHODS OF ANALYSIS

General principle. Types of titrations. Requirements for titrimetric analysis. Concentration systems: equivalent weight, Molarity - Normality - problems. Primary and secondary standards, criteria for primary standards, preparation of standard solutions, standardization of solutions. Limitation of volumetric analysis, endpoint and equivalence point.

Acid-base Equilibria pH of strong and weak acid solutions. Buffer solutions. Henderson equations. Preparation of acidic and basic buffers. Relative strength of acids and bases from Ka and Kb values. Neutralisation-titration curve, theory of indicators, choice of indicators. Use of phenolphthalein and methyl orange.

Complexometric titrations

Stability of complexes, titration involving EDTA. Metal ion indicators and characteristics. Problems based on titrimetric analysis.

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
I	**17U1CHMAA1**	**Allied Mathematics-I (For Physics and Chemistry)**	**5**	**3**

Objectives:

- To introduce the basic concepts of summation of series, theory of equations, special types of matrices, trigonometry and calculus.

UNIT-I

Algebra: Binomial Theorem: some standard expansions – general term – expansion of rationa fractions – approximations – summation of series - Exponential Theorem: results – summation of series - Logarithmetic series: standard results.

UNIT-II

Theory of Equations: Fundamental theorem of algebra – symmetric function of the roots – formation of equations – Diminishing of roots – Reciprocal Equations: four types.

UNIT-III

Matrices: Rank of a Matrix – elementary transformations - Linear Equations: Homogeneous and Non- Homogeneous equations – Characteristic Roots and Vectors – Properties of eigen vector – Cayley-Hamilton theorem.

UNIT-IV

Trigonometry: Expansion in series – expansion of $\cos^n\theta$ and $\sin^n\theta$ – expansion of $\cos n\theta$ and $\sin n\theta$ – expansion of $\sin\theta$, $\cos\theta$ and $\tan\theta$ - Hyperbolic Functions – relations connecting hyperbolic functions and circular functions – periods of hyperbolic function – Inverse hyperbolic functions.

UNIT-V

Differential Calculus: Curvature – radius of curvature in Cartesians – parametric form - Maxima and minima of a function of two variables – Lagrange's method of undetermined multipliers.

Textbook:

Allied Mathematics, Paper-I, First Semester, P. Kandasamy and K. Thilagavathy, S.Chand & Company Pvt. Ltd., New Delhi, 2014.

Unit I : Algebra: Chapter II, III, IV
Unit II : Theory of Equations: Chapter I, II.
Unit III: Matrices: Chapter II, III, IV.
Unit IV: Trigonometry: Chapter I, II.
Unit V : Differential Calculus Chapter IV, V.

References:

1. *Algebra Volume I*, **T.K.M. Pillay, T. Natarajan and K.S.Ganapathy, S. Viswanathan (Printers & Publishers) Pvt. Ltd.**
2. ***Calculus Volume I***, S. Narayanan and T.K. Manicavachagom Pillay, S. Viswanathan pvt. Ltd., 2014.
3. *Trigonometry*, **Narayanan and T.K.Manicavachagom Pillay, S. Viswanathan pvt. Ltd., 2013.**

Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
I & II	**17U2CHMAA2**	**Allied Mathematics-II (NS)**	**3+3**	4

Objectives:

- To introduce concepts of Hyperbolic function and correlation.
- To introduce the concepts of numerical solution of ordinary differential equation and 3 dimensional analytical geometry.

UNIT –I: Trigonometry

Expansions: Expansions of cos nθ and sin nθ – Expansions of tan nθ – Expansion of tan(A + B + C + …) – Powers of sines and cosines of θ – Expansions of $\cos^n\theta$ – Expansions of $\sin^n\theta$ – Expansions of sinθ and cosθin a series of power of θ .

UNIT – II

Hyperbolic functions: hyperbolic functions – Relation between hyperbolic functions – Relation between circular functions – Inverse hyperbolic functions – separation of real and imaginary parts of inverse hyperbolic function.

UNIT – III

Correlation – Karl Pearson coefficient of correlation – Rank correlation – Regression: Regression coefficients – Properties of regression coefficients

UNIT – IV

Numerical solution of ordinary differential equation: Taylor series – Euler's method – Modified Euler's method – R. K method - 4^{th} order only.

UNIT – V

Planes: Standard Equation of planes – angle between the planes – **Straight lines:** Equations of straight lines – coplanar lines – S.D between two skew lines – **Sphere:** equation of sphere – centre and radius – length of the tangent from the point to the sphere.

Text Book:

5. Trignometry, T.K.M.Pillai, S. Narayanan, 2015
   Unit I: Chapter – 3
   Unit II: Chapter – 4
6. Fundamentals of Mathematical Statistics, S.C. Gupta, V. K. Kapoor, Sulthan, 2002.
   Unit III: Chapter – 10(Sec.10.2–10.4, 10.7), Chapter – 11(Sec.11.1–11.2.2)
7. Numerical methods, P. Kandasamy, Thilagavathi and Gunavathi
   Unit IV : Chapter – 11(Sec.11.5, 11.9, 11.11 – 11.3)
8. Analytical Geometry 3D - T.K.M.Pillai, 2015
   Unit V: Chapter – 2(Sec.1-7), Chapter – 3(Sec.1-4, 7, 8), Chapter – 4(Sec.1-4)

General References:

1. Trigonometry - S.Arumugam
2. Statistics - M.Sivathanupillai
3. Ancillary Maths - P.R.,Vittal, Margam Publications.

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
III	**17U3CHC4**	**AGRICULTURAL CHEMISTRY**	**3**	**3**

Unit - I

Soil Science : Physical properties of soil – structure, retention of water by solid, soil moisture content, soil air, soil temperature – chemical properties of soil – chemical composition – soil colloids and its properties – ion charge reaction – soil colloid as source of plant nutrients - Soil pH– buffer action – effect of soil reaction on nutrients – Acid soil, alkaline soil, saline soil- tolerance by plants.

Unit -II

Fertilizer : Definition – Classification – Nitrogenouos , phosphatic and potassium fertilizers – importance, examples with concerned nutrients – complex and mixed fertilizers – micro nutrients and their functions in plants – sources – Bio fertilizers

Unit - III

Manures: Difference between fertilizer and manures – bulky organic manures – handling and storage practice – compost methods – manuring – concentrated organic manures.

Unit - IV

Insecticides: Definition of pesticide – classification of - safety measures – Insecticides – definition – plant product – Inorganic pesticides - organic pesticides – mode of action of DDT, BHC, methoxy chloro, chlordane-Endosulfan organo phosphorous compounds.

Unit - V

Fungicides and Herbicides: Inorganic and organic fungicides and herbicides acaricides, rodenticide, attractants, repellents, fumigants. Act and laws of insects and insecticides.

References :

1. N.C.Brady, the Nature and properties of soils Eurasia publishing house, (p) Ltd. 9th Ed. (1984).
2. Biswas, T.D. and Mukeherjee S.K. Text book of soil science (1987).
3. A.J.Daji A Text book of soil science –Asia publishing house, Madras (1970).
4. Donahue, R.L.Miller, R.W.and shickluna, J.C. Soil – An introduction to soil and plant Growth – Prentice Hall of India (P) Ltd., New Delhi(1987).
5. Colling, G.H. Commercial Fertilizers – McGraw Hill Publishing Coo., New York(1955)
6. Tisdale, S.L.Nelson , W.L. and Beaton , J.D. Soil fertility and fertilizers. Macmillan publishing company, New York (1990).
7. Hesse, P.R..A text book of soil chemical analysis John Muray, New York (1971).
8. Jackon, M.L., soil chemical analysis. Prentic Hall of India, New Delhi (1958).
9. Buchell, K.H.. Chemical of pesticides – John wiley &Sons, NewYork (1983).
10. Mcinikov, N.N. Chemistry of pesticides Vol.36 of Residue Review-springer verlac, New York (1971).
11. Sree Ramula I, U.S. chemistry of Insecticides and Fungicides – Oxford and IBH publishing (1979).

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
IV	**17U4CHC5**	**General Chemistry – IV**	**6**	**5**

Unit - I

Metallurgy: Occurrence of metals – minerals & ores – mineral wealth of India. *concentration of ores*: Froth floatation, magnetic separation, liquation, leaching. *Production of the metal:* calcinations, roasting, smelting, aluminothermic process and amalgamation. *purification of metals* : Poling, electrolysis, zone refining , cupellations, Van Arkel and de Boer methods – Microbial metallurgy.

Chemistry of transition elements: Electronic configuration – general periodic trend – group study of iron, copper and zinc – galvanization.

Unit - II

Iron: Commercial forms - manufacture of cast iron. **Steel**: Classification and heat treatment -alloys of steel (composition and uses).

f-Block Elements: Electronic configuration**.** *Lanthanides and actinides*: Occurrence, oxidation states, magnetic properties, colour (not for actinides) and spectra – lanthanide and actinide contraction - differences between lanthanides and actinides - separation of lanthanides by ion exchange and solvent extraction methods – uses of lanthanides and actinides - extraction and properties of thorium.

Unit - III

Alcohols: Classification and nomenclature – General methods of preparation, physical & chemical properties aliphatic alcohols - industrial preparation of ethanol – preparation , properties and uses of glycerol.

Ethers: Classification and nomenclature: Preparation, physical & chemical properties of Diethyl ether and Anisole – estimation of methoxy group by zeisel's method.

Crown ethers: Introduction – structures – applications.

Unit - IV

Chemical Kinetics: Rate of a reaction, rate equation, order and molecularity of reaction. Factors influencing the reaction rate–zero, first, second and third order reactions and their characteristics- pseudo uni molecular reaction - derivation of rate constants for first and second order reactions (equal initial concentration) – derivation of time for half change with examples. Methods of determination of order of reactions - effect of temperature on reaction rate – concept of activation energy, energy barrier - Arrhenius equation. *Theories of reaction rates*: collision theory – absolute reaction rate theory (ARRT) for a bimolecular reaction.

UNIT - V

Catalysis: General characteristics of a catalyst .*Types*: Homogeneous and heterogeneous catalysis, positive and negative catalysts, acid – base, induced, auto and enzyme catalysis – promoter – catalytic poisoning (anti catalyst) - intermediate compound theory and adsorption theory catalysis. Factors increasing and decreasing the catalytic activity - mechanism and characteristics of enzyme catalysis – Michaelis-Menton equation.

Adsorption: Types – characteristics of adsorption - comparison of chemisorption and physisorption - *Isotherms*: Freundlich and Langmuir adsorption isotherms.

Colloids: Definition - types - stability - gold number - kinetic, optical and electrical properties. *Emulsion and Gels*: Types of emulsions, preparation, properties and application.

Books for Reference:

1. Puri B.R. Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry, Milestone Publishers, Delhi (2008)
2. Gopalan R., Inorganic Chemistry for undergraduate students, Universities Press(India) Pvt.ltd.,Hyderabad(2009)
3. Soni P.L.,Mohan Katyal,Text book of Inorganic chemistry,20th edition,Sultan Chand & Son,New Delhi (1992)
4. Lee J.D., Concise Inorganic Chemistry, UK, Black well science (2006).
5. Puri B.R..,Sharma L.R., Pathania M.S., Principles of Physical Chemistry, Vishal Publishing Co., Jalandar, (2004)
6. Soni P.L.,Dharmarah O.P.,Dash U.N.,Text book of physical chemistry,22nd edition, Sultan Chand &Son,New Delhi (2001)
7. Glasstone S., Lewis D. Elements of Physical Chemistry, London, Mac Millan & Co. Ltd.
8. ArunBahl, Bahl .B.S.,Tuli G.D., Essentials of Physical , Multi colour edition, S. Chand & Company Ltd., New Delhi, (2008).
9. Morrison R.T., Boyd R.N. Organic Chemistry (6th edition), New York, Allyn & Bacon Ltd., (2006).
10. Bahl B.S. Arun Bahl, Advanced Organic Chemistry, S. Chand & Company ltd., New Delhi, (2005).
11. Bahl B.S. Arun Bahl, Text book of Organic Chemistry, Multi colour edition, S. Chand & Coy Ltd.,New Delhi, (2006).
12. Soni P.L.,Chawla H.M., Text book of Organic chemistry,29th edition, Sultan Chand & Son,New Delhi (2007)
13. Jain M.K.,Sharma S.C., Modern Organic chemistry, Vishal Publishing Co., Jalandar, (2012)
14. Pillai C.N.,Organic Chemistry for undergraduate students, Universities Press(India) Pvt.ltd.,Hyderabad(2008).
15. Bhupinder Mehta and Manju Mehta "Organic Chemitry", PHI Learning Pvt Ltd, New Delhi – 110001.(2012)

Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
V	**17U5CHC7**	**Physical Chemistry – I**	**5**	**6**

UNIT - I

Thermodynamics: Definitions of System, surrounding, isolated, closed and open systems, state of the system, Intensive and extensive variables. *Thermodynamic processes*: Reversible and irreversible, isothermal and adiabatic processes - state and path functions - exact and inexact differentials.

First law of thermodynamics: Statement - definition of internal energy (E), enthalpy (H) and heat capacity. Relation between Cp and Cv. calculation of w, q, dE and dH for expansion of ideal and real gases under isothermal and adiabatic conditions of reversible and irreversible processes. Definition of joule - thomson coefficient ($\mu_{J.T}$) - calculation of ($\mu_{J.T}$) for ideal and real gases .

Thermochemistry: Relation between enthalpy of reaction at constant volume (q_v) and at constant pressure (q_p) - temperature dependence of heat of reaction - Kirchoffs equation - bond energy and its calculation from thermochemical data - Hess's law of heat summation (statement and applications)

UNIT - II

Second law of thermo dynamics : Need for the law - different statements of the law - Carnot's cycle and efficiency of heat engine - Carnot's theorem - thermodynamic scale of temperature.

Entropy : Definition and physical significance of entropy - entropy as a function of P, V and T - entropy changes during phase changes - entropy of mixing - entropy criterion for spontaneous and equilibrium processes in isolated system .

Gibb's free energy (G) and Helmholtz free energy (A) :Variation of A and G with P, V and T- Gibb's - Helmholtz equation and its applications - thermodynamic equation of state - Maxwell's relations - ΔA and ΔG as criteria for spontaneity and equilibrium - advantage of ΔG over entropy change.

UNIT - III

Third law of thermodynamics : Nernst heat theorem - Statement and concept of residual entropy - evaluation of absolute entropy from heat capacity data.

Equilibrium constant and free energy change: Thermodynamic derivation of law of mass action - equilibrium constants in terms of pressure and concentration - thermodynamic interpretation of Lechatelier's principle - Van't Hoff's reaction isotherm - Van't Hoff's isochore - Clapeyron equation and Clausius – Clapeyron equation- applications

Systems variable composition : Partial molar quantities - chemical potential - variation of chemical potential with T, P and X (mole fraction) - Gibb's Duhem equation.

UNIT - IV

Solutions: Henry's law and Raoult's law - Ideal and non-ideal soultions, concept of activity and activity coefficients – Gibbs - Duhem - Margules equation .*Completely miscible liquid systems :* benzene and toluene - deviation from Raoult's law. Theory of fractional distillation **-** azeotropes - HCl - water and ethanol - water systems . *Partially miscible liquid systems* : phenol - water, triethylamine - water and nicotine - water systems. lower and upper CSTs - effect of impunities on CST. *Completely immiscible liquids* : Principle and applications of steam distillation - Nernst distribution law – derivation - applications.

Dilute solutions: Colligative properties, lowering of vapour pressure, elevation of boiling point , depression of freezing point , osmotic pressure - determination of molecular masses using the above properties - abnormal molecular masses – (molecular dissociation & association).

UNIT – V

Phase rule: Definition of terms - derivation .*One component systems*: water and sulphur - super cooling - sublimation. *Two component systems*: solid liquid equilibria. *Simple eutectic systems***:** (lead-silver, Bi-Cd) - desilverisation of lead - compound formation with congruent melting point. (Mg-Zn) and incongruent melting point (Na-K).
Solid solutions: (Ag-Au) - fractional crystallisation.- *Freezing mixtures* : $FeCl_3$ - H_2O systems and $CuSO_4$-H_2O system.

Book for Reference:

1. Puri B.R., Sharma L.R., Pathania M.S., Principles Of Physical Chemistry, (23rd edition), New Delhi, Shoban Lal, Nagin Chand & Co., (1993)
2. Maron and Prutton, Physical Chemistry, Mac Millan, London.
3. Atkins P.W., Physical Chemistry, (5th edition) Oxford Uiversity Press. (1994)
4. Castellan G.V., Physical Chemistry, Orient Longmans, New Delhi.
5. Soni P.L.,Dharmarah O.P.,Dash U.N.,Text book of physical chemistry,22nd edition, Sultan Chand & Son,New Delhi (2001)
6. Glasstone S., Lewis D. Elements of Physical Chemistry, London, Mac Millan & Co. Ltd.
7. Arun Bahl, Bahl .B.S., Tuli G.D., Essentials of Physical , Multi colour edition, S. Chand & Company Ltd., New Delhi, (2008).

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
V	**17U5CHC8**	**Inorganic Chemistry**	**5**	**6**

UNIT - I

Coordination compounds: Central metal ion – ligands-types of ligands– coordination number, oxidation numbers, and coordination sphere – Nomenclature - isomerism (structural and stereo) - Werner's theory of complexes. EAN rule VB theory- applications and limitations, Factors affecting stability of complexes.

UNIT - II

Crystal Field theory: Crystal field splitting in octahedral, tetrahedral and square planar fields – factors influencing the magnitude of crystal field splitting – magnetic properties and colour. Labile and inert complexes- stepwise and overall stability constants- Reaction mechanism – substitution reactions in octahedral complexes – Acid hydrolysis: SN1 and SN2 mechanisms – Complementary and non- complementary reactions- Trans effect.

UNIT - III

Biologically important coordination compounds: Structure and application Chlorophyll, hemoglobin, vitamin B_{12} – role of alkali and alkaline earth metals in biological systems.

Metal carbonyls - synthesis and structure of mono nuclear carbonyls of Ni, Fe, Cr, and bi nuclear carbonyls of Co , Mn - synthesis and structure . **Nitrosyl compounds**: Classification, preparation and properties - structure and uses of sodium nitroprusside.

Biological functions and toxicity of some elements : Cr, Mn, Co, Ni, Cu, Se, Mo, Cd, I, Hg Pb, Fe and Zn. Estimation of nickel using DMG and aluminium using oxine - estimation of hardness of water using EDTA.

UNIT - IV

Solid state : Isotropic and anisotropic solids – Interfacial angle – symmetry elements in crystal systems – Bravais lattices - Unit cell – law of rational indices (Weiss indices), Miller indices – unit cell dimension – density – number of atoms per unit cell – X-ray diffraction by crystals – derivation of Bragg's equation – Experimental methods of X-ray study- rotating crystal method – X-ray pattern by powder method – crystal structure of KCl, NaCl, ZnS, CsCl – Radius ratio and packing in crystal. 3

UNIT – V

Organo metallic compounds : Introduction - *Ferrocene*: preparation , property, structure and stability – *Zeigler natta catalyst. Binary compounds* : hydrides ,borides (structure, properties and uses), Boranes (structure of Diborane only) carbides (classification and applications only) and Boron nitride and Borozole (structure only) – Clathrates (examples , applications, formation in quinol). *Silicones*: composition, manufacture, structure, properties and uses. **Silicates**: Different types with examples and structures.

Books for Reference:

1. Soni P.L., Text Book of Inorganic Chemistry, S, Chand & Co, New Delhi (2006).
2. Madan R.D.,Juli G.D and Malik S.M.,Selected Topics in Inorganic Chemistry, S.Chand & Co,NewDelhi (2006) 4.Lee J.D.,Concise Inorganic Chemistry, ELBS Edition.
3. Puri B.R. Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry, Milestone Publishers, Delhi (2008)
4. Gopalan R., Inorganic Chemistry for undergraduate students, Universities Press(India) Pvt.ltd.,Hyderabad(2009)
5. Lee J.D., Concise Inorganic Chemistry, UK, Black well science (2006).

Semester	Subject Code	Title of the Paper	Hours of Teaching/ Week	No. of Credits
V	**17U5CHEL1A**	**Major elective - I PHARMACEUTICAL CHEMISTRY**	**4**	**4**

Unit - I

Terminology: Drugs, pharmacy, pharmacology, pharmacognosy toxicology, chemotherapy, Medicinally important compound – Aluminum Alum, Aluminium hydroxide gel –phosphorus – Phosphoric acid, Hypophosphorus acid – Iron – Ferrous gluconate – Ferrous sulphate –Preparation, Properties and uses.

Unit - II

Analgesic and Antipyretics: Types - Norcotic analgesics – Morphine, Heroin, Pethidine – Structure and uses. Non – narcotic analgesics – Aspirin, Methyl Salicylate, Paracetmol, Phenacticin – Preparation, Properties and uses.

Unit – III

Antibiotics: Introduction penicillin – Types, Structure, Properties, assay, SAR chloramphenicol, structure, Properties, SAR.

Unit - IV

Blood – Composition of blood, Function of erythrocytes leucocytes, platelets and plasma protein, blood grouping and matching, Hematological agents – Coagulation and blood coagulants.

UNIT V:

Clinical Chemistry

Determination of sugar (glucose) in serum – *o*-toluidine method – diagnostic test for sugar in urine – Benedict's test – detection of diabetes – detection of cholesterol in urine – detection of anaemia – estimation of haemoglobin (Hb concentration) – red cell count.

REFERENCES

1. Jayashree Ghosh, A Text Book of Pharmaceutical Chemistry; 5th Ed., S.Chand and Company Ltd., New Delhi, 2014.
2. S. Lakshmi; Pharmaceutical Chemistry; 1st Ed., S. Chand and Company Ltd., New Delhi, 1995.
3. Bhagavathi Sundari; Applied Chemistry; 1st Ed., MJP Publishers, Chennai, 2006.

Semester	Subject Code	Title of the Paper	Hours of Teaching /Week	No. of Credits
VI	**17U6CHC11**	**INORGANIC CHEMISTRY - II**	**5**	**5**

UNIT I

Nuclear Chemistry–I: Nuclear particles **-** composition of nucleus - nuclear forces - packing fraction - mass defect - binding energy - nuclear stability - shell and liquid drop nuclear models – magic numbers. *Isotopes*: Detection and separation - deviation of atomic weights from whole numbers – isobars, isotones and mirror nucli.

UNIT II

Radioactivity :Discovery - α, β, γ rays –detection (by Wilson cloud chamber) and measurements (Geiger – Muller counter) of radiation - group displacement law - rate of disintegration - half life and average life, - radioactive series - nuclear transmutation – types of nuclear transmutations - particle accelerators (cyclotron only) - nuclear fission- nuclear reactors – fast breeder reactor (FBTR) – atom bomb – nuclear fusion – hydrogen bomb - applications of nuclear science in agriculture and medicine- carbon dating - rock dating.

UNIT III

Structure of alloys: Substitutional and interstitial solid solutions - Hume Rothery ratio.

Semi conductors: Extrinsic and intrinsic, n-type and p-type, transistors – uses.

Solvents for inorganic reactions: Definition and examples of protic, aprotic, polar, non-polar, non-aqueous solvents.

Acid Base - Theories of acids-bases- Arrhenius, Bronsted – Lowry, Lewis, Solvent system (levelling and differentiating effect), Lux - Flood and Usanovich definition – HSAB principle.

UNIT IV

Fossil fuels : Varieties of coal and petroleum - petroleum refineries in India.*Fuel gases*: Calorific value – units of heat - composition and preparation of water gas, semi water gas, carbureted water gas, producer gas, natural gas, LPG and biogas.

Fertilizers: Essential nutrients for plants –functions N,P,K nutrients- manufacture of urea, calcium superphosphate, potassium sulphate and mixed fertilizers - micronutrients and their role in plant life.

Pesticides: Insecticides (stomach & contact poison and fumigant), fungicides, herbicides, rodenticides and their adverse effect – alternative methods for pest control.

Safety matches, **fireworks**: Manufacturing details

UNIT V

Cement: Classification – functions of ingredients of Portland cement - manufacture – Chemistry of setting of cement

Glass: Manufacture-different types of glasses – uses.

Paints and varnishes: Constituent's oil paint –paint pigments –mechanism of drying - **Special paints**: Heat resistant, fire retardant, chemical resistant, temperature

indication, luminous, water repellent, anti fouling paints.-oil and spirit varnishes-enamels and lacquers.

Water pollution: Various water pollutants (sewage, infectious agents, plant nutrients, exotic organic chemicals, inorganic minerals and chemical compounds) and their adverse effect.

Books for Reference:

1. Soni P.L., Text book of Inorganic Chemistry, S.Chand & Co, New Delhi (2006)
2. Lee J.D., Concise Inorganic Chemistry, Black well science, UK (2006).
3. Puri B.R. and Sharma L.R., Principles of Inorganic Chemistry, Soban Lal Nagin Chand & Co. New Delhi,
4. Satyaprakash, Tuli, G.D., Basu, S.K., and Madan, R.D,] Advanced Inorganic chemistry (vol I & II), S. Chand, New Delhi (2006)
5. Gopalan R., Inorganic Chemistry for undergraduate students, Universities Press(India) Pvt.ltd.,Hyderabad(2009)