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

Programme: B. Sc.
Department: Physics

Syllabus Revision 2017-2018

S.No.	Components	Number of courses having changes
1.	Part - I	04
2.	Part - II	03
3.	Part - III	11
4.	Part - IV	-
	TOTAL	18

Total Number of Courses : 43

Total Number of Courses having changes : 18

Percentage of Revision : 41.9 %

Note:

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

B.Sc., PHYSICS (2017 – 2018)

S. No	SEM	Category	Paper Code	Title of the Paper	Maximum Marks			Minimum Marks For Pass			Hours Week	Credits
					CIA	E.E	Total	CIA	E.E	Total		
1	I	Part-I	17U1PHT1/H1	Tamil-I/ Hindi-I	25	75	100	10	30	40	6	3
2		Part – II	17U1PHE1	English-I	25	75	100	10	30	40	6	3
3		Core	17U1PHC1	Properties of Matter and Sound	25	75	100	10	30	40	7	5
4		Core	17U1PHCP1	Major Practical -I	40	60	100	16	24	40	3	4
5		Allied	17U1PHMAA1	Allied Mathematics-I	25	75	100	10	30	40	5	3
		Allied	17U2PHMAA2	Allied Mathematics-II (NS)	-	-	-	-	-	-	3	-
6		ES	17U1PHES	Environmental studies	-	100	100	-	40	40	-	1
7	II	Part-I	17U2PHT2/H2	Tamil-II/Hindi -II	25	75	100	10	30	40	6	3
8		Part - II	17U2PHE2	English – II	25	75	100	10	30	40	6	3
9		Core	17U2PHC2	Mechanics and Special theory of Relativity	25	75	100	10	30	40	5	4
10		Core	17U2PHC3	Electricity & Electromagnetism	25	75	100	10	30	40	4	4
11		Allied	17U2PHMAA2	Allied Mathematics – II	25	75	100	10	30	40	3	4
12		Allied	17U2PHMAA3	Allied Mathematics – III	25	75	100	10	30	40	5	3
13		SBE	17U2PHS1	Skill Based Elective – I	25	75	100	10	30	40	1	1
14		VBE	17U2PHVE	Value Based Education	25	75	100	10	30	40	-	-
15	III	Part-I	17U3PHT3/H3	Tamil-III/ Hindi-III	25	75	100	10	30	40	6	3
16		Part – II	17U3PHE3	English-III	25	75	100	10	30	40	6	3
17		Core	17U3PHC4	Heat and Thermodynamics	25	75	100	10	30	40	5	5
18		Core	17U3PHC5	Laser Physics	25	75	100	10	30	40	5	4
19		Allied	17U3PHCHA1	Allied Chemistry-I	25	75	100	10	30	40	5	4
		Allied	17U4PHCHAP1	Allied Chemistry Practical (NS)	-	-	-	-	-	-	3	-
20		GS	17U3PHGS	Gender Studies	-	100	100	-	40	40	-	-

S. No	SEM	Category	Paper Code	Title of the Paper	Maximum Marks			Minimum Marks For Pass			Hours Week	Credits
					CIA	E.E	Total	CIA	E.E	Total		
21	IV	Part-I	17U4PHT4/H4	Tamil-IV/ Hindi – IV	25	75	100	10	30	40	6	3
22		Part – II	17U4PHE4	English – IV	25	75	100	10	30	40	6	3
23		Core	17U4PHC6	Optics	25	75	100	10	30	40	6	5
24		Core	17U4PHCP2	Major Practical-II	40	60	100	16	24	40	3	4
25		Allied	17U4PHCHA2	Allied Chemistry-II	25	75	100	10	30	40	5	4
26		Allied	17U4PHCHAP1	Allied Chemistry Practical (NS)	40	60	100	16	24	40	3	2
27		SBE	17U4PHS2	Skill Based Elective-II	25	75	100	10	30	40	1	1
28	V	Core	17U5PHC7	Atomic Physics and Wave Mechanics	25	75	100	10	30	40	5	6
29		Core	17U5PHC8	Basic Electronics	25	75	100	10	30	40	4	5
30		Core	17U5PHC9	Material Science	25	75	100	10	30	40	4	4
31		Core	17U5PHCP3	Major Practical – III	40	60	100	16	24	40	6	6
32		Major Elective-I	17U5PHEL1A 17U5PHEL1B	Energy Physics/ Information Technology	25	75	100	10	30	40	4	3
33		Major Elective-II	17U5PHEL2A 17U5PHEL2B	Digital Electronics/ Bio Physics	25	75	100	10	30	40	4	4
34		NME	17U5PHNME	Non-Major Elective	25	75	100	10	30	40	2	1
35		SSD	17U5PHSSD	Soft Skill Development	25	75	100	10	30	40	1	
36	VI	Core	17U6PHC10	Nuclear Physics	25	75	100	10	30	40	5	5
37		Core	17U6PHC11	Communication Electronics	25	75	100	10	30	40	5	5
38		Core	17U6PHC12	Linear Integrated Circuits	25	75	100	10	30	40	4	4
39		Core	17U6PHCP4	Major Practical-IV	40	60	100	16	24	40	6	6
40		Major Elective-II	17U6PHEL3A 17U6PHEL3B	Programming in C / History of Physics	25	75	100	10	30	40	4	3
41		Major Elective-IV	17U6PHEL4A 17U6PHEL4B	8085 Microprocessor & Applications / Nanoscience	25	75	100	10	30	40	4	4
42		GK	17U6PHGK	General knowledge	-	100	100	-	40	40	1	-
43		CN	17U6PHCN	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	**17U1PHMAA1**	**Allied Mathematics – I**	**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	**17U2PHMAA2**	**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 cosθ in 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	**17U3PHCHA1**	**Allied Chemistry – I**	**5**	**4**

Unit –I

Atomic Structure : Atomic number and mass number – isotopes (hydrogen, oxygen , chlorine and uranium) - Orbit and orbital – shapes of s, p, d orbitals - Aufbau principle Hund's rule – electronic configuration of hydrogen carbon, nitrogen, oxygen, - stability of half filled and completely filled orbitals with the examples if Cr, Cu and Ag.

Types of chemical bonds : Octet rule – formation of ionic, covalent , co-ordinate covalent bond with the examples of NaCl, H_2, Cl_2, HF molecules and BF_3 – NH_3 - VSEPR theory -shapes of $BeCl_2$, BF_3, H_2O, PCl_5, XeF_6 – inter and intra molecular hydrogen bonds and their consequences.

Unit –II

Kinetics: Definition with suitable examples of rate, rate law, rate constants, order, molecularity, pseudo firs order and half life period - factors that influence the rate of chemical reactions – effect of temperature on rate .

Catalysis: General characteristics of a catalyst –types (homogeneous & heterogeneous, positive & negative and enzyme) – catalytic promoter and catalytic poisoning - intermediates compound theory and adsorption theory.

Energetics: Heat units - concept of internal energy, enthalpy, entropy – exothermic and endothermic reactions

Unit –III

Acid – base concept: Arrhenius, Lowry – Bronsted and Lewis concepts – strong & weak acids - pH, buffer solution – buffer action.

Colloids: Types- properties (Tyndall effect, Brownian movement, electrophoresis, elect osmosis) – purification by dialysis and ultrafilltration. Types of emulsions and gels

Water chemistry: Hard water – soft water, temporary and permanent Hardness – removal of hardness by reverse osmosis and ion exchange method.

Soaps and detergents – cleaning action of soap - -merits and demerits of soap and detergent

Unit – IV

Separation and purification techniques: Solvent extraction with Soxhlet apparatus - crystallization, fractional crystallization, distillation, fractional distillation, steam distillation with suitable examples.

Chromatography: adsorption and partition principles – column (preparation of column, development and elution), paper (sampling, ascending & descending developments, R_f values) and TLC (preparation of plate, sampling, ascending & descending developments) chromatography.

Unit –V

Organic compounds: Classification - functional groups – nomenclature of simple organic compounds.

Isomerism : Definition – types (structural & stereo) - position, chain, functional isomerism and metamersm shown by butyl alcohol - Geometrical isomerism exhibited by maleic & fumaric acids - optical activity – condition for optical activity - optical isomerism exhibited by lactic acid & tartaric acid – racemisation – resolution .

Hybridisation of carbon: SP^3, SP^2, & SP hybridization with geometry citing examples.

References:

1. Puri B.R. Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry, Milestone Publishers, Delhi (2008)
2. Puri B.R..,Sharma L.R., Pathania M.S., Principles of Physical Chemistry, Vishal PublishingCo., Jalandar, (2004)
3. Bahl B.S. Arun Bahl, Advanced Organic Chemistry, S. Chand & Company ltd., New Delhi, (2005).
4. Usharani S., Analytical Chemistry, Macmillian India Ltd., NewDelhi (2000)

Semester	Subject code	Title of the paper	Hours of Teaching /Week	No. of Credits
IV	**17U4PHCHA2**	**Allied Chemistry – II**	**5**	**4**

Unit – I

Concept of mole : Definition of mole - Avagadro number - calculation of molecular masses of Urea, Glucose, HCI, H_2SO_4, NaOH, Na_2CO_3 and sucrose - Molar volume, equivalent masses of acid and base (HCI, H_2SO_4, NaOH, Na_2CO_3).

Concentration terms: % by weight, molarity, molality, normality, mole fraction - simple problems to prepare different normal / molar solution for the substances NaOH and Glucose - simple problems to prepare different normal / molar solution from the given strength of solutions using $V_1V_2 = V_2N_2$ formula (for the HCI, H_2SO_4, NaOH, solutions).

Co-ordination compounds: Double salts (Mohr's salt, potash alum) and complex salt – terminology in co-ordination chemistry – Werner's theory – IUPAC names simple co-ordination compounds –structure and uses of haemoglobin and chlorophyll.

Unit – II

Industrial chemistry: *Fertilizers*: Essential nutrients for plants –functions N,P,K nutrients- micronutrients and their role in plant life - formulae of urea, calcium superphosphate, super phosphate of lime, potassium sulphate - mixed fertilizers - *Pesticides*: Isecticides (stomach & contact poison and fumigant), fungicides, herbicides, rodenticides and their adverse effect – alternative methods for pest control - *Fuel Gases***:** Water gas, natural gas, bio gas and producer gas (no manufacture)

Electrochemistry: specific conductivity–equivalent conductivity–effect of dilution – conductometric titrations– PH– buffer– calculation of pH using Henderson equation.

Photochemistry: Lambert Law, Lambert. Beer's Law, Grothus – Drapper law – Quantum yield – photo sensitization

Unit – III

Solid state: Elements of symmetry - crystal lattices & unit cell -seven crystal systems – cubic unit cells (sc, bcc & fcc cubes) – elementary structure of NaCl crystal – structure of metal crystals (hcp, ccp, bcc structure) – crystal defects (vacancy, interstitial and impurity)

Alloys: General methods of preparation of alloys – role of carbon in steel - heat treatment of steel – metallic bonding (electron sea model)

Phase rule: Definitions of phase, component and degrees of freedom – one component system (sulphur) two component system (Pb – Ag)

Unit – IV

Fundamental concepts in organic chemistry: Homolytic and heterolytic fissions – substitution, addition, elimination, and condensation reactions, electrophiles-nucleophiles and free radicals with suitable examples. Mechanism of chlorination of CH_4 - Electron displacement effect- inductive and mesomeric effects.

Carbohydrates: Definition –classification – D,L notations - mutarotation – invertsurar – reducing and non reducing sugars - structure of starch and cellulose(no structural elucidation)- Gun cotton, cellulose acetate and viscose rayon.

Unit -V

Chemotherapy: Drugs–sulpha drugs (structures of sulphapyridine,sulphadiazine, sulphaguanidine, sulphathiozole, sulphaacetamide) – mode of action – uses –Definition of antimalarials, antipyretics , analgesics tranquilizers and sedatives , anti septics and disinfectants – structure , uses and side effects of Aspirin, Pharacetamol Phenacetin - local and general anesthetics - *Antibiotics* : Definition – structure ,mode of action and side effect of Pencillin, Chloramphenicol and tetracycline.

Polymers: Homo and co- polymers with the examples of polythene and polyester, thermoplastic and thermosetting polymers (PVC and backelite)

References:

1. Puri B.R. Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry, Milestone Publishers, Delhi (2008).
2. Puri B.R..,Sharma L.R., Pathania M.S., Principles of Physical Chemistry, Vishal PublishingCo., Jalandar, (2004).
3. Bahl B.S. Arun Bahl, Advanced Organic Chemistry, S. Chand & Company ltd., New Delhi, (2005).
4. Jaya shree Ghosh , A text book of pharmaceutical chemistry, 3rd ed., S.Chand &Company Ltd., New Delhi (2008).

Semester	Subject Code	Title of the Paper	Hours of Teaching / Week	No. of Credits
III & IV	**17U4PHCHAP1**	**Allied Chemistry Practical (NS)**	**3+3**	**2**

A. Volumetric Analysis

9. Estimation of HCl (or H_2SO_4) by NaOH using a standard oxalic acid solution
10. Estimation of NaOH by H_2SO_4 (or HCl) using a standard Na_2CO_3 solution
11. Estimation of oxalic acid by $KmnO_4$ using a standard Mohr's salt solution
12. Estimation of Ferrous sulphate by $KmnO_4$ using a standard oxalic acid solution.
13. Estimation of Mohr's salt by $KmnO_4$ using a standard oxalic acid solution.
14. Estimation of KMnO4 by thio using a standard $K_2Cr_2O_7$ solution.
15. Estimation of $K_2Cr_2O_7$ by thio using a standard $CuSO_4$ solution
16. Estimation of $CuSO_4$ by thio using a standard $K_2Cr_2O_7$ solution

B. Organic qualitative analysis

Systematic analysis of an organic compound, Preliminary tests, detection of element present, Aromatic or aliphatic, Saturated or unsaturated, nature of the functional group and exhibiting confirmatory tests for given organic compounds.

The following substance are prescribed:

Benzoic Acid, Cinnamic acid, Pheno, Cresol, Aniline, Toludine, Urea, Benzaldehyde, Glucose

Reference:

2. Venkateswaran V. Veerasamy R. Kulandaivelu A.R., Basic principles of Practical Chemistry, 2nd edition, Sultan Chand & sons, New Delhi, (1997)

Semester	Subject Code	Title of the Paper	Hours of Teaching/ week	No. of Credits
V	**17U5PHC8**	**Basic Electronics**	**4**	**5**

Objectives:

- To gain the concepts of electronics.
- To introduce the knowledge of opto electronic devices.

Unit – I Semiconductor Diodes, Rectifiers and Filters

Intrinsic and Extrinsic Semiconductors – PN junction diode – Volt-Ampere characteristics – Zener diode – Characteristics – Zener diode as voltage regulator – Half wave rectifier – Full wave rectifier – Efficiency – Centre tap – Bridge rectifier – Ripple Factor – Comparison of rectifiers – Filter Circuits – Capacitor filter – Choke input filter – Π filter.

Unit – II Transistors

Transistor – Transistor action – Transistor connections – common base – common emitter – common collector – characteristics – Transistor biasing – Stabilization – Essentials of a transistor biasing circuit – Methods of transistor biasing – Base resistor method – Biasing with feedback resistor – Voltage-divider bias method.

Unit – III Amplifiers

Single stage transistor Amplifiers – common based and common emitter – Multi stage transistor amplifier – RC Coupled Amplifier – Transformer coupled Amplifier – Power amplifiers - classification – Class A, Class B, Class C and Pushpull Amplifiers – Negative feedback amplifiers – Principle – Gain – advantages.

Unit – IV Oscillators

Sinusoidal Oscillators – classification – oscillator circuit – frequency stability - Essentials of feedback – Barkhausen criterion – Transistor oscillators – Tuned base oscillator – Tuned collector oscillator – Hartley oscillator – Colpitt's oscillator – Phase shift oscillator - Wien Bridge oscillator.

Unit – V Semiconductor Devices

FET – Characteristics – Biasing – Applications – FET Amplifier – MOSFET – Working Principle – SCR – Working – Principle – V-I Characteristics – SCR as a Switch – UJT – Characteristics – Advantages – Application – UJT Relaxation oscillator.

Books for Study

1. Principles of Electronics - V. K. Metha.
2. Basic Electronics – B. L. Theraja.
3. Integrated circuits & Semiconductor devices – DEBOO/BORROUS

Books for Reference

1. Basic electronics – A. P. Malvino.
2. Electronics – P. Arun.
3. Hand book of electronics – Gupta & Kumar.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ week	No. of Credits
V	**17U5PHC9**	**Materials Science**	**4**	**4**

Objectives:

- To gain the knowledge about crystallography.
- To introduce the basic ideas of magnetic and engineering materials.

Unit – I Elementary Crystallography

Basic concepts of crystal – Lattice – Basis – Crystal structure - Unit cell – lattice parameters – crystal systems – Bravais lattice – crystal planes – Miller indices – Sc, Bcc, Fcc, HCP crystal structures – Bragg's law – Laue and Power methods of X- ray diffraction.

Unit – II Bonding and Defects in Solids

Interatomic forces – Bonding in solids – Primary bonds – Ionic, Covalent and metallic bonds – Secondary bonds – Dipole, dispersion and hydrogen bonds. Defects in solids – point defect – Line defects.

Unit – III Conductors and Semiconductors

Classical free electron theory of metals – Electrical and Thermal conductivity – Wiedmann-Franz law – Quantum free electron theory – Schrodinger wave equation – density of states – Band theory of solids – Brillouin zones. Semiconductors – Intrinsic and extrinsic semiconductors – carrier concentration of P-type and n-type – Hall Effect.

Unit – IV Dielectric and magnetic materials

Dielectrics – polarization – types of polarization – dielectric constant – Clausius Mossaotti relation – Properties of dielectric materials – Dielectric loss and breakdown. Magnetism – dia, para, ferro, antiferro and ferrimagnetisms – classical theory of diamagnetism – Langevin's theory of paramagnetism – Weiss's theory ferromagnetism – Anti ferromagnetic materials – Ferrimagnetic materials – Hard and soft magnetic materials.

Unit – V Superconducting and Engineering materials

Superconductors – properties – critical temperature – isotopic effect – Meissner effect – Types of superconductors – BCS theory - Polymers – Types of polymerization – Metallic glasses – Composite materials – Fibre optic materials – Acoustic materials – Group II-IV and Group II-VI Semiconductors.

Books for study

1. Solid State Physics – Dr .K. Ilangovan
2. Materials Science – Dr. Raghavan

Books for Reference

1. Materials Science – M. Arumugam
2. Solid State Physics – S.O. Pillai
3. Physics of Solids – W. Thompson.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ week	No. of Credits
V	**17U5PHEL1A**	**Major Elective – I Energy Physics**	**4**	**3**

Objective:

- To introduce the awareness of non-conventional energy.

Unit – I Introduction to Energy Sources

Energy Sources – Types – Various forms of Energy – World energy Features – Commercial energy sources and their availability – conventional and non conventional energy systems – comparison – Coal, oil, natural gas – Availability – Statistical details – applications – merits and demerits – prospects of renewable energy sources.

Unit – II Solar Energy

Introduction – Solar constant – nature of Solar radiation – Solar radiation measurements – Principle of conversion of solar radiation into heat – Solar energy collectors – Types – applications and advantages – Solar Ponds – Principle of operation – applications – Thermal electric conversion – photovoltaic generation – Solar cooking – merits and demerits.

Unit – III Biomass energy and Wind energy

Biomass energy – Classification – Photosynthesis – Biomass conversion process – Biogas plants – Types – Gobar gas plants – Biogas from plant wastes – wood gasification – ethanol from wood – advantages and disadvantages – Wind energy – Principles of wind energy conversion – WECS – Wind machines – Types – Energy Storage – Applications.

Unit – IV Other forms of energy sources

Geothermal energy – Geothermal sources – Advantages and disadvantages of geothermal energy over other energy forms – Applications – Ocean thermal energy conversion – OTEC – Power generation – Energy forms waves and tides – Hydrogen energy - methods – thermo chemical method – solar energy method – utilization of hydrogen gas.

Unit – V Impacts of non-conventional energy

Economic concept of energy – Conservation of energy – Patterns of energy consumption in domestic, industrial, transportation agricultural sectors – Conservation principles in these sectors – energy crisis and possible solution – energy options for the developing countries – impact due to non-conventional energy sources – global warming.

Books for Study

1. Non conventional Energy sources, G.D. Rai, 5th Edition, 2011.
2. Solar Energy, S.P. Sukhatme, Tata McGraw – Hill Publishing company, 2nd Edition 1997.

Books for Reference

1. Solar Energy, G.D. Rai, 5th Edition, 1995.
2. Energy Technology, S. Rao and Dr. B.B. Parulekar, 2nd Edition, 1997.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ week	No. of Credits
VI	**17U6PHC10**	**Nuclear Physics**	**5**	**5**

Objectives:

- To gain the knowledge about Properties of Nuclei.
- To introduce knowledge Cosmic rays and elementary particles.

Unit – I General Properties of Nuclei & Nuclear forces

Classification of nuclei – General properties of nucleus – Nuclear size – Experimental determination – electron scattering experiment – Nuclear mass – Dumpster's mass spectrograph – binding energy, mass defect and packing fraction – stability and binding energy – Semi empirical mass formula – Nuclear spin and magnetic moment – Electric quadruple moment – Nuclear forces – basic properties- Meson theory of Nuclear forces.

Unit - II Radioactivity

Laws of Natural radioactivity – Law of radioactive disintegration – Half life period – Mean life period – Law of successive disintegration – Radioactive Equilibrium – Types of radioactive radiations – Properties – Alpha emission – Velocity and Range of Alpha particles – Geiger and Nuttal law – Alpha particle spectra – Theory of alpha decay – Gamow's theory – Beta ray spectra – line and continuous spectrum – Neutrino theory – Gamma rays spectra – origin of Gamma rays – Nuclear isomerism – Internal conversion.

Unit – III Nuclear Reactions

General ideas of nuclear reactions – types of Nuclear reactions – energy balance in nuclear reaction – threshold energy – nuclear transmutations – types of transmutations with examples – discovery of neutron – properties – types – sources – detection.

Unit – IV Detectors and Accelerators

Solid state detectors – Geiger-Muller counter – Wilson-cloud chamber – Bubble chamber – Scintillation counters – Cerenkov counter – Linear accelerator – Cyclotron – Synchrocyclotron – Betatron – Electron synchrotron – Proton synchrotron.

Unit – V Comic Rays and elementary Particles

Discovery of Cosmic rays – Latitude effect – Azimuth effect – Altitude effect – Primary and Secondary cosmic rays – cosmic ray showers – Van Allen belts – Origin of cosmic rays – Elementary particles – classification – Particles and antiparticles – fundamental interactions – elementary particle quantum numbers – conservation laws and symmetry.

Books for Study

1. Modern Physics – J.B. Rajam
2. Modern Physics – R. Murugesan

Books for Reference

1. Nuclear Physics - R.C. Sharma.
2. Introductory Nuclear Physics - R.K. Puir and V.K. Babbar

Semester	Subject Code	Title of the Paper	Hours of Teaching /week	No. of Credits
VI	**17U6PHC12**	**Linear Integrated Circuits**	**4**	**4**

Objectives:

- To gain the knowledge in operational amplifiers.
- To introduce the concepts of IC's.

Unit – I Operational Amplifier characteristics

Introduction to Operational Amplifier – Op-Amp Characteristics – Differential amplifier – Ideal - Practical Op-Amp – Op -Amp parameters – Output offset voltage – Input offset current – Frequency response of op-amp – Inverting and Non-inverting Amplifier.

Unit – II Operational amplifier with negative feedback

Feedback configuration – Block diagram – Voltage – Series feedback – Negative feedback – Closed Loop Voltage gain – Input Resistance with feedback – Output resistance with feedback – Bandwidth with feedback – Effect of feedback on total of output offset voltage.

Unit – III Applications of Operational Amplifier

Basic Op-Amp circuits – Summing and difference amplifier – Integrator – Differentiator – Linear op-amp circuits – DC sources – Current-to-Voltage and Voltage-to-Current converters – Log and Antilog amplifiers.

Unit – IV Signal Generators

Comparator – Regenerative Comparator (Schmitt Trigger) – Triangular wave generator – Sawtooth Waveform generator – Multivibrator – Astable – Monostable – 555 Timer.

Unit - V IC Fabrication

IC Fabrication – Advantages – Drawbacks – Scales of Integration – Classification - making of monolithic ICs – fabrication of IC components – Resistors – capacitors – diodes – transistors.

Books for study

1. Integrated Electronics (Analog and digital circuits and systems), Jacob Millman and Christos C. HalKias, Tata McGraw Hill edition, New Dehli.
2. Electronic Devices and Circuits, Millman and HalKias.
3. Micro Electronics, Digital and Analog circuit and System – Jacob Mill man.

Semester	Subject Code	Title of the Paper	Hours of Teaching/ week	No. of Credits
VI	**17U6PHEL4A**	**Major Elective – IV 8085 Microprocessor & Applications**	**4**	**4**

Objective:

- To introduce the knowledge in 8085 Microprocessor.

Unit – I Microprocessor architecture and microcomputer system

Microprocessors – organization of microprocessor – machine language – micro processor architecture and its operations – The 8085 MPU – pin diagram – 8085 architecture – communication and bus timing- timing diagrams: Example (i)transfer of byte from memory to MPU, (ii)Execution of instruction MVI A, XXH – Address decoding and memory addresses.

Unit – II 8085 Assembly Language programming

Assembly language – assembler – mnemonics – Instruction and op-code format - Instructions classification including its size: Data transfer, Arithmetic, Logical, Branching and machine control – Five addressing modes of 8085.

Unit - III Programming Aspects

Flow chart – Writing ALP technique – Debugging of a program – How to write ALP and execute a simple program – 8bit: addition, subtraction, multiplication and division -16 bit instructions – Simple programs using IN, OUT and JMP instructions.

Unit – IV Counters and Time delays in Programming

Programming techniques: looping , counting and indexing – Counting and Time delay programs: using one register, register pair, loop and loop within a loop – Example programs: hexadecimal counter, Zero to nine counter and generating pulse waveforms

Unit – V Prelude to interfacing

Introduction to interfaces – merits and cautions – 8255 (PPI or PIA): interfacing keyboard and seven segment display – 8254 (8253) programmable interval timer – 8259A programmable interrupt controller – 8257 DMA controller.

Books for Study and Reference

1. Microprocessor Architecture, Programming and Application 8085 – III – By Ramesh S. Gaonkar.
2. Microprocessor & Applications Adhidya P. Mathur.