VIVEKANANDA COLLEGE

College with Potential for Excellence

(Residential & Autonomous-A Gurkula Institute of Life-Training)

(Affiliated to Madurai Kamaraj University)

Re-accredited with 'A' Grade (CGPA 3.59 out of 4) by NAAC

TIRUVEDAKAM WEST

MADURAI DISTRICT – 625 234

POST GRADUATE AND RESEARCH

DEPARTMENT OF CHEMISTRY

B.Sc. CHEMISTRY

SYLLABUS

Choice Based Credit System

(For those who joined in June 2017 onwards)

(2017-2020 Batch)

ABOUT THE COLLEGE

Vivekananda College was started by Founder-President Swamiji Chidhbhavanandhaji Maharaj of Sri Ramakrishna Tapovanam, Tirupparaithurai, Trichy in 1971 on the banks of the river Vaigai which is blissfully free from the noise and hurry, the crowds and distraction of the city.

Vivekananda College is a residential college functioning under Gurukula pattern. It is Man-making education that is imparted in this institution, Culture, character and curriculam are the three facets of ideal education that make man a better man. This is possible only when the teacher and taught live together, The Gurukula system of Training is therefore a humble and systematic attempt in reviving the age old GURUGRIHAVASA for wholesome education, Attention to physical culture, devotion to duty, obedience to teachers, hospitality to guests, zest for life, love for the nation, and above all, humility and faith in the presence of God etc. are the values sought to be inculcated. All steps are taken to ensure the required atmosphere for the ideal life training.

Vivekananda College, Tiruvedakam West, Madurai District-625 234 is an aided college established in 1971 and offers UG and PG courses. This College is affiliated to the Madurai Kamaraj University, Madurai. The College was reaccredited with 'A' grade (CGPA 3.59 out of 4.00) by NAAC in September 2015. The college was awarded College with Potential for Excellence by UGC in 2016.

VISION AND MISSION

Our Vision: To raise an army of neo-graduates steeped in the hoary culture of the motherland and dedicated to serving her as potential leaders in the manifold spheres of national effort.

Our Mission: A harmonious enrichment of physical, emotional and intellectual facets of a student's personality to bring out his inherent PERFECTION.

OBJECTIVES OF THE INSTITUTION

1. To inculate spiritual, ethical, moral and social values in all disciplines of study.
2. Simultaneous education of the Hand, Heart and Head. Only a sound body can hold a sound mind.
3. Provide opportunities for all round development of the students and excellence in higher education, research and extension in different disciplines.
4. Disseminate the findings of research to the community to facilitate its development.
5. To provide society citizens of sterling character.
6. To cater the needs of the educationally backward people – the most backward, scheduled caste and tribe.

I. Eligibility For Admission

Admission to B.Sc. – Chemistry Programme is open to candidates with +2 pass with Maths, Physics, Chemistry, Biology, Botany and Zoology as main subjects.

For B.Sc.- Chemistry course offered in the college, a pass in the Higher Secondary Examination conducted by the Government of Tamil Nadu or an examination accepted as equivalent there to by the Syndicate of the MKU, subject to such conditions as may be prescribed therefore.

II. Duration

The course is for a period of three years. Each academic year shall comprise of two semesters viz. Odd and Even semesters. Odd semesters shall be from June to November and Even Semesters shall be from December to April. There shall be not less than 90 working days which shall comprise 450 teaching clock hours for each semester (Exclusive of the days for the conduct of university end-semester examinations) for each semester.

III. CBCS System

All Programmes offered in the college are run on Choice Based Credit System (CBCS). It is an instructional package developed to suit the needs of students to keep pace with developments in higher education and the quality assurance expected of it in the light of liberalization and globalization in higher education.

IV. Semesters

An academic year is divided into two semesters. In each semester, courses are offered in 15 teaching weeks. Each week has 30 working hours spread over 6 days a week.

V. Credits

The term 'Credit' refers to the weightage given to a course, usually in relation to the instructional hours assigned to it. The total minimum credits, required for completing the B.Sc. Programme is 140.

VI. Course

Each Course is to be designed variously under lectures / laboratory / seminar / practical training / assignments to meet effective teaching and learning needs.

VII. Examinations

i). There shall be examinations at the end of each semester, for odd semesters in the month of October / November; for even semesters in April/May. A candidate who does not pass the examination in any course(s) shall be permitted to appear in such failed course{s) in the subsequent examinations to be held in October / November or April/May.

ii). A candidate should get registered for the first semester examination. If registration is not possible owing to shortage of attendance beyond condonation limit / regulations prescribed or belated joining or on medical grounds, the candidates are permitted to move to the next semester. Such candidates shall re-do the missed semester after the completion of the programme.

VIII. Condonation

Students must have 75% of attendance in each paper for appearing the examination. Students who have 65% to 74% of attendance shall apply for condonation in the prescribed form with the prescribed fee. Students who have 50% to 64% of attendance shall apply for condonation in prescribed form with the prescribed fee along with the Medical Certificate. Students who have below 50% of attendance are not eligible to appear for the examination. They shall compensate the shortage after the completion of the programme.

IX. Question Paper Pattern

Time: 3 Hours Maximum Marks: 75

SECTION-A (10 X 1 =10 Marks)

Answer All Questions

(1-5) Multiple Choice

(6-10) Fill in the blanks

Two questions from each unit

SECTION-B (5 X 7 = 35 Marks)

Answer All Questions

(11-15) Questions shall be in the format of either (a) or (b)

One question from each unit

SECTION-C (3 X 10 = 30 Marks)

Answer any THREE Questions

(16-20) One question from each unit.

X. Evaluation:

Performance of the students are evaluated objectively. They will be assessed continuously through Internal Assessment System and finally through summative (end) semester examination. To assess internally, there will be three examinations conducted centrally with duration of two hours for each paper. In addition to continuous evaluation, the summative semester examination, which will be a written examination of three hours duration, would also form an integral component of the evaluation. Evaluation is done both internally and externally. The ratio of marks to be allotted to continuous internal assessment and to end semester examination is 25 : 75.

The pattern of internal valuation shall be:

Test: 20 Marks (the average of best two tests out of three tests)

Assignment: 5 marks

Total: 25 marks.

In respect of practical papers, the ratio of marks to be allotted to internal assessment and to summative (end) semester examination is 40 : 60. The internal marks will be calculated on the basis of marks secured at the model examination and marks awarded for the preparation of practical note book. The external marks will be calculated on the basis of the marks awarded by the internal examiner and the external examiner at the summative semester examination.

XI. Passing Minimum

There is no passing minimum for Internal Assessment. The passing minimum for external Examinations shall be 27 out of 75 marks and passing minimum for a paper is 40%.

XII. Classification of Students

Candidates who have secured not less than 40% of marks in each paper shall be declared to have passed in that paper. Candidates who obtain 40% and above but below 50% shall be declared to have passed in Third Class. Candidates who obtain 50% and above but below 60% of the aggregate marks in Part-III shall be declared to have passed in Second Class and those who obtain 60% of marks and above shall be placed in the First Class. Candidates who obtain 75% and above shall be declared to have passed in Distinction provided he has not re-appeared for any paper during the course of the study.

XIII. Failed Candidates

A candidate who has arrears in any paper in a semester examination will be permitted to proceed to the next semester classes. A candidate who has arrears may appear again in these failed papers at the November/April examinations. The internal assessment marks already obtained by him shall be carried over for the subsequent appearance also.

XIV. Improvement of Internal Marks

The student desirous of improving the internal assessment marks may request the Head of the Department. After obtaining permission from the Staff Council Meeting by the Head, the student may write improvement examinations in consultation with the course teacher. The marks obtained (when it is more than the previous marks) will be submitted to the Controller of Examinations for further adoption.

XV. Study Tour

Students are expected to participate in the field visit and the study tours organized by the department. Though study tour/field trip carries no credit, it is compulsory for the students to attend whereby the students can get an opportunity to gain practical knowledge. As such, observational visit to selected social welfare organizations, industries, trade centres, exhibitions, places of historical importance and the like will be considered as extra-curricular activities.

HISTORY OF THE POST GRADUATE AND RESEARCH DEPARTMENT OF CHEMISTRY

The under graduate Department of Chemistry was started in the year 1981 and elevated as Postgraduate department in the year 2003. From the year 2005 the department has become a full fledged research centre as approved by the Madurai Kamaraj University, Madurai. The department glorified its ventures by conducting 24 MTCs (Modern Trends in Chemistry) seminars /symposia, from 1993. In addition to the teaching activities, the department is known for its research works in thrust areas like Green Chemistry, Coordination Chemistry, Supramolecular Chemistry, BioinorganicChemistry, Corrosion Science and Photochemistry. There are four major research projects have completed one funded by CSIR and the other three supported by UGC. One minor project funded by UGC is being carried out.

We have endowed with the following state of the art instruments:

S.No	Name of Equipment	Model or Make
1	UV-Visible Spectrophotometer	JASCO -V530
2	Spectro Fluorimeter	JASCO - FP6200
3	CH - Electrochemical Workstation	CHI6087D
4	Rotavapor and Vaccum pump	BUCHI
5	Oven	NSW-143
6	Progammalbe Hot Air Oven	THERMOCON
7	UltraSonic Bath Sonicator	PCI Analytics
8	Vaccum Pump	RIVO TEK
9	Visible Annular type Photo Reactor	HERBER
10	Doubled distilled Water Set	Easy Still Mark 2000-DDQXL
11	Low temperature Bath	JULABO F32

VIVEKANANDA COLLEGE –TIRUVEDAKAM WEST, MADURAI

Statement of Vision The Chemistry Department is dedicated to

- Provide a comprehensive, relevant curriculum to the students of chemistry department
- Produce knowledgeable graduates for careers in academia, industry and government,
- Conduct significant research in chemistry,
- Promote the collegial exchange of ideas, independent thought and the highest ethical standards.

Statement of Mission:

The mission of Department of Chemistry is to advance the chemical sciences through the education of students by providing them with quality classroom, research and service opportunities. With a high standard for excellence in all three areas the department will produce students who are knowledgeable in chemistry and can think critically.

In support of our mission the Chemistry Department faculty members strive to:

- Act as mentors to students through advising them in research.
- Teach students the value of cross-disciplinary thinking by providing them with educational and research opportunities between chemistry and other fields of study.
- Promote innovative curriculum development while exposing students to advanced instrumentation and technology.
- Foster multi-disciplinary curriculum development to provide students with a breadth of course options in Forensic Chemistry, Biochemistry, Natural Product Chemistry, Environmental Science, Polymer Science and Chemical Education.
- Encourage community engagement by providing students with service-learning and community-based research opportunities.
- Serve as good role models to students for safe and ethical professional behaviour.
- Encourage students to value diversity and to develop a global perspective through international experiences in chemistry.

Mission Statements:

The mission of the Department of Chemistry is to create and maintain programs of excellence in the areas of research, education and public outreach. Our goals are (1) continue to attract, develop and retain world-renowned faculty, (2) maintain state of the art research and teaching facilities, (3) recruit outstanding graduate students, (4) provide innovative, dedicated classroom instruction at both the graduate and undergraduate levels, and (5) communicate the excitement of chemistry to the public at large. To help us accomplish these goals we remain dedicated to a core set of values: excellence in teaching and research, respect for all members of the Department and University, diversity in our students, faculty and staff and service to the citizens of the world.

SCHEME OF EXAMINIATION

(For those who join in June 2017 and after)

FIRST SEMESTER

Part	Study Component	Subject Code	Title of the Paper	Hours	Credit	Sessional Marks	Summative Marks	Total
I	Tamil	P1LT11	Tamil: Ikkalak Kavithaiyum Urainadaium	6	3	25	75	100
	Sanskrit	P1LS11	Fundamental Grammar & History of Sanskrit Literature – I					
II	English	P2LE11	Communicative English Spoken English – I	5 1	2	25	75	100
III	Core	07CT11	Inorganic and Physical Chemistry	4	4	25	75	100
	Core	07CT12	Organic Chemistry – I	3	3	25	75	100
	Core	07CP23	Practical : Semi Micro Inorganic Qualitative analysis	3	-	-	-	-
	Allied	06AT01	Allied Paper I : Physics	4	4	25	75	100
	Allied		Allied: Practical	2	-	40	60	100
IV	Non Major	07NE11	Non Major Elective Paper I: Food Chemistry	2	2	25	75	100
			TOTAL	**30**	**18**			

SECOND SEMESTER

Part	Study Component	Subject Code	Title of the Paper	Hours	Credit	Sessional Marks	Summative Marks	Total
I	Tamil	P1LT21	Tamil: Ikala Kadhai Ilakkiyamum Makkal Thagavaliyalum.	6	3	25	75	100
	Sanskrit	P1LS21	Poetry, Grammar & History of Sanskrit Literature – II					
II	English	P2LE21	Functional English	5	2	25	75	100
	English	P2LE22	Spoken English-I	1	1	100	--	100
III	Core	07CT21	Inorganic and Organic Chemistry-I	3	3	25	75	100
	Core	07CT22	Physical Chemistry – I	4	4	25	75	100
	Core	07CP23	Practical : Semi Micro Inorganic Qualitative analysis	3	2	40	60	100
	Allied	06AT02	Allied Paper II : Physics	4	4	25	75	100
	Allied	06AP03	Allied : Practical	2	2	40	60	100
IV	Non Major	07NE21	Non Major Elective Paper II: Medicinal Chemistry-Vaccine Preventable Diseases	2	2	25	75	100
			TOTAL	**30**	**23**			

Note: Practical Examinations – 07CP23 – 3 Hrs

THIRD SEMESTER

Part	Study Component	Subject Code	Title of the Paper	Hours	Credit	Sessional Marks	Summative Marks	Total
I	Tamil	P1LT31	Kappiyamum Pakthi Ilakiyamum Nadakamum	6	3	25	75	100
	Sanskrit	P1LS31	Prose, Poetics & History of Sanskrit Literature-III					
II	English	P2LE31	English through Drama & Poetry Spoken English – II	4 1	2	25	75	100
III	Core	07CT31	Inorganic and Organic Chemistry-II	4	4	25	75	100
	Core	07CT32	Physical Chemistry – II	4	3	25	75	100
	Core	07CP33	Practical : Volumetric Analysis	3	2	40	60	100
	Allied	05AT01	Allied Paper I : Mathematics – I	6	5	25	75	100
	Allied	09AT01	Animal Organisation	4	4	25	75	100
	Allied		Allied: Practical	2	-	40	60	-
IV	Skill Based	07SB3A	Skill Based Paper -I: Biomolecules and Pharmaceutical Chemistry	2	2	25	75	100
			TOTAL	**30**	**20/ 21**			

Note: Practical Examinations – 07CP33 – 3 Hrs

FOURTH SEMESTER

Part	Study Component	Subject Code	Title of the Paper	Hrs	Credit	Seessional Marks	Summ. Marks	Total
I	Tamil	P1LT41	Sanga Ilakkiyamum Neethi Ilakkiyamum	6	3	25	75	100
	Sanskrit	P1LS41	Drama and History of Sanskrit Literature – IV					
II	English	P2LE41	English through classics	4	2	25	75	100
	English	P2LE42	Spoken English – II	1	1	100	--	100
III	Core	07CT41	Organic and Physical Chemistry	4	4	25	75	100
	Core	07CT42	Inorganic Chemistry – I	4	4	25	75	100
	Core	07CP43	Practical : Organic Preparation and Estimation	3	2	40	60	100
	Allied	05AT02	Allied Paper IV: Mathematics – II	6	5	25	75	100
	Allied	09AT02	Biology and Human Welfare	4	4			
	Allied	09AP03	Allied : Practical	2	2	40	60	100
IV	Skill Based	07SB4A	Skill Based Paper II: Chemistry in Action	2	2	25	75	100
			TOTAL	**30**	**23/ 24**			

Note: Practical Examinations – 07CP43 – 4 Hrs;

FIFTH SEMESTER

Part	Study Component	Subject Code	Title of the Paper	Hours	Credit	Sessional Marks	Summative Marks	Total
II	English	P2LE51 P2CE51	English for Career Development	1	1	100	--	100
III	Core	07CT51	Organic Chemistry - II	4	4	25	75	100
	Core	07CT52	Inorganic Chemistry -II	5	5	25	75	100
	Core	07CT53	Physical Chemistry –III	5	4	25	75	100
	Core	07CP54	Gravimetric Analysis	3	2	40	60	100
	Core	07CP55	Organic Analysis	3	2	40	60	
	Elective	07EP51	Computer Application in Chemistry and Green Chemistry	5	5	25	75	100
IV	Skill Based	07SB5A 07SB5B 07SB5C	Drug Chemistry / Industrial Chemistry Preparation / Polymer Chemistry	2	2	40	60	100
	ES	ESUG51	Environmental Studies	2	2	25	75	100
			TOTAL	**30**	**27**			

Note: Practical Examinations – 07CP54 – 6 Hrs; 07CP55 – 4 Hrs

SIXTH SEMESTER

Part	Study Component	Subject Code	Title of the Paper	Hours	Credit	Sessional Marks	Summative Marks	Total
II	English	P2LE61	English for Professional Excellence	1	1	100		100
III	Core	07CT61	Organic Chemistry-III	5	4	25	75	100
	Core	07CT62	Physical Chemistry-IV	5	4	25	75	100
	Core	07CP63	Practical : Physical Chemistry	6	5	40	60	100
	Elective	07EP61	Nanochemistry	5	5	25	75	100
IV	Skill Based	07SB6A 07SB6B	Chemistry and General Aptitude for Competitive Examinations / Leather Chemistry	2	2	25	75	100
	Skill Based	07SB6C 07SB6D 07SB6E	Dairy Chemistry / Industrial Chemistry / Water Analysis	2	2	40	60	100
	Skill Based	07SB6F 07SB6G	Analytical Methods in Chemistry/ Stereochemistry	2	2	25	75	100
	VE	VEUG61	Value Education	2	2	25	75	100
	EA	EAUG61	Extension Activity		1	25	75	100
			TOTAL	**30**	**28**			
			TOTAL HOURS	**180**				
			TOTAL CREDITS		**140**			

Note: Practical Examinations – 07CP63 – 6 Hrs

பகுதி -1 – பொதுத்தமிழ்

முதல் பருவம் - பாடத்திட்டம்

(2017-2018 ஆம் கல்வியாண்டு முதல் முதற்பருவத்தில் சேரும் மாணவர்களுக்குரிய பாடத்திட்டம்)

PART-I: **Language Tamil Subject**		
Subject Title: **இக்காலக் கவிதையும் உரைநடையும் - தாள்:1**		
Subject Code: **P1LT11**	Hours per week: **6**	Credit: **3**
Seasonal Marks: **25**	Summative marks: **75**	Total Marks: **100**

பாடப்பகுதி

அலகு : 1 தமிழ்ச் செய்யுள் : மரபுக்கவிதைகள்
அலகு : 2 தமிழ்ச் செய்யுள் : புதுக்கவிதைகள்
அலகு : 3 தமிழ் உரைநடை இலக்கியம் : சுவாமி சித்பவானந்தரின் சிந்தனைகள்.
அலகு : 4 தமிழ் இலக்கணம் : எழுத்து இலக்கணம்
அலகு : 5 தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத்தமிழும்

பாடப்பகுதியின் உட்பிரிவுகள்

அலகு: 1 தமிழ்ச் செய்யுள் : மரபுக்கவிதைகள்

1. பாரதியார் கவிதைகள்

1. தமிழ் (கவிதை முழுவதும்)
2. நடிப்புச் சுதேசிகள் (கவிதை முழுவதும்)

2. பாரதிதாசன் கவிதைகள்

1. நீங்களே சொல்லுங்கள் (கவிதை முழுவதும்)
2. புதிய உலகு செய்வோம் (கவிதை முழுவதும்)

3. குருதேவர் இராமகிருஷ்ணர்

நாமக்கல் கவிஞர் வெ.இராமலிங்கம் பிள்ளை

4. கோவில் வழிபாடு

கவிமணி தேசிக விநாயகம் பிள்ளை

5. மதுரை ஸ்ரீமீனாட்சியம்மை

சோழவந்தான் அரசஞ்சண்முகனார்

அலகு: 2 தமிழ்ச்செய்யுள் : புதுக்கவிதைகள்

6. அன்னை – கவிஞர் கண்ணதாசன்
7. கிழக்கு விழிக்கும் நேரம் - கவிஞர் வைரமுத்து (கொடிமரத்தின் வேர்கள்)
8. அவர்கள் வருகிறார்கள் - மு.மேத்தா (சுதந்திர தாகம்)
9. புதுக்கவிதைகள் - க.நா.சுப்ரமண்யம் (கவிதை)
10. நாம் இருக்கும் நாடு - தமிழன்பன் (வாக்கு வரம் தரும் தெய்வம்)
11. தீர்த்தக்கரையினிலே - முருகு சுந்தரம் (ஒலிபெருக்கி)
12. ஹைக்கூ கவிதைகள் - க.ராமச்சந்திரன்

அலகு: 3 தமிழ் உரைநடை இலக்கியம் - சுவாமி சித்பவானந்தரின் சிந்தனைகள் (தமிழ்த்துறை வெளியீடு)

அலகு: 4 தமிழ் இலக்கணம் - எழுத்து

1. முதல் எழுத்துக்கள்
2. சார்பெழுத்துக்கள்
3. மொழி முதல் எழுத்துக்கள்
4. மொழி இறுதி எழுத்துக்கள்
5. வல்லெழுத்து மிகும் இடங்கள்
6. வல்லெழுத்து மிகா இடங்கள்

அலகு: 5 தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத் தமிழும்

அ) 1. மரபுக்கவிதையின் தோற்றமும் வளர்ச்சியும்
2. புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்

ஆ) மரபுப்பிழை நீக்குதல் - பிறமொழிச் சொற்களை நீக்குதல் - பிழையற்ற தொடரைத் தேர்ந்தெடுத்தல் - ஒருமை பன்மை மயக்கம் – ஓர் எழுத்து ஒரு மொழிக்குரிய பொருள் - ஒலி வேறுபாடுகளும் பொருள் வேறுபாடுகளும் - பொருத்தமான பொருள் - பொருத்தமான தொடர் அறிதல்.

பாடநூல்கள்

1. தமிழ்ச் செய்யுள் தொகுப்பு (தமிழ்த்துறை வெளியீடு)
2. சுவாமி சித்பவானந்தரின் சிந்தனைகள் (தமிழ்த்துறை வெளியீடு)

பார்வை நூல்கள்

1. பாரதியார் கவிதைகள் (குமரன் பதிப்பகம்)
2. பாரதிதாசன் கவிதைகள் (சுவாமிமலை பதிப்பகம்)
3. தமிழ் இலக்கிய வரலாறு - முனைவர். பாக்யமேரி
4. தமிழ் இலக்கிய வரலாறு - மு.வரதராசனார்

B.Sc. Chemistry Part-II English CBCS Syllabus - **SEMESTER I**
(For those who joined in June 2017 and after)

PART II – Paper I		
Subject Title **: Communicative English**		
Subject Code:**P2LE11**	Hours per week: **5**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives: Total number of hours per semester: **75 Hrs**

- *To develop listening and speaking skills*
- *To increase the vocabulary of students*
- *To improve reading skills*
- *To develop competency in grammar*
- *To develop continuous writing*

Unit – I - Listening, Speaking and Reading Components 15 Hrs

1. Rabindranath Tagore – Cabuliwallah
2. Khushwant Singh – Karma
3. R.K. Narayan – Sweets for Angels
4. K.A.Abbas – Sparrows

Unit – II 15 Hrs

- Sentences, Clauses, and Phrases
- Parts of Speech
- Nouns
- Pronouns
- Determiners
- Articles
- Adjectives
- Verbs
- Adverbs
- Some Common Adjectives and Adverbs

Unit – III Composition 15 Hrs

- Letter writing – Formal Letters & Informal Letters
- Descriptive Writing – General topics (Paragraph)

Unit – IV - Extensive Reading: Short Stories 15 Hrs

- Young Naren - by Brahamachari Amal.
  [From "A Simple life of Swami Vivekananda"
  Advaita Ashrama, Kolkata]
- A Story of Initiation - by Sri Aurobindo Society.
  From "Stories and Anecdotes from the Mother"
  Pondicherry.
- Glory At Twilight - Bhabani Bhattacharya
- The Martyr's Corner - R.K. Narayan

Unit – V - Translation 15 Hrs

Translation of Sentences and Stories from Tamil to English / English to Tamil (Passages will be supplied)

Reference Book:

1. A Textbook of English Grammar and Usage by K.V.Joseph (Page. No.1-184) Second Edition (2012), TATA McGraw Hill Education Private Limited, New Delhi.

B.Sc. Chemistry CBCS Syllabus – **SEMESTER - I**

(For those who joined in June 2017 and after)

PART III – Core Subject Theory – I		
Subject Title **: Inorganic and Physical Chemistry**		
Subject Code:**07CT11**	Hours per week: **4**	Credit: **4**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

To enable the students

- *To understand the structure of polyelectronic atoms*
- *To gain basic knowledge about quantum chemistry*
- *To familiar with fundamentals of periodic properties*
- *To gain basic knowledge of colloids*
- *To understand the theory of adsorption*

UNIT I: ATOMIC STRUCTURE 12 Hrs

Black body radiation – quantum theory – Bohr's model of an atom - Bohr's energy for hydrogen and hydrogen like atoms (He^{+}, Li^{2+}) – Ritz combination principle – hydrogen spectrum - defects of Bohr's model – Bohr-Sommerfeld theory – de Broglie's equation – concept of photoelectric effect – Compton effect – Heisenberg uncertainty principle.

UNIT II: BASIC QUANTUM MECHANICS 12 Hrs

Schrodinger wave equation (derivation only) - interpretation of Ψ and Ψ^2 – eigen function – eigen values – quantum numbers – Zeeman effect – atomic orbitals – shapes of orbitals - representation of angular radial parts – nodal planes and character – Aufbau principle – Hund's rule – Pauli's exclusion principle and Stark effect.

UNIT III: PERIODIC PROPERTIES AND CHEMICAL BONDING – I 12 Hrs

Periodic properties – interpretation of periodic properties of the elements in terms of their electronic configuration – atomic radius – van der Waals radius – ionic radius – ionization potential – electron affinity – electronegativity - determination of electronegativity by Pauling and Mulliken's methods - ionic bond – lattice energy, Born-Haber cycle – properties of ionic compounds – covalent bond–Fajan's rule – hydrogen bond – metallic bond.

UNIT IV: COLLOIDS 12 Hrs

Definition – types of colloids, sols – preparation, purification, properties – kinetic, optical and electrical, stability of colloids – gold number. Emulsions – types of emulsions, preparation, properties and applications. Gels – types of gels, preparation, properties and applications. Donnan – Membrance equilibrium – osmosis, reverse osmosis, dialysis and desalination – macromolecules – molecular weight of macro molecules – determination of molecular weight by osmotic pressure method and light scattering methods – applications of colloids.

UNIT V: ADSORPTION AND CATALYSIS 12 Hrs

Adsorption: Definition of the various forms of adsorption of gases on solids – characteristics of adsorption of gases on solids – physisorption and chemisorption – factor influencing adsorption – adsorption isobars. Freundlich and Langmuir adsorption isotherms – applications of adsorption.

Catalysis: Definition-various types of classifications – characteristics of catalysis, theories of catalysis – promoters and poisons, enzyme catalysis, acid-base catalysis and autocatalysis with suitable examples – applications.

Text Books:

1. Essentials of Physical chemistry Arun Bahl, B.S.Bhal & G.D.Tuli, S.Chand Publishing Company, New Delhi, 2010 Edition.
2. Text book of Inorganic Chemistry by P.L.Soni, Mohan Katyal, Sultan Chand & Sons, New Delhi, 2010 Edition.

Reference Book:

1. Principles of Physical Chemistry by B.R.Puri, L.R.Sharma, and S.Pathania,Vishal Publishing Co., New Delhi, 2012 Edition.

B.Sc. Chemistry CBCS Syllabus - **SEMESTER - I**
(For those who joined in June 2017 and after)

PART III – Core Subject Theory – II		
Subject Title **: Organic Chemistry - I**		
Subject Code**: 07CT12**	Hours per week: **3**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

To enable the students

- *To know about the fundamental concept of organic chemistry.*
- *To understand the various types of reaction intermediates*
- *To study the alkane ,alkene and alkyne*
- *To know about the chemistry of aromaticity and aromatic electrophilic substitution reaction*

UNIT I: NOMENCLATURE AND ISOMERISM 9 Hrs

Nomenclature – common and IUPAC system of naming-aliphatic and aromatic compounds (Definitions and examples only). Isomerism – structural isomerism – chain isomerism-position isomerism-functional isomerism- metamerism – tautomerism.

UNIT II: ELECTRON DISPLACEMENT EFFECTS 9 Hrs

Inductive effect – electromeric effect – mesomeric effect – hyperconjugative effect – homolytic fission and heterolytic fission – definition, structure, formation and stability of carbonium ion, carbanion and free radicals, electrophilic reagents – nucleophilic reagents. Types of reactions: substitution, addition, elimination and rearrangement reactions.

UNIT III: ALKANE, ALKENE AND ALKYNE 9 Hrs

Preparation – chemical properties and uses of methane. Mechanism of free radical substitution in methane by halogenation. Alkenes – preparation - electrophilic addition reactions – Markounikov's rule, peroxide effects, geometrical isomerism – methods of preparation of alkynes - relative acidity of alkene and alkyne.

UNIT IV: AROMATICITY 9 Hrs

Aromaticity – modern theory of aromaticity – conditions for aromaticity – Huckel's rule {(4n+2) rule} – resonance and resonance energy in benzene – structure of benzene - preparation and properties of benzene.

UNIT V: AROMATIC ELETROPHILIC SUBSTITUTION REACTIONS 9 Hrs

Aromatic electrophilic substitution reactions – mechanism of nitration, sulphonation, halogenation, Friedel –Craft's alkylation and acylation of benzene.

Directive influence and orientation of aromatic monosubstituted benzene – ortho, para directors and meta directors – ring activating and deactivating substituents.

Text Book:

1. Advanced Organic Chemistry by Bahl & Arun Bahl, S.Chand & Company Ltd, New Delhi, 2012 Edition.

Reference Book:

1. Text book of Organic chemistry by P.L.Soni, H. M. Chawla S. Chand & Company Ltd, 2007.

B.Sc. Chemistry CBCS Syllabus – **SEMESTER - I**
(For those who joined in June 2017 and after)

PART III – Core Subject Practical		
Subject Title **: Semi Micro Inorganic Qualitative Analysis**		
Subject Code: **07CP23**	Hours per week: **3**	Credit: **2**
Sessional l Marks: **40**	Summative Marks: **60**	Total Marks: **100**

Objectives:

To enable the students

- *To acquire skill in semi-micro inorganic qualitative analysis*

Analysis of mixture containing two cations and two anions of which one is an interfering ion using semi micro method.

Cations:

Lead, bismuth, copper, cadmium, antimony, iron (II & III), aluminium, zinc, manganese, cobalt, nickel, barium, strontium, calcium, magnesium and ammonium.

Anions:

Carbonate, sulphate, nitrate, chloride, bromide, fluoride, oxalate, borate, phosphate, arsenite, and arsenate.
(Summative practical examination: At the end of second semester)

Text book:

1. Dr. V. V. Ramanujam, Inorganic semimicro qualitative analysis, The National Publishing Company.

Reference Book:

1. Vogels Text book of Qualitative Inorganic Analysis, Addition Wesley Longman, 7th edition, 2001

B.Sc. Chemistry Allied Physics CBCS Syllabus **- SEMESTER – I**
(For those who joined in June 2017 and after)

PART – III : Allied Subject		
Subject Title **: Allied Physics – I**		
Subject Code: **06AT01**	Hours per week: **4**	Credit: **4**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

- *To learn about acoustics of buildings*
- *To know about elasticity, viscosity and Surface tension*
- *To get a knowledge in electricity and magnetism.*
- *To provide a good foundation in optics.*

UNIT I: Waves and Oscillations

Simple Harmonic Motion – Composition of two Simple Harmonic Motions in a straight line- Composition of two Simple Harmonic Motions of equal time periods at right angles- - Melde's Experiment – Ultrasonics- production – application and uses- – Reverberation – Absorption coefficient - Acoustics of buildings – factors affecting the acoustics of buildings- Sound distribution in an auditorium

UNIT II: Properties of Matter

Elasticity: Introduction- Different moduli of elasticity – Poisson's ratio- Energy stored in a stretched wire - Bending of beams – expression for the bending moment- Theory of Non-uniform bending – Torsion Pendulum – expression for the period of oscillation of a torsion pendulum.

Viscosity: Streamline flow and turbulent flow – Coefficient of viscosity - Derivation of Poiseulle's formula.

Surface Tension: Introduction- experimental determination of surface tension – Jaegar's method.

UNIT III: Thermal Physics

Laws of thermodynamics – Zeroth law of thermodynamics –first law of thermodynamics - second law of thermodynamics- third law of thermodynamics – Heat engine – Entropy – Change of entropy in a Carnots cycle.

Unit IV: Electricity and Magnetism

Introduction – Magnetic effect of electric current – Oersted's experiment – BiotSavart law- Magnetic induction at a point on the axis of a circular coil- choke coil-Electric circuit – switches- fuses- circuit breaker – the relay

Unit V: Geometrical Optics

Introduction – image formation by refraction – Critical angle –Refraction through prism – direct vision spectroscope – coma – Spherical aberration in a lens – methods of minimizing spherical aberration – condition for minimum spherical aberration of two thin lenses separated by a distance - chromatic aberration in a lens- condition for achromatism of two lenses separated by a distance

Text Book:

Allied Physics Paper I and II - R. Murugeshan, M.Shantha Kiruthiga Sivaprasath, S.Chand & Company Pvt. Ltd. New Delhi, Revised Edition, Reprint 2014.

Unit I: 1.1 to 1.3, 1.9, 1.11 to 1.19.

Unit II: 2.1 to 2.7, 2.12, 2.14, 2.15, 2.17, 2.24, 2.29

Unit III: 3.15 to 3.21

Unit IV: 4.1, 4.4 to 4.6, 4.15 to 4.20

Unit V: 5.1, 5.2, 5.4, 5.6, 5.14, 5.16, 5.18 to 5.20, 5.22, 5.27

Reference Books:

1. Electricity and Magnetism - R. Murugeshan -Reprint with correction 2008
2. Principles of Electronics - V.K.Metha & Rohit Metha -Multicolour Illustrative edition – 2006- S. Chand & Company Ltd., New Delhi
3. Modern Physics-R. Murugeshan & Kiruthiga Sivaprasath- Multicolour Edition – 2007- S. Chand & Company Ltd., New Delhi

B.Sc. Chemistry CBCS Syllabus - **SEMESTER - I**
(For those who joined in June 2017 and after)

PART IV- Non Major Elective Paper I		
Subject Title **: Food Chemistry**		
Subject Code: **07NE11**	Hours per week: **2**	Credit: **2**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

To enable the students

- *To know about the concept of food adulteration.*
- *To understand the various types of food poison*
- *To know about the food materials & their preservations*

UNIT I: INTRODUCTION TO FOOD SCIENCE 6 Hrs

Food and health – functions of food – classifications of food – nutritional deficiency – cooking –preliminary preparations – cooking methods – microwave cooking

UNIT II: FOOD ADULTERATION 6 Hrs

Sources of food, types, advantages and disadvantages. Food adulteration – contamination of wheat, rice, alial, milk, butter etc. with clay stones, water and toxic chemicals – common adulterants. Ghee adulterants and their detection. Detection of adultered foods by simple analytical techniques.

UNIT III: FOOD POISON 6 Hrs

Food poisons – natural poisons (alkaloids – nephrotoxing) – pesticides. (DDT, BHC, Malathion) – chemical poisons – first-aid for poison consumed victims.

UNIT IV: FOOD ADDITIVES 6 Hrs

Food additives – artificial sweetners – saccharin – cyclomate and aspartate. food flavours – esters, aldehydes and heterocyclic compound. Food colours – restricted use – spurious colours – emulsifying agents – preservatives learning agents. baking powder- yeast – taste makers – MSG – vinegar.

UNIT V: FOOD TECHNOLOGY 6 Hrs

Biotechnology of food – algae as food – spirulina – organic foods – food irradiation – packaging of foods- classification of package.

Text Book:

1. Food Science B. Srilakshmi Third Edition, New Age International (P) Limited, Publishers -2002

Reference Books:

1. Jayashree Ghosh, Fundamental concepts of Applied Chemistry, S. Chand & Co. Publisheres. 1998
2. Thanlamma Jacob, Text Books of Applied Chemistry for Home Science and Allied Sciences, Macmillan. 2000

இரண்டாம் பருவம் - பாடத்திட்டம் (2017 - 2018-ஆம் ஆண்டு முதல்)

PART-I: **Language Tamil Subject**		
Subject Title: **இக்காலக் கதை இலக்கியமும் மக்கள் தகவலியலும் - தாள்: 2**		
Subject Code: **P1LT21**	Hours per week: **6**	Credit: **3**
Seasonal Marks: **25**	Summative marks: **75**	Total Marks: **100**

பாடப்பகுதி

அலகு: 1 தமிழ்ச் சிறுகதை இலக்கியம்
அலகு: 2 தமிழ் நாவல் இலக்கியம்
அலகு: 3 மக்கள் தகவலியல்
அலகு: 4 தமிழ் இலக்கணம் - சொல்
அலகு: 5 தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத்தமிழும்

பாடப்பகுதியின் உட்பிரிவுகள்

அலகு : 1 தமிழ்ச் சிறுகதை இலக்கியம் - பூ மலரும் காலம் (ஜி.மீனாட்சி)
அலகு : 2 தமிழ் நாவல் இலக்கியம் - வேரில் பழுத்த பலா (சு.சமுத்திரம்)

அலகு : 3 மக்கள் தகவலியல் - பாடப்பகுதிகள்

1. இதழ்கள் தொடங்குவதற்குரிய வழிமுறைகள்
2. செய்தித்தாள் நிர்வாக அமைப்பு
3. பேட்டி - அதன் வகைகள்
4. செய்தி - செய்தி விளக்கம்

அலகு : 4 தமிழ் இலக்கணம் - சொல்

1. நான்கு வகைச் சொற்கள்
2. வினா - விடை வகைகள்
3. வேற்றுமைகள்
4. தொகைகள் (வேற்றுமைத் தொகை, வினைத்தொகை, பண்புத்தொகை, உவமைத்தொகை, உம்மைத்தொகை, அன்மொழித்தொகை)

அலகு : 5 தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத்தமிழும்

அ) 1. சிறுகதையின் தோற்றமும் வளர்ச்சியும்
2. புதின இலக்கியத்தின் தோற்றமும் வளர்ச்சியும்

ஆ) தொடரும் தொடர்பும் அறிதல் - பிரித்து எழுதுதல் - பொருந்தாச் சொல்லைக் கண்டறிதல் – வழுவுச்சொற்களை நீக்கிய தொடரைக் குறிப்பிடுதல்- சொற்களை அகர வரிசைப்படுத்தல்- வேர்ச்சொல்லைத் தேர்வு செய்தல் - எவ்வகை வாக்கியம் எனக் கண்டு எழுதுதல் - சொற்களை ஒழுங்குபடுத்திச் சொற்றொடர் ஆக்குதல் - ஆங்கிலச்சொல்லுக்கு நிகரான தமிழ்ச் சொல் அறிதல்.

பாடநூல்கள்

1. சிறுகதை – பூ மலரும் காலம் (ஜி.மீனாட்சி)
2. நாவல் - வேரில் பழுத்த பலா (சு.சமுத்திரம்)
3. இதழியல் கலை (டாக்டர் மா.பா.குருசாமி)
4. தமிழ் இலக்கிய வரலாறு (முனைவர் பாக்யமேரி)

பார்வை நூல்கள்

1. மக்கள் தகவல் தொடர்பியல் அறிமுகம் (டாக்டர் கி. இராசா)
2. இதழியல் (ச.ஈஸ்வரன்)
3. இதழியல் (டாக்டர் இரா.கோதண்டபாணி)

4. இதழியல் ஓர் அறிமுகம் (டாக்டர் அந்தோணி இராசு)
5. தமிழ் இலக்கிய வரலாறு (டாகடர் மு.வரதராசனார்)

DEPARTMENT OF SANSKRIT

B.A. / B.Sc. PART-I –LANGUAGE SANSKRIT SYLLABUS: SEMESTER – II:

PAPER – II

(For those who join in June 2017and After)

PART – I Sanskrit Paper II		
Subject Title : **Poetry Grammar & History of Sanskrit Literature – II**		
Subject Code:**P1LS21**	Hours per week: **6**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

POETRY

Selected portions from the prescribed text: **Kaliviḍambanam** & **Sabhārañjanaśatakam**

- Published by SADGUNA PUBLLICATIONS

Kalividambanam Cidambaram (TN)

Unit I. scholars and Teachers Verse No. 1-10,

Unit II. Astrologers & Physicians V. 14-30

Unit III. Relatives & Pseudo monks Vv. 41-50, 84-93.

Sabhārañjanaśatakam

Unit IV Wisdom and it's acquisition Vv. 1-12

Unit V Poetry & Poet Vv. 13-30.

Prescribed text:
LYRICS & CHAMPU KAVYAS
A short history of Sanskrit Literature
(Published by A.M.G. Publications, Madurai – 625 016 Page No. 51 – 60, 42 – 45)
year of publication- 1996

Kaliviḍambanam & Sabhārañjanaśatakam
Published by SADGUNA PUBLLICATIONS
Cidambaram (TN). 2014.

B.Sc. Chemistry Part-II English CBCS Syllabus - **SEMESTER – II**
(For those who join in June 2017 onwards)

PART II – Paper I		
Subject Title **: Functional English**		
Subject Code:**P2LE21**	Hours per week: **5**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives: Total number of hours per semester: **75 Hrs**

- *To develop listening, speaking and reading skills*
- *To develop Information and Communication Technology (ICT) skills*
- *To develop presentation skills*
- *To develop competency in grammar*

Unit – I Listening, Speaking and Reading Components 15 Hrs

Prose

1. **MY VISIONS FOR INDIA - A.P.J. ABDUL KALAM**
2. Mahatma Gandhi - V.S.Srinivasa Sastri
3. The Secret of Work - Swami Vivekananda
4. The Golden Age of Cricket - Neville Cardus
5. Tree Speaks - C. Rajagopalachari

Unit – II Language Study 15 Hrs

- Tenses and Their Uses
- Concord or Agreement
- Conditional Sentences
- Active and Passive Voice
- Preposition

Book: ***A Textbook of English Grammar and Usage*** **by K.V.Joseph**
Second Edition (2012), TATA McGraw Hill Education Private Limited, New Delhi.

Unit – III Composition 15 Hrs

- Letter writing – Informal Letters
- Hints Development
- Descriptive Writing

Unit – IV Extensive Reading: Short Stories 15 Hrs

Extensive Reading

1. Upper Division Love - Manohar Malgonkar
2. The Tiger in the Tunnel - Ruskin Bond
3. A Devoted Son - Anitha Desai
4. *The Lost Child* - *Mulk Raj Anand*
5. The Cask of Amantilado - Edgar Allan Poe

Unit – V Translation 15 Hrs

- Translation of Sentences and Stories from Tamil to English/English to Tamil (Passages will be supplied)

B.Sc. Chemistry CBCS Syllabus - **SEMESTER II**
(For those who joined in June 2017 and after)

PART III – Core Subject Theory – III		
Subject Title **: Inorganic and Organic Chemistry – I**		
Subject Code: **07CT21**	Hours per week: **3**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

To enable the students

- *To understand the theory of chemical bonding*
- *To know about the halogen derivatives of aliphatic halogen compound*
- *To gain basic knowledge about organometallic reagents*
- *To have basic idea of aromatic halogen compound*

UNIT I: CHEMICAL BONDING –II 9 Hrs

VB theory - overlaping of orbitals (s-s, s-p and p-p)-sigma and pi bonds – hybridisation – sp, sp^2 and sp^3 hybridisation with suitable examples. MO theory – bonding – antibonding orbitals – bond order – bond strength – application of MOT to H_2, O_2 and N_2 molecules. VSEPR theory – application to H_2O, NH_3 and CH_4 molecules.

UNIT II: ALIPHATIC HALOGEN COMPOUNDS 9 Hrs

Preparation, properties and uses of – methyl chloride – chloroform-carbon tetrachloride – relative reactivity of alkyl halides – reaction and mechanism of S_N1, S_N2, E_1 and E_2 with reference to alkyl halides.

UNIT III: ALIPHATIC AND AROMATIC ALCOHOLS 9 Hrs

General methods of preparation and reactions of ethyl alcohol – allyl alcohol-ethylene glycol-glycerol – nitro glycerine – methods of preparation and properties of benzyl alcohol

UNIT IV: ORGANOMETALLIC REAGENTS 9 Hrs

Organometallic reagents – preparations, properties and synthetic applications Grignard reagent – preparations and synthetic applications of dialkyl zinc – preparations, properties and uses of tetra ethyl lead (TEL)

UNIT V: ALIPHATIC AND AROMATIC HALOGEN DERIVATIVES 9 Hrs

Preparation and properties of vinyl chloride, allyl iodide – preparation of westron, freon and chloroprene – preparations and properties of chlorobenzene, benzyl chloride.

Text Books:

1. Text book of Inorganic Chemistry by P.L.Soni and Mohan Katyal, Sultan Chand & Sons, New Delhi, 2010 Edition.
2. Advanced Organic Chemistry by Bahl & Arun Bahl, S.Chand & Company Ltd, New Delhi, 2012 Edition.

Reference Books:

1. Concise inorganic chemistry, JD.Lee, Blackwell science Ltd, vediga 2003.

2. Organic Chemistry, Robert Thornton Morrison & Robert Neilson Boyd, Printice Hall of India, (6th Edition) 1995.

B.Sc. Chemistry CBCS Syllabus - **SEMESTER II**

(For those who joined in June 2017 and after)

PART III – Core Subject Theory – IV		
Subject Title **: Physical Chemistry – I**		
Subject Code: **07CT22**	Hours per week: **4**	Credit: **4**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

To enable the students

- *To understand the essentials of nuclear chemistry*
- *To have basic idea of solid state chemistry*
- *To gain basic knowledge about crystallographic systems*
- *To study in detail about liquid state &liquid crystals*

UNIT I: NUCLEAR CHEMISTRY I 12 Hrs

Introduction – composition of nucleus and nuclear forces (meson field theory) nuclear stability – mass defect – binding energy - packing fraction – n / P ratio, magic numbers – nuclear models – liquid drop – shell and collective model – isotopes – detection and separation – deviation of atomic weights from whole numbers – isobars – isotones and isomers.

UNIT II: NUCLEAR CHEMISTRY II 12 Hrs

Radioactivity – discovery, detection – Geiger Muller counter, Willson cloud chamber and measurements, laws of radioactivity – rate of disintegration – half life and average life, group displacement law – radioactive series – nuclear transformations – use of projectiles – nuclear reactions – fission and fusion – nuclear reactors and cyclotron. applications of nuclear science in agriculture and medicine carbon dating – rock dating – radioactive waste disposal.

UNIT III: SOLID STATE 12 Hrs

Classification and properties of solids, crystalline state – amorphous substances – polymorphism of the elements – allotropy. crystallography – definition-unit cell-face and edge of crystal – interfacial angle – crystal lattice-space lattice-law of crystallography. i) Law of constancy of interfacial angle ii) Law of rationality of indices. iii) Law of symmetry – symmetry elements – plane, axis and centre of symmetry. iv) Miller Indices and Weiss indices.

UNIT IV: CRYSTALLOGRAPHIC SYSTEMS 12 Hrs

Bravais lattices – Simple cubic, face centered cubic and body centered cubic – Applications of X-rays to the study of crystal structures – Bragg's equation – Powder method – Rotating crystal method – Determination of interplanar distance and wavelength of x-rays.

UNIT V: TYPES OF CRYSTALS AND LIQUID STATE 12 Hrs

a) Ionic crystals: analysis of NaCl KCl and CsCl – determination of Avogadro number. Molecular crystals: H_2O and NH_3. covalent crystals: diamond and graphite, metallic crystals: metallic bonds in metals – conductors – insulators – semiconductors - n and p-type semiconductors-band theory – defects in crystals – point defects – Schottky and Frenkel defects.

b) Vitreous state and liquid crystals – Types of liquid crystal and applications – Disorders in the liquid state.

Text Book:

1. Essentials of Physical chemistry Arun Bahl, B.S.Bhal & G.D.Tuli, S.Chand Publishing Company, New Delhi, 2010 Edition.

Reference Book:

1. Principles of Physical Chemistry by B.R.Puri, L.R.Sharma, and S.Pathania,Vishal Publishing Co., New Delhi, 2012 Edition.

B.Sc. Chemistry CBCS Syllabus - **SEMESTER II**
(For those who joined in June 2017 and after)

PART III – Core Subject Practical		
Subject Title **: Inorganic Qualitative Analysis**		
Subject Code: **07CP23**	Hours per week: **3**	Credit: **2**
Sessional Marks: **40**	Summative Marks: **60**	Total Marks: **100**

Objectives:

To enable the students

- *To acquire skill in semi-micro inorganic qualitative analysis*

Analysis of mixture containing two cations and two anions of which one is an interfering ion using semi micro method.

Cations:

Lead, bismuth, copper, cadmuium, antimony, iron (II & III), aluminium, zinc, manganese, cobalt, nickel, barium, strontium, calcium, magnesium and ammonium.

Anions:

Carbonate, sulphate, nitrate, chloride, bromide, fluoride, oxalate, borate, phosphate, arsenite, and arsenate.

(Summative practical examination: At the end of second semester)

Text book:

1. Dr. V. V. Ramanujam, Inorganic semimicro qualitative analysis, The National Publishing Company.

Reference Book:

1. Vogels Text book of Qualitative Inorganic Analysis, Addition Wesley Longman, 7th edition, 2001.

B.Sc. Chemistry Allied Physics CBCS Syllabus - **SEMESTER – II**
(For those who joined in June 2017 and after)

PART – III : Allied Subject		
Subject Title **: Allied Physics – II**		
Subject Code: **06AT02**	Hours per week: **4**	Credit: **4**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

- *To learn about Atomic and nuclear physics*
- *To know about elements of relativity*
- *To get a knowledge in electronics*

UNIT I: PHYSICAL OPTICS

Interference – Introduction – interference in thin films – production of colors in thin films – diffraction – introduction – plane transmission diffraction grating – polarization – introduction – double refraction – specific rotator power - lauret's half shade polarimeter –difference between interference and diffraction.

UNIT II: ATOMIC PHYSICS

Vector atom model – Quantum numbers associated with the vector atom model – the Pauli's exclusion principle – magnetic dipole moment due to spin – the stern and gerlach experiment.

Unit III: NUCLEAR PHYSICS:

Models of nuclear structure – mass defect – binding energy – ionization chamber - nuclear fission-energy released in fission- atom bomb – Nuclear reactor – Nuclear fusion – Distinction between fission and fusion.

UNIT IV: ELEMENTS OF RELATIVITY

Frame of reference - Galilean Transformation Equations – Postulates of Special theory of Relativity – The Lorentz Transformation Equations - derivation – Length Contraction – Time Dilation –Mass Energy Equivalence

UNIT V: ELECTRONICS

Light Emitting Diode (LED) – Zener Diode- experiment to study the characteristics of the zener diode – zener diode as voltage regulator – Logic Gates – AND gate – OR gate- the NOT gate – the NAND gate –NAND gate is a universal gate- the NOR gate –NOR gate is universal gate – Boolean algebra – Postulates and theorem of Boolean algebra - De Morgan's theorem.

Text Book:

Allied Physics Paper I and II - R. Murugeshan, M.Shantha Kiruthiga Sivaprasath, S.Chand & Company Pvt. Ltd. New Delhi, Revised Edition, Reprint 2014.

Unit I: 6.2 to 6.4, 6.8, 6.10, 6.12, 6.14, 6.19, 6.20
Unit II: 7.1, 7.2, 7.4, 7.7, 7.8
Unit III: 8.1, 8.3, 8.4, 8.6, 8.8, 8.9, 8.12, 8.13, 8.14

Unit IV: 10.1 to 10.4, 10.11 to 10.21
Unit V: 9.1 to 9.7, 9.9

Reference Books:

1. Electricity and Magnetism - R. Murugeshan -Reprint with correction 2008
2. Principles of Electronics - V.K.Metha & Rohit Metha -Multicolour Illustrative edition – 2006- S. Chand & Company Ltd., New Delhi
3. Modern Physics-R. Murugeshan & Kiruthiga Sivaprasath- Multicolour Edition – 2007- S. Chand & Company Ltd., New Delhi

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B.Sc. Chemistry Allied Physics CBCS Syllabus **- SEMESTER – II**

(For those who joined in June 2017 and after)

PART – III : Allied Physics Practical		
Subject Title **: Allied Physics Practical**		
Subject Code: **06AP03**	Hours per week: **2**	Credit: **2**
Sessional Marks: **40**	Summative Marks: **60**	Total Marks: **100**

(Any fourteen experiments)

1. Non-Uniform Bending – Pin and Microscope
2. Non-Uniform Bending – Optic lever
3. Uniform Bending – Pin and Microscope
4. Uniform Bending – Optic lever
5. Compound Pendulum
6. Torsion Pendulum
7. Sonometer – Verification of Laws (1^{st} law & 2^{nd} law)
8. Viscosity by Stoke's method
9. Newton's rings – Determination of Radius of curvature
10. Air wedge – Thickness of a paper
11. Spectrometer – Refractive Index
12. Spectrometer – Grating -Normal incidence
13. Carey Foster Bridge
14. Diode Characteristics
15. Zener Diode Characteristics
16. Logic Gates – AND, OR, NOT

B.Sc. Chemistry CBCS Syllabus - **SEMESTER II**

(For those who joined in June 2017 and after)

PART IV- **Non Major Elective**		
Subject Title **: Medicinal Chemistry – Vaccine Preventable Diseases**		
Subject Code: **07NE21**	Hours per week: **2**	Credit: **2**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

To enable the students

- *To know about the fundamental concepts of medicinal chemistry*
- *To understand the vaccine preventable diseases*
- *To know about the epidemic diseases*

UNIT I: INTRODUCTION 6 Hrs

Common diseases – infective disease – insect borne disease, air borne disease – water borne disease – hereditary disease – definitions of pharmacology, pharmacognosy, pharmacodynamics and pharmacokinetics.

UNIT II: SCIENCE OF DRUGS 6 Hrs

The science of medicinal chemistry: Introduction, from concept to market. Drug targets: enzymes, receptors, carrier proteins, structural proteins, nucleic acids, lipids, carbohydrates.

UNIT III: VACCINES 6 Hrs

Introduction of vaccination – epidemiology, clinical features, prevention and control of (i) Mumps (ii) Rubella and (iii) Hepatitis.

UNIT IV: EPIDEMIC DISEASES 6 Hrs

Epidemiology, clinical features, prevention and control of

(1) Typhoid (ii) Cholera and (iii) Meningococcal meningitis.

UNIT V: COMMON BODY AILMENTS 6 Hrs

Diabetes – causes, hyper and hypoglycemic drugs – blood pressure – systolic & diastolic hypertensive drugs – cardiovascular drugs.

Text Book:

1. An Introduction to Medicinal Chemistry Graham L. Patrick Third Edition Oxford University Press. – 2000.

Reference Books:

1. PGDMCH-4, Child health – Indira Gandhi National Open University School of Health Sciences.

2. Pharmaceutical Chemistry, Jayashree Ghosh, S.Chand and Company Ltd., New Delhi.2006

மூன்றாம் பருவம் - பாடத்திட்டம் (2017-2018 ஆம் ஆண்டு முதல்)

PART-I: **Language Tamil Subject**		
Subject Title:**காப்பியமும் பக்தி இலக்கியமும் நாடகமும் - தாள்:3**		
Subject Code: **P1LT31**	Hours per week: **6**	Credit: **3**
Seasonal Marks: **25**	Summative marks: **75**	Total Marks: **100**

பாடப்பகுதி

அலகு: 1 தமிழ்க் காப்பிய இலக்கியம்
அலகு: 2 தமிழ்ப் பக்தி இலக்கியம்
அலகு: 3 தமிழ் நாடகம் (வைகையில் வெள்ளம் வரும்)
அலகு:4 தமிழ் இலக்கணம் (அணிகள்)
அலகு: 5 தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத்தமிழும்.

பாடப்பகுதியின் உட்பிரிவுகள்

அலகு: 1. தமிழ்க் காப்பிய இலக்கியம்

1. சிலப்பதிகாரம் - வழக்குரை காதை
2. மணிமேகலை - ஆபுத்திரன் திறம் அறிவித்த காதை
3. கம்பராமாயணம் - வாலி வதைப்படலம்
4. வில்லிப்புத்துரார் பாரதம் - கண்ணன் தூதுச்சருக்கம்
5. கந்த புராணம் - அயனைச் சிறை நீக்கும் படலம்

அலகு: 2 தமிழ் பக்தி இலக்கியம்

1. தேவாரம் – திருஞானசம்பந்தர் (திருவேடகப் பதிகம்)
2. திருவாசகம் – மாணிக்கவாசகர் (பிடித்த பத்து)
3. திருமந்திரம் – திருமூலர் (10 பாடல்கள்)
4. திருப்பாவை – ஆண்டாள் (10 பாசுரங்கள் தெரிவு செய்யப்பெற்றவை)
5. பராபரக்கண்ணி – தாயுமானவர் (10 கண்ணிகள் தெரிவு செய்யப்பெற்றவை)

அலகு: 3 நாடகம் – வைகையில் வெள்ளம் வரும்

அலகு: 4 தமிழ் இலக்கணம் – அணிகள்

1. அணிகள் (உவமையணி, உருவக அணி, வேற்றுமை அணி, பிறிது மொழிதல் அணி, வஞ்சப்புகழ்ச்சி அணி)
2. பாவகைகள் (வெண்பா, ஆசிரியப்பா)
3. மடல் வரைதல் – விண்ணப்பம் (புகார்க் கடிதம் – பாராட்டுக் கடிதம்)

அலகு: 5 தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத்தமிழும்.

அ) 1. காப்பிய இலக்கிய வரலாறு
2. பக்தி இலக்கிய வரலாறு

ஆ) பத்திரிக்கைச் செய்தி எழுதுதல் - நேர்காணல் எடுத்தல் - துணுக்குகள் எழுதுதல்

பாடநூல்கள்

1. தமிழ்ச் செய்யுட் தொகுப்பு (தமிழ்த்துறை வெளியீடு)

2. நாடகம் - வைகையில் வெள்ளம் வரும் (பாவை பப்ளிகேஷன்ஸ்).

பார்வை நூல்கள்

1. தமிழ் இலக்கிய வரலாறு (முனைவர் பாக்யமேரி)
2. தமிழ் இலக்கிய வரலாறு (டாக்டர் மு.வரதராசனார்

DEPARTMENT OF SANSKRIT

B.A. / B.Sc. PART-I –LANGUAGE SANSKRIT SYLLABUS: SEMESTER – III:

PAPER – III

(For those who join in June 2017and After)

PART – I Sanskrit Paper III		
Subject Title : **Prose ,Poetics & History of Sanskrit Literature – III**		
Subject Code: **P1LS31**	Hours per week: **6**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

PROSE

Following portions from the prescribed text: 'SAHITYA RASA KANA'
- Published by J.M. Publications, Madurai.

UNIT I & II

1. Gurubhakti
2. Mātaṅgacaritam
3. Samsargajādoṣaguṇā bhavanti
4. Akarṇahrudayo gardabhaḥ
5. Śukanāsopadeśaḥ

POETICS

UNIT III & IV

ALAṄKĀRA (POETICS) FROM THE TEXT BOOK: SĀHITYA RASAKANĀḤ:-

UPAMĀ, ANANVAYA, UTPREKṢĀ, ATIŚAYOKTI, ULLEKHĀ, VYATIREKA, SAMĀSOKTI, ŚLEṢA, ARTHĀNTARANYĀSA.

HISTORY OF LITERATURE

UNIT V

Prose Romance,

Historical Kavyas, Popular Tales.

Prescribed text:

A short history of Sanskrit Literature

(Published by A.M.G. Publications, Madurai – 625 016, Page No. 35 – 40, 40 – 44, 45 - 50) year of publication- 1996

B.Sc. Chemistry Part-II English CBCS Syllabus - **SEMESTER III**
(For those who join in June 2017 and after)

PART II – Paper I		
Subject Title **:** **English through Drama and Poetry**		
Subject Code:**P2LE31**	Hours per week: **4**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives: **Total number of hours per semester: 60 hours**

- *To make students read and appreciate English Plays*
- *To make students appreciate English poetry*
- *To motivate students to face Competitive Examinations*
- *To develop continuous writing in English*
- *To make students read extensively*

Unit I – One Act Plays 15 Hrs

1. The First and the Last - John Galsworthy
2. Remember Caesar - G.Devoit
3. The Sheriff's Kitchen - Ronald Gow
4. The Boatswain's Mate - W.W.Jacobs and H.C. Sargent

Unit II – Poems 15 Hrs

1. Githanjali (Poem 50) - Rabindranath Tagore
2. The Earthen Goblet - Harindranath Chattopadhyaya
3. La Belle Dame sans Mercy - John Keats
4. Fidelity - William Wordsworth
5. The Tiger and the Deer - Sri Aurobindo

Unit - III **Objective English** 10 Hrs

- Comprehension
- Spotting the Errors
- Sentence rearrangement
- Sentence Fillers
- Cloze test or Numbered Gaps

Text Book: *Objective English for Competitive Examinations* – Hari Mohan Prasad, Uma Rani Sinha, Tata McGraw Hill Education Private Limited, New Delhi. 2014, 5th Edition

Unit – **IV Composition** 10 Hrs

- Dialogue Writing
- Paragraph Writing

Unit – V Intensive Reading (Great Speeches) 10 Hrs

Swami Vivekananda – Addresses at the Parliament of Religions

1. Response to Welcome,
2. Why We Disagree,
3. Religion Not the Crying Need of India,
4. Paper on Hinduism,
5. Address at the Final Session

Text: Swami Vivekananda's Chicago Address, Ramakrishna Tapovanam Printing School.

B.Sc. Chemistry CBCS Syllabus - **SEMESTER III**
(For those who joined in June 2017 and after)

Part-III - Core Subject Theory V		
Subject Title **: Inorganic and Organic Chemistry – II**		
Subject Code: **07CT31**	Hours per week: **4**	Credit: **4**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

To enable the students

- *To understand the principle of volumetric analysis*
- *To gain basic knowledge about metallurgy*
- *To know about the phenols and polynuclear compounds*
- *To learn the basic idea of aliphatic and aromatic aldehydes and ketones*

UNIT I: PRINCIPLE OF VOLUMETRIC ANALYSIS 12 Hrs

Concept of molecular weight, formula weight, equivalent weight – concentration terms– molarity, molality, normality and weight percentage. principle of titrimetry – primary and secondary standards – preparing standard solutions – standardising the secondary standard solutions – types of titrimetric analyses. Indicator-types of titrations and indicators – neutralisation, redox, precipitation and complex formation reactions – choice of indicators in acid – base titrations.

UNIT II: METALLURGY 12 Hrs

General principle involved in the purification of ores – extraction of metals and purification of metals-froth flotation technique – electromagnetic separation – smelting – calcination – roasting – reduction – amalgamation – zone refining method – extraction of tungston – Van-Arkel method – vanadium, uranium thorium, and titanium. Comparative study of some specific groups – Ga, In, Tl (Group III) – Ge, Sn, and Pb (group IV).

UNIT III: PHENOLS AND POLYNUCLEAR COMPOUNDS 12 Hrs

Phenols – preparations and properties - Dihydric phenols – catechol and resorcinol – picric acid – Acidity of phenol and comparison with alcohol – antioxidant. Polynuclear compounds: preparation and properties of naphthalene and anthracene.

UNIT IV: ETHERS, THIO ALCOHOLS AND THIO ETHERS 12 Hrs

Ethers – aliphatic ethers-methods of preparation, properties and uses of diethyl ether – comparison of ethers and alcohols – aromatic ethers – preparations and properties of anisole and phenetole. Thioalcohols – preparation and properties of ethyl mercaptan. Thio ethers – preparations and properties of mustard gas. Ylides – preparations and properties – Wittig reaction.

UNIT V: ALIPHATIC AND AROMATIC ALDEHYDES AND KETONES 12 Hrs

Mechanism of nucleophilic addition – reactivity of carbonyl group – preparation and properties of acetaldehyde and ethyl methyl ketone – importance of flavouring agents – veratraldehyde.

UNSATURATED AND HYDROXYALDEHYDES AND KETONES

Acrolein – crotonaldehyde – preparation and properties of hydroxy aldehydes and ketones – glycolaldehyde, aldol and diacetone alcohol. Cinnamaldehyde and salicylaldehyde.

AROMATIC ALDEHYDES AND KETONES

Preparations and properties of benzaldehyde, acetophenone, benzophenone and quinones.

Text Books:

1. Text book of Inorganic Chemistry by P.L.Soni and Mohan Katyal, Sultan Chand & Sons, New Delhi, 2010 Edition.
2. Advanced Organic Chemistry by Bahl & Arun Bahl, S.Chand & Company Ltd, New Delhi, 2012 Edition.

Reference Book:

1. Text book of Organic chemistry by P.L.Soni, H. M. Chawla S. Chand & Company Ltd, 2007.

B.Sc. Chemistry CBCS Syllabus - **SEMESTER III**
(For those who joined in June 2017 and after)

Part-III - Core Subject Theory VI		
Subject Title **: Physical Chemistry –II**		
Subject Code: **07CT32**	Hours per week: **4**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

To enable the students

- *To have basic idea of gaseous state chemistry*
- *To gain basic knowledge in thermodynamics*
- *To understand the theory of chemical equilibrium*

UNIT I: GASEOUS STATE 12 Hrs

Real and ideal gases (definition only) – Boyle's law-Graham's law of diffusion – Avogadro's law – Gay Lussac's law (statement only) – postulates of kinetic theory of gases-derivation of $PV=1/3\ mnc^2$, Maxwell – Boltzmann distribution law of molecular velocities – classification and relation between different molecular velocities – effect of temperature on distribution of molecular velocities and graphical representation. Molecular collision of gases and mean free path – collision number – collision diameter-compressibility factor for gases and determination of molecular diameter – van der Waals and London forces.

UNIT II: THERMODYNAMICS-I First Law of Thermodynamics 12 Hrs

Definition of thermodynamic terms: system, surroundings – types of systems, intensive and extensive properties – state and path functions and their differentials – thermodynamic process – concept of heat and work.

Definition of internal energy and enthalpy. Heat capacity – heat capacities at constant volume and pressure and their relationship. Joule-Thomson effect – Joule-Thomson coefficient and inversion temperature. Calculation of w, q, dU & dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process – Hess's Law of constant heat summation and its applications.

UNIT III: THERMODYNAMICS-II Second law of thermodynamics 12 Hrs

Need for the second law-different statements of the second law-Carnot cycle and efficiency-Carnot's theorem. Thermodynamic scale of temperature. Entropy as state function – entropy as a function of pressure and volume – entropy changes of an ideal gas – physical significances of entropy – Clausius inequality – entropy as criteria of spontaneity and equilibrium. Gibbs function (G) and Helmholts function (H) as thermodynamics quantities. Gibbs-Helmholts equation.

UNIT IV: THIRD LAW OF THERMODYNAMICS 12 Hrs

Need for the third law of thermodynamics – Nernst heat theorem – statement of the third law of thermodynamics – absolute entropy – definition and its determination (graphical method) – experimental verification of third law of thermodynamics – entropy changes in Chemical reaction – concept of residual entropy.

UNIT V: CHEMICAL EQUILIBRIUM 12 Hrs

Reversible reaction – characteristics of equilibrium – law of mass action – equilibrium Law – equilibrium constant expression in terms of partial pressures – units of equilibrium constant – heterogeneous equilibria – Le Chatelier's principle – conditions for maximum yield in industrial processes – synthesis of ammonia (Haber process) – manufacture of sulphuric acid (Contact process) – manufacture of nitric acid (Brikeland-Eyde Process).

Text Book:

1. Essentials of Physical chemistry Arun Bahl, B.S.Bhal & G.D.Tuli, S.Chand Publishing Company, New Delhi, 2010 Edition.

Reference Book:

1. Principles of Physical Chemistry by B.R.Puri, L.R.Sharma, and S.Pathania,Vishal Publishing Co., New Delhi, 2012 Edition.

Part-III -Core paper Practical		
Subject Title **: Volumetric Analysis**		
Subject Code**: 07CP33**	Hours per week: **3**	Credit: **2**
Sessional Marks: **40**	Summative Marks: **60**	Total Marks: **100**

A double titration involving the making up of the solution to be estimated and the preparation of a primary standard of solution.

LIST OF EXPERIMENTS

I. ACIDIMETRY AND ALKALIMETRY

1. Estimation of Na_2CO_3
2. Estimation of NaOH / KOH
3. Estimation of H_2SO_4 / HCl.

II.REDOX TITRATIONS

a. Permanganimetry

1) Estimation of ferrous ion

2) Estimation of oxalic acid

b. Dichrometry

1) Estimation of ferrous ion.(FAS / FS)

III.IODOMETRY AND IODIMETRY

1) Estimation of potassium dichromate

2) Estimation of potassium permanganate

Reference Book:

1. A. O. Thomas and Mani Text Book of Practical Chemistry Scientific Publication, IVth Revised Edition, 1976.

B.Sc. Chemistry Allied Mathematics CBCS Syllabus - **SEMESTER – III**
(For those who joined in June 2017 and After)

PART – III : **Allied Subject Theory**		
Subject Title : **MATHEMATICS – I**		
Subject Code: **05AT01**	Hours per week: **6**	Credit: **5**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objective

- *To develop the skill of solving problems.*

Unit – I:

Trigonometry – expression for sin nθ, cos nθ and tan nθ – expression for $\sin^n \theta$ and $\cos^n \theta$ – expansion of sinθ, cosθ and tanθ as a series in ascending powers of θ – hyperbolic functions and inverse hyperbolic functions.

Unit – II:

Differential calculus – differentiation methods – successive differentiation (up to second order derivative only, omit Leibnitz theorem).

Unit –III:

Integral calculus – properties of definite integrals – reduction formula for $\int \sin^n x\, dx$, $\int \cos^n x\, dx$ and $\int \sin^m x \cos^n x\, dx$ only – double and triple integrals (simple problems).

Unit IV:

Vector differentiation – differentiation of vectors – gradient of a vector – directional derivative and its maximum value – divergence and curl of a vector – solenoidal and irrotational vectors (simple problems only).

Unit V:

Line and surface integrals – Green's theorem, Stoke's theorem and Gauss' divergence theorem (statements only) – verifications (simple problems).

Text book:

1. Ancillary Mathematics by Dr.S.Arumugam & Issac. Vol I – IV (Relevant Chapters), New Gamma Publishing House, Palayamkottai

Reference:

1. Ancillary Mathematics by T.K Manikavasagampillai & Others Viswanathan printers and publishers Pvt. Ltd., Chennai.

B.Sc. Chemistry Allied Zoology CBCS Syllabus - **SEMESTER – III**
(For those who join in June 2017 and after)

Part – III : Allied Subject Theory		
Subject Title : **Animal Organisation**		
Subject Code: **09AT01**	Hours per week: **4**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives

To enable the students to

- *Fundamental course that provides basic understanding of biology of invertebrate and chordate.*
- *Study of salient features of invertebrates and chordates*

Unit-I

a. Principles of taxonomy – Binomial nomenclature - Animal Organisation – body types – protozoa – metazoa – types of coelom – types of symmetry
b. Outline classification of Invertebrates and the salient features of the Phyla with examples
c. Outline classification of Chordates upto classes giving exampls

Unit – II

a. Feeding and digestion in Amoeba, Hydra and Frog.
b. Respiration in Amoeba, Cockroach
c. Gills in Fish and Lungs in bird.

Unit – III

a. Circulatory system in *Paramecium*, Earthworm and *Calotes*.
b. Locomotion in Amoeba, *Paramecium* and Earthworm
c. Flight mechanism in Pigeon.

Unit – IV

a. Nervous system of Earthworm
b. Human brain and ear
c. Receptors – photoreceptors of Euglena, insects and man

Unit – V

a. Excretion in Amoeba and Earthworm
b. Excretion in Man-Structure of kidney and urine formation.
c. Reproductive system of Rabbit.

Text Books:

1. Nair, Leelavathy, S., Soundrapandian, N., Murugan, T. 2014. A Text Book of Invertebrates, Saras Publications.

Reference Books:

1. Jordan & Verma, 2011. Chordate Zoology, S.Chand & Co Ltd
2. Kotpal, R.L.2011. Invertebrates, Rastogi Publications
3. Kotpal, R.L.2011. Vertebrates, Rastogi Publications
4. Thangamani, A., Prasannakumar, S., Narayanan, L.M., Arumugam, N. 2014. A Text Book of Chordates, Saras Publications

B.Sc. Chemistry CBCS Syllabus - **SEMESTER III**
(For those who joined in June 2017 and after)

PART – IV : Skill Based Subject		
Subject Title : **Biomolecules and Pharmaceutical Chemistry**		
Subject code : **07SB3A**	Hours per week : **2**	Credit : **2**
Sessional Marks : **25**		Total Marks:**25**

Objectives:

To enable the students

- *To have basic idea of protein and nucleic acids*
- *To understand the theory enzyme*
- *To gain basic knowledge in medicine*

UNIT I: PROTEINS AND NUCLEIC ACIDS 6 Hrs

Preparation and properties of amino acids – properties of proteins – structure of proteins – nucleic acids – nucleotides, nucleosides – different types of DNA and RNA.

UNIT II: ENZYMES 6 Hrs

Nomenclature and classification of enzyme – specificity – enzyme action, Fischer – Lock and key model.

UNIT III: ANAESTHETICS 6 Hrs

Definition – characteristics – mode of action – classification –gaseous anaesthetics – advantage and disadvantages of vinyl ether, cyclopropane, Halohydro carbon, chloroform – Haloethane, Trichloroethylene.

Thiopental sodium advantages and disadvantages of cocaine and benzocaine (structure and therapeutic use only).

UNIT IV: ANALGESIC, ANTIPYRETIC AND ANTI INFLAMMATORY AGENTS 6 Hrs

Analgesic: Definition – narcotic analgesic – morphine and its derivative, pethidine and methadone. Non- narcotic analgesic. **Antipyretic analgesics:** salicylic acid derivatives – indole derivatives and p – aminophenol derivatives. **Anti-inflammatory:** paracetamol, naproxen and ibuprofen (medicinal uses and structure only).

UNIT V: ANTISEPTICS AND DISINFECTANTS 6 Hrs

Definition, uses – distinction between disinfectants and antiseptics – phenol derivative, halogen compounds – bleaching powder – dyes – organic mercurial's – formaldehyde and its derivatives – nitro furan derivatives.

Reference Books:

1. Chemistry by Raymond Chang Williams College, 2008 IXth Edition, Tata McGraw – Hill Publishing Company Ltd., New Delhi.
2. Pharmaceutical Chemistry, Jayashree Ghosh, S.Chand and Company Ltd., New Delhi - 2006

PART – IV : Skill Based Subject Theory		
Subject Title **:Textile chemistry**		
Subject Code: **07SB3B**	Hours per week: **2**	Credit: **2**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

UNIT 1 : VEGETABLE FIBRES AND ANIMAL FIBRES 6 Hrs

Definition-classification of textile fibres –essential and desirable properties of textile fibres – Cotton fibre – Physical and chemical properties, Jute-Purification; physical and chemical properties of jute, silk and wool

UNIT 2: REGENERATED AND SYNTHETIC FIBRES 6 Hrs

Rayon different types of rayon and their sources- manufacture of viscose rayon- physical and chemical properties – acetate rayon – manufacture – properties, enprammonium rayon – manufacture and properties. Manufacture – properties and uses of polyamides – polyester – polypropylene.

UNIT 3: PREPARATORY PROCESS PRIOR TO DYEING 6 Hrs

Scouring: Objectives of scouring – process of caustic scouring on open kier and closed kier machine with sine diagram, scouring with NaOH and Na_2CO_3 – precaution to be taken before scouring. Desizing using malt extract – merits and demerits of acid and enzyme desizing. Singeing – impurities present in grey cotton and cotton fabric- objects of sigeing – process of singeing on gas singeing machine – precaution to be taken during gas singeing.

UNIT 4: PRINCIPLES OF BLEACHING 6 Hrs

Principles of wetting and mechanism of detergency- synthetic detergents- surface active agents- bleaching processes-bleaching agents – H_2O_2, NaOCl, bleaching powder and biobleaching and their properties – bleaching of cotton, rayon, wool and synthetic fibres.

UNIT 5: PRINCIPLES OF DYEING 6 Hrs

Colour and chemical constitution – chromophore and auxochromes- natural and synthetic dyes– classification, synthesis of dyeshift – congo red, bismark brown and theories of dyeing – effect of temperature and salt on dyeing – dyeing of wool, silk and poly-esters – dyeing of cotton with reactive dyes – fastness properties – washing, light, rubbing and perspiration.

Reference Books:

1. Shenai V.A., Textile fibres (Vol.1),III Edition Mahajan publishers, Ahmedabad.2002
2. Shenai V.A., Technology of bleaching, III Edition Mahjan Publishers, Ahmedabad. 1998.

நான்காம் பருவம் - பாடத்திட்டம் (2017-2018 ஆம் ஆண்டு முதல்)

PART-I: **Language Tamil Subject**		
Subject Title: சங்க இலக்கியமும் நீதி இலக்கியமும் - தாள்:4		
Subject Code: **P1LT41**	Hours per week: **6**	Credit: **3**
Seasonal Marks: **25**	Summative marks: **75**	Total Marks: **100**

பாடப்பகுதி

அலகு: 1 தமிழ்ச் சங்க இலக்கியம் (பத்துப்பாட்டு)
அலகு: 2 தமிழ்ச் சங்க இலக்கியம் (எட்டுத்தொகை)
அலகு: 3 தமிழ் நீதி இலக்கியம்
அலகு: 4 தமிழ் இலக்கணம்
அலகு: 5 தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத்தமிழும்.

பாடப்பகுதியின் உட்பிரிவுகள்

அலகு : 1 தமிழ்ச் சங்க இலக்கியம் (பத்துப்பாட்டு)
பத்துப்பாட்டு **(முல்லைப்பாட்டு முழுவதும்)**

அலகு : 2 தமிழ்ச் சங்க இலக்கியம் (எட்டுத்தொகை)

1. நற்றிணை
2. குறுந்தொகை
3. கலித்தொகை
4. அகநானூறு
5. புறநானூறு

அலகு : 3 தமிழ் நீதி இலக்கியம்

1. திருக்குறள் : செய்நன்றியறிதல் **(அதிகாரம் - 11)**
   காலமறிதல் **(அதிகாரம் - 49)**
   குறிப்பறிதல் **(அதிகாரம் - 71)**
2. பழமொழி நானூறு **(கல்வி அதிகாரம் முழுவதும்)**

1 கொன்றை வேந்தன் **(முதல் 10 பாடல்கள்)**
2 மூதுரை **(முதல் 10 பாடல்கள்)**

அலகு : 4 தமிழ் இலக்கணம் (பொருள்)

1. அகப்பொருள் – அகத்திணைகள் (முதற் கரு உரிப்பொருள்)
2. புறப்பொருள் – புறத்திணைகள் (வெட்சி முதல் பெருந்திணை வரை உள்ள 12 திணைகள்)
3. மரபியல் – பெயர் மரபுகள் – ஆண்பால் – பெண்பால் – இளமைப் பெயர்

அலகு: 5 தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத்தமிழும்.

அ) 1. சங்க இலக்கிய வரலாறு
2. நீதி இலக்கிய வரலாறு

ஆ) 1. திரைப்பட விமர்சனம்
2. புத்தக விமர்சனம்

பாட நூல்

1. தமிழ்ச் செய்யுள் தொகுப்பு (தமிழ்த்துறை வெளியீடு)

பார்வை நூல்கள்

1. தமிழ் இலக்கிய வரலாறு (டாக்டர் மு.வரதராசனார்)

2. தமிழ் இலக்கிய வரலாறு (முனைவர் பாக்யமேரி)

DEPARTMENT OF SANSKRIT

B.A. / B.Sc. PART-I –LANGUAGE SANSKRIT SYLLABUS: SEMESTER – IV:

PAPER – IV

(For those who join in June 2017and After)

PART - I Sanskrit Paper IV		
Subject Title : **Drama And History of Sanskrit Literature – IV**		
Subject Code: **P1LS41**	Hours per week: **4**	Credit: **2**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

60 hours to Drama, 30 hours to Spoken Sanskrit.

DRAMA

Following portions from the prescribed text: 'SĀHITYA RASAKANĀḤ'
- Published by J.M. Publications, Madurai.

Unit I, II, III

1. Karṇabhāra of Bhāsa

Unit IV

History of Drama Literature

A short history of Sanskrit Literature

(Published by A.M.G. Publications, Madurai – 625 016
Page No. 59 – 75) year of publication- 1996

Unit V

30 HOURS OF ORAL TRAINING DEVELOPING THE COMMUNICATION SKILLS THROUGH THE SANSKRIT LANGUAGE.

B.Sc. Chemistry Part-II English CBCS Syllabus - **SEMESTER** – **IV**
(For those who join in June 2017 onwards)

PART II – Paper I		
Subject Title **: English through Classics**		
Subject Code:**P2LE41**	Hours per week: **4**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives: **Total number of hours per semester: 60 hours**

- *To motivate students to read and understand English prose*
- *To make students appreciate English poetry*
- *To enable students to face Competitive Examinations in English*
- *To develop continuous writing of the students*
- *To make students read extensively.*

Unit I - Prose

1. Building Self Confidence (Personality - by Norman Vincent Peale Development) From, English for Enrichment, Edited by Prof. K. Chellappan.
2. Sport- A Modern Hunting Ritual - by Desmond Morris (Essay), From, English for Enrichment, Edited by Prof. K. Chellappan.
3. The Soft Thunder of Lumbini - by Hugh and Colleen, (A travelogue Feature in a Newspaper) From, English for Enrichment, Edited by Prof. K. Chellappan.
4. She is Dancing Back in Life - by Deborach Cowley (A True Life Story) From, English for Enrichment, Edited by Prof. K. Chellappan.
5. Within Without - Rabindranath Tagore.

Unit II – Poems

1. Kali the Mother — Swami Vivekananda
2. Lochinvar — Walter Scott
3. Yossouf — James Russell Lowell
4. The Daffodils — William Wordsworth
5. Much Madness — Emily Dickinson
6. The Woman Who is ……(XCII) — Kabir Das
7. Stopping by Woods on a Snowy Evening — Robert Frost

Unit III - Objective English

- Sentence Completion
- Synonyms
- Antonyms
- Idioms and Phrases

- Substitution

Text Book: *Objective English for Competitive Examinations* – Hari Mohan Prasad, Uma Rani SInha, Tata McGraw Hill Education Private Limited, New Delhi. 2010, Fourth Edition

Unit IV - Composition

- Descriptive writing - Topics on Personal Experience
- Resume Preparation
- SMS and E-Mail Preparation and sending.

Unit V Extensive Reading: Four Scenes from Shakespeare's plays.

1. **The Merchant of Venice.** Act IV – Scene I – Portia's Speech.
2. **Julius Caesar.** Act III – Scene II – Mark Antony and Brutus Speech.
3. **Twelfth Night.** Act V – Scene I – Before Olivia's House.
4. **Othello.** Act V – Scene II – A Bedchamber in the Castle.

B.Sc. Chemistry CBCS Syllabus - **SEMESTER IV**
(For those who joined in June 2017 and after)

Part III- Core Subject Theory VII		
Subject Title **: Organic and Physical Chemistry**		
Subject Code: **07CT41**	Hours per week: **4**	Credit: **4**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

To enable the students

- *To know about the Carboxylic acids*
- *To have basic idea of Carbohydrates*
- *To understand the theory of Physical properties*
- *To have gain knowledge about Distribution law*

UNIT I: MONO CARBOXYLIC ACIDS 12 Hrs

Aliphatic acids: Preparation and properties of formic acid and acetic acid - structural effect on strength of carboxylic acids.

Halogen substituted acids: Preparation and properties of monochloro, dichloro, trichloro acetic acids. Influence of halogen atom on the strength of acids.

Hydroxy acids: General methods of preparation and properties of glycolic acid and lactic acid. Action of heat on α, β and γ-hydroxy acids.

Amino acids: Preparation and properties of glycine and alanine.

Aromatic acids: Preparation and properties of benzoic acid-salicylic acid-anthranilic acid.

UNIT II: ALDEHYDIC AND KETONIC ACIDS 12 Hrs

Preparation and properties of glyoxalic acid and acetoacetic acid. Decarboxylation of keto acid-synthetic application of malonic ester, acetoacetic ester and keto-enol tautomerism.

UNIT III: CARBOHYDRATES 12 Hrs

Monosaccharides – preparation and properties –structure and configuration of glucose and fructose. Mutarotation and epimerization. Interconversion of glucose and fructose and vice versa. Descent and ascent conversion of the sugar series. Disaccharides-structure and properties of sucrose – manufacture of sucrose. Polysaccharides –starch and cellulose structure of only. Application of cellulose derivatives.

UNIT IV: PHYSICAL PROPERTIES AND CHEMICAL CONSTITUTION 12 Hrs

Surface tension and chemical constitution-use of parachor in elucidating structure-viscosity and chemical constitution-Dunstan rule-molar viscosity-Rhecohor-diople moment-determination of dipole moment-dipole moment and molecular structure- dipole moment and ionic character-molar refraction and

chemical constitution-optical activity and chemical constitution –magnetic properties- paramagnetic substances -diamagnetic substances.

UNIT V: DISTRIBUTION LAW 12 Hrs

Nernst's distribution law – explanation of distribution law – Limitation of distribution law – Henry's law – determination of equilibrium constant from distribution coefficient – extraction with a solvent – multiple extraction – liquid – liquid chromatography – application of distribution – solvent extraction - partition chromatography – desilverization of lead (Parke's Process) – determination of association – determination of dissociation – determination of solubility – distribution indicators.

Text Books:

1. Advanced Organic Chemistry by Bahl & Arun Bahl, S.Chand & Company Ltd, New Delhi, 2012 Edition.
2. Essentials of Physical chemistry Arun Bahl, B.S.Bhal & G.D.Tuli, S.Chand Publishing Company, New Delhi, 2010 Edition.

Reference Books:

1. Text book of Organic chemistry by P.L.Soni Sultan chand and sons, New Delhi, 2004 Edition.
2. Principles of Physical Chemistry by B.R.Puri, L.R.Sharma, and S.Pathania,Vishal Publishing Co., New Delhi, 2012 Edition.

B.Sc. Chemistry CBCS Syllabus – **SEMESTER-IV**
(For those who joined in June 2017 and after)

Part III- Core Subject Theory VIII		
Subject Title **: Inorganic Chemistry – I**		
Subject Code: **07CT42**	Hours per week: **4**	Credit: **4**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

To enable the students

- *To have basic idea of silicates*
- *To familiar with basic concept of halogens*
- *To have gain about acid base concept*
- *To know about inorganic reagents and basic idea of electron deficient*

UNIT I: SILICONES AND SILICATES 12 Hrs

Introduction – preparation, properties and uses of silicones – silicates – classification of silicates – ortho silicates – pyrosilicates – chain silicates – cyclic, sheet silicates and three dimensional silicates – feldspars – zeolites – ultramarines.

UNIT II: HALOGENS 12 Hrs

Halogen – position of the halogens in the periodic table-anomalous behavior of fluorine- difficulties in isolating fluorine-modern method of isolation of fluorine-estimation of available chlorine in bleaching powder – structure -properties and uses-perchloric acid-brominating mixture – interhalogen compounds – polyhalides - pseudo halogens-basic iodine.

UNIT III: HARD AND SOFT ACIDS AND BASES (HSAB) 12 Hrs

Definition of acids and bases-Lowry-Bronsted and Lewis theory of acids and bases- classification of acids and bases as hard and soft. Pearson's HSAB concept, acid-base strength and hardness and softness. Symbiosis, theoretical basis of hardness and softness, electronegativity, hardness and softness.

Non-Aqueous Solvents: Definition-types of non aqueues solvents - physical properties of a non aqueous solvent, reaction in non-aqueous solvents with reference to liquid NH_3 and liquid SO_2.

UNIT IV: INORGANIC REAGENTS 12 Hrs

Organic reagents in inorganic analysis- advantages- disadvantages-dimethyl glyoxime, aluminon, thiourea, uranyl zinc acetate, Rhodamine-B, cupron, Magneson, alizarin, EDTA – estimation of magnesium and nickel using EDTA.

UNIT V: ELECTRON DEFICIENT COMPOUNDS 12 Hrs

Introduction – hydrides of boron –general preparation and properties of boranes- diboranes preparation, properties, uses, structure and bonding. Wades rule.

Tetra boranes – penta borane 9 –penta borane -11 hexaborane -10, decaborane 14 (structure only).

Text Books:

1. Text book of Inorganic Chemistry by P.L.Soni, Mohan Katyal, Sultan Chand & Sons, New Delhi, 2010 Edition.
2. Selected topics in Inorganic Chemistry by Malik, Tuli, and Madan, Sultan Chand & Sons, New Delhi, First Edition - 2006
3. Advanced Inorganic chemistry by Satyaprakash Volume II Sultan Chand & Sons, New Delhi, First edition -2008.
4. Principles of Inorganic Chemistry, Puri, Sharma, Kalia Milestone Publishers and distributors Pvt Ltd, New Delhi, 30^{th} Edition – 2006

Reference Books:

1. Advanced Inorganic chemistry by Satyaprakash Volume I Sultan Chand & Sons, New Delhi, First edition - 2008
2. Text book of Modern inorganic chemistry Dr.R.D. Madan, Sultan Chand & Sons, New Delhi, Third edition -2011

B.Sc. Chemistry CBCS Syllabus - **SEMESTER IV**

(For those who joined in June 2017 and after)

Part III- Core paper Practical		
Subject Title **: Organic preparation and Estimation**		
Subject Code: **07CP43**	Hours per week: **3**	Credit: **2**
Sessional Marks: **40**	Summative Marks: **60**	Total Marks: **100**

Objectives:

- *To enable the students*
- *To apply theoretical knowledge to laboratory work*
- *To develop skill in volumetric analysis*

ORGANIC PREPARATION

1. Nitration
   a) Picric acid from phenol
   b) Dinitro benzene from nitrobenzene
2. Bromination: p-bromoacetanilide from acetanilide
3. Hydrolysis: Benzoic acid from ethyl benzoate (or) benzamide
4. Acetylation / Benzoylation a) Acetanilide from aniline b) benzanilide from aniline
5. Oxidation: Benzoic acid from benzaldehyde
6. Glucosazone from glucose

ORGANIC ESTIMATION

1. Estimation of Phenol (Bromination method)
2. Estimatiom of aniline (Bromination method)

Reference Book:

1. A. O. Thomas and Mani Text Book of Practical Chemistry Scientific Publication, IVth Revised Edition, 1976.

B.Sc. Chemistry Allied Mathematics CBCS Syllabus -**SEMESTER - IV**
(For those who joined in June 2017 and After)

PART – III : **Allied Subject Theory**		
Subject Title : **MATHEMATICS - II**		
Subject Code: **05AT02**	Hours per week: **6**	Credit: **5**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objective:

- *To develop the skill of Knowledge in Mathematics and Solving problems*

UNIT I:

Formation of differential equation – differential equation of first order and first degree – variables seperable, homogeneous and nonhomogeneous differential equations – linear equations.

UNIT II:

Second order linear differential equations with constant coefficients – methods of finding particular integrals for the funtions of the type e^{ax}, cos ax, sin ax, x^m, $e^{ax}V$ – second order linear differential equations with variable coefficients.

UNIT III:

Laplace transforms – inverse Laplace transforms – solution of differential equations using Laplace transforms.

UNIT IV:

Formation of partial differential equations – definition of complete, particular, singular and general integrals – solving first order partial differential equations.

UNIT V:

Fourier series – Fourier series for even and odd funtions – half range Fourier cosine and sine series.

Text Book:

1. Ancillary Mathematics by Dr.S.Arumugam & Issac. Vol I – IV (Relevant Chapters), New Gamma Publishing House, Palayamkottai

Reference Book:

1. Ancillary Mathematics by T.K Manikavasagampillai & Others Viswanathan, printers and publishers Pvt Ltd. Chennai.

B.Sc. Chemistry Allied Zoology CBCS Syllabus -**SEMESTER - IV**

(For those who join in June 2017 and after)

Part – III : Allied Subject Theory		
Subject Title : **Biology and Human welfare**		
Subject Code: **09AT02**	Hours per week: **4**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives

To enable the students to

- *Knowledge on viral, bacterial, fungal, protozoan and helminthes disease and their control.*
- *Entrepreneurial avenues in Sericulture, Fish culture, Vermiculture, Mushroom and Apiculture.*

Unit I

a. Structure of a typical virus
b. Brief account on Viral diseases
c. Polio, Rabies and AIDS.

Unit-II

a. Structure of typical Bacteria
b. Brief account on Bacterial diseases
c. Cholera, Tuberculosis and Tetanus.

Unit III

a. Fungal diseases – Ringworm and Black piedra
b. Protozoan diseases – Amoebic dysentery and Malaria
c. Helminth parasites – *Ancylostoma* and *Wucheraria*

Unit IV

a. Sericulture – Scope – Silkworm biology –Life cycle – common diseases and control- Silkworm rearing methods.
b. Fish culture – Scope and Importance – Types of culture – Identification of common edible fishes - Induced breeding - common diseases and control – maintenance of fish pond.
c. Vermiculture – Features of exotic and indigenous species – rearing and culturing – Characteristics of Vermicast and Vermiwash – Economics of vermiculture

Unit V

a. Biogas production – characteristic features of biogas – production of biogas – uses

b. Mushroom culture – nutritive and medicinal value – Morphology of Indian oyster mushroom – cultivation of paddy straw mushroom - Advantages
c. Apiculture – biology of honey bees – bee hive – honey extraction – medicinal value – bee wax and bee venom

Text Book:

1. Ananthanarayanan, 2004. Text Book of Microbiology, Orient Longman.

Reference Books

1. Park and Park 2011.Text Book of Preventive and Social Medicines, M/s Banarsidas Bhanot Publications.
2. Gupta 2003. Vermicomposting for sustainable agriculture, Agrobios (India), Jodhpur
3. Nita Bahi1988. Handbook on Mushrooms, Oxford and IBH.
4. Ganga & Sulochana shetty 1997. An Introduction to Sericulture, Oxford and IBH.

B.Sc. Chemistry Allied Zoology CBCS Syllabus -**SEMESTER - IV**
(For those who join in June 2017 and after)

Part – III : Allied Subject Practical		
Subject Title : **PRACTICAL-I**		
Subject Code: **09AP03**	Hours per week: **2**	Credit: **1**
Sessional Marks: **40**	Summative Marks: **60**	Total Marks: **100**

Objectives

To enable the students to

- *Identification of all classes of invertebrates and vertebrates.*
- *Unrevealing anatomical features of invertebrate and chordate*

1. Observation of the following -Spotters
    - *Paramecium*- conjugation
    - *Obelia* (entire)
    - Hydra (entire)
    - *Taenia* (entire)
    - Scolex of *Taenia*
    - *Ascaris* male and female
    - *Neries* (entire)
    - *Penaeus*
    - *Pila* (entire) and shell of Fresh water mussel)
    - Starfish (entire)
    - Amphioxus, *Balanoglossus, Scoliodon*
    - Cobra, Viper, Pigeon
    - Skull of Pigeon dorsal and ventral view
    - Pectoral girdle of pigeon
    - Fore and hind limb of Frog
    - Synsacrum of bird
2. Simple staining of Bacteria from milk and sewage water.
3. Mounting of mouth parts of Mosquito, Housefly and Honey bee.
4. Identification of Ascaris (male & female) and Tapeworm.
5. Identification of egg, larva, pupa and adult of silk moth.
6. Dissection to show silk glands.
7. Common appliances used in silkworm rearing and apiculture.
8. Visit to Biogas production, Mushroom culture and Fish culture centres.

B.Sc. Chemistry CBCS Syllabus - **SEMESTER IV**
(For those who joined in June 2017 and after)

Part – IV : Skill Based Subject Theory		
Subject Title**: Chemistry in Action**		
Subject Code: **07SB4A**	Hours per week: **2**	Credit: **2**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

To enable the students

- *To have basic idea of chemistry in action*
- *To understand the theory electron microscopy*
- *To gain basic knowledge in Petroleum*

UNIT I: 6 Hrs

Primordial Helium and the Big Bang Theory – The importance of units – Distribution of elments on Earth and in living System – Chemical fertlizers – An undesirable precipitation reaction – Breathalyzer – metal from the sea – Scuba diving and the Gas laws – Super cold atoms –Making snow and inflating a Bicycle Tyre

UNIT II: 6 Hrs

Laser – the Splendid Light – Electron microscopy – The bthird liquid Element? Discovery of the Nobel gases –Sodium Chloride – A common and important ionic compound – Microwave ovens – Dipole Moments at work – Bucky ball any one? Why do lakes freeze from the top down? High – Temperture Superconductors –And all for the want of a button – Hard – boiling an egg on a mountain top – Pressure cookers, and Ice Skating.

UNIT III: 6 Hrs

Liquid crystals –The killer lake –Desalination the age of the shroud of Turin – Fentochemistry – Life at high altitudes and Haemoglobin production. The Haber process –antaacids and the P^H balance in your stomach –Maintaining the P^H of blood –How an eggshell is formed – the efficiency of heat engines**.**

UNIT IV: 6 Hrs

The thermodynamics of a rubber band –Bacteria power – Dental filling Discomfort –Recycling Aluminium – Metallic hydrogen –Synthetic gas from coal – Ammonium nitrate –The expolsive fertilizer – Coordination compounds the living systems – Cisplatin – the anticancer drug – Natures Own fission reactor

UNIT V: 6 Hrs

Food irradiation – Ice that burns – The Petroleium Industry – The disappearance of the dinosaurs – Who killed Napoleon? – Out of Oxygen – the exploding tire –Discovery of Helium and the rise and fall of coronium – the wrong knife –Decaying papers – A hard – boiled snack – tained water – dating paintings with Prussian blue – The Art forgery of the Twentieth Century.

Reference Book:

1. Chemistry by Raymond Chang Williams College, Tata McGraw – Hill Publishing Company Ltd., New Delhi. X^{th} 2008.

B.Sc. Chemistry CBCS Syllabus - **SEMESTER IV**

(For those who joined in June 2017 and after)

Part – IV : Non major Elective Theory		
Subject Title **:Agricultural Chemistry**		
Subject Code**: 07SB4B**	Hours per week: **2**	Credit: **2**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

UNIT I: ORIGIN OF SOIL (6 Hrs)

Soil formation – physical, chemical and biological factors responsible for soil formation- soil forming processes-Major soil groups of Tamil Nadu- Soil survery standard soil survey- methods of soil survery- methods of soil surveys – remote sensing and soil mapping –soil resource management-use of satellite data for source inventory.

UNIT 2: PHYSICAL PROPERTIES OF SOIL (6 Hrs)

Physical properties of soil-soil texture and textural classification- pore space- bulk density, particle density- soil structure and soil colour –surface area-soil colloids. Soil reaction- Ion exchange reaction – cation exchange-anion exchange –Buffering capacity- hydrogen ion concentiation- determination of pH values- Factors affecting soil pH.

UNIT 3: CHEMISTRY ASPECTS OF SOIL (6 Hrs)

Origin of problem soils, their properties acid, alkali and saline soils-diagnosis-remediation of acid and salt effected soils- Methods of reclamation and after care-Quality of irrigation water –causes for poor quality waters for irrigation, their effects in soils and crops. Soil testing- concept, objectives and basis –soil sampling, tooks, collection processing, dispatch of soil and water samples. Soil Organic matter- its decomposition and effect on soil fertility- source of organic matter in soil- maintenance and distribution-soil organism-their role –nitrification – denitrification nitrogen fixation in soils- biological nitrogen fixation- microbial interrelationship in soil- microbes in pest and disease management –Bio-conversion of agricultural wastes.

UNIT 4: PLANT NUTRIENTS (6 Hrs)

Plant nutrients- macro and micro nutrients- their role in plant growth- sources-forms of nutrient absorbed by plants- factors affecting nutrient absorption-deficiency symptoms in plants-corrective measures-chemicals used for correcting nutritional deficiencies-nutrient requirement of crops, their availability, fixation and release of nutrients. Fertilizers-classification of NPK fertilizers- sources-natural and synthetic.

UNIT 5: PESTICIDES, FUNGICIDES AND HERBICIDES (6 Hrs)

Pesticides: Definition- Classification- organic and inorganic pesticides- mechanism of action. Fungicides: Definition- classification – mechanism of action. Herbicides: Definition- Classification-mechanism of action.

Reference Book:

1. Biswas, T.D. and Mukeherjee, S.K. Text book of Soil Science, 1987.

B.Sc. Chemistry Part-II English CBCS Syllabus - **SEMESTER – V**
(For those who join in June 2017 and After)

PART II – Paper I		
Subject Title **: English for Career Development**		
Subject Code:**P2LE51 / P2CE51**	Hours per week: 1	Credit: 1
Sessional Marks: **100**		Total Marks: **100**

Total number of hours: 15 hours

Objectives:

- *To make students face Competitive Examinations with confidence*
- *To train students in writing book reviews*
- *To make them write reports, resolutions, minutes*
- *To make them prepare agenda for meeting.*
- *To make students read books on Personality Development*

Unit I

- Comprehension

Unit II

- Spotting the Errors
- Sentence Improvement
- Voice
- Preposition
- Cloze Test or Numbered Gaps

Text Book:

Objective English for Competitive Examinations, Hari Mohan Prasad Uma Rani Sinha, Tata McGraw Hill Education Private Limited, New Delhi.

Unit III

- Book Reviews

Unit IV

- Report-Writing
- Preparation of Agenda, Resolutions, Minutes

Unit V

Extensive Reading – Self study – How to win Friends and Influence People – Dale Carnagie, Vermilian, London

B.Sc. Chemistry CBCS Syllabus - **SEMESTER - V**
(For those who joined in June 2017 and after)

PART- III : Core Based Subject		
Subject Title : **Organic Chemistry – II**		
Subject code : **07CT51**	Hours per week : **4**	Credit **: 4**
Sessional Marks **: 25**	Summative Marks: **75**	Total Marks:**100**

Objectives:

To enable the students

- *To know about the Carboxylic acids*
- *To have basic idea of nitrogen compounds*
- *To predict the conformer of acyclic and cyclic compounds*
- *To have gain about stereochemistry*

UNIT I: DICARBOXYLIC ACID AND ITS DERIVATIVES 12 Hrs

Aliphatic dicarboxylic acids: Preparation and properties of malonic acid-succinic acid and adipic acid.

Unsaturated dicarboxylic acid: Preparation and properties of maleic and fumaric acids – geometrical isomerism exhibited by maleic and fumaric acid.

Hydroxy acids: Preparation and properties of tartaric acid-optical isomerism exhibited by tartaric acid.

Aromatic dicarboxylic acids: Preparation and properties of phthalic acid and its derivatives – phthalic anhydride and phthalimides.

UNIT II: NITROGEN CONTAING COMPOUNDS-I 12 Hrs

Aliphatic nitrogen compounds: General methods of preparation and properties of methyl cyanide and isocyanides-distinction between cyanide and isocyanide – tautomerism by nitro compounds.

Amines: General methods of preparation and properties of primary, secondary and tertiary amines – quaternary ammouium compound-distinction among primary – Secondary and tertiary amines – diamide – urea (preparation, properties and structure)–preparation of thiourea.

UNIT III: NITROGEN CONTAING COMPOUNDS-II 12 Hrs

Aliphatic diazo compounds: Preparation, properties and structure of diazomethane and diazoacetic ester.

Aromatic nitrogen compounds: Preparation and properties of nitrobenzene. Reduction of aromatic nitro compounds. Preparation and properties of aromatic amino compounds aniline and toluidines. Diazonium chloride.

UNIT IV: STEREOCHEMISTRY 12 Hrs

Stereoisomerism – nomenclature of geometrical isomers – cis and trans isomerism – E and Z nomenclature – determination of configuration of the geometrical isomers – optical isomerism. Conditions for optical activity – symmetry elements – chirality – definition of enantiomers, diastereomers, recemic

mixture and meso compounds – optical isomerism of lactic acid, malic acid and tartaric acid. Fischer projection – Sawhorse projection- Newmann projection– configuration – specification configuration– D and L notations –R and S notations – resolution – recemisation – Walden inversion and asymmetric synthesis.

UNIT V: CONFORMATIONL ANALYSIS OF ACYLIC AND CYCLOALKANES 12 Hrs

Conformational study of ethane, n-butane and 1,2-dichloroethane - relative stability of cycloalkanes from cyclopropane up to cyclooctane - Bayer's strain theory – limitations and its modification. Conformational analysis of cyclohexane, cyclohexanone and decalins.

Text Book:

1. Advanced Organic Chemistry by Bahl & Arun Bahl, S.Chand & Company Ltd, New Delhi, 2012 Edition.

Reference Books:

1. Text book of Organic chemistry by P.L.Soni,.Sultan chand &company Ltd., Edition 2006.
2. A text book of Organic Chemistry K.S. Tewari., N.K. Vishnoi and S.N. Mehrotra, 2nd revised edition, Vikas Publishing House Pvt Ltd., Edition 2002.

B.Sc. Chemistry CBCS Syllabus - **SEMESTER - V**
(For those who joined in June 2017 and after)

PART- III : Core Based Subject		
Subject Title : **Inorganic Chemistry – II**		
Subject code : **07CT52**	Hours per week : **5**	Credit : **5**
Sessional Marks **: 25**	Summative Marks: **75**	Total Marks:**100**

Objectives:

To enable the students

- *To understand the basic concept of co – ordination chemistry*
- *To know about the Analytical chemistry*
- *To gain basic knowledge about Bio-inorganic chemistry*

UNIT I: COORDINATION CHEMISTRY – I 15Hrs

Definitions of ligand, coordination number, coordination sphere and types of ligands — EAN rule – nomenclature – isomerism – ionization isomerism – linkage isomerism – coordination isomerism – geometrical isomerism and optical isomerism – Werner's theory – valance bond theory – bonding in complexes.$[Co(NH_3)_6]^{3+}$, $[Ni(CN)_4]^{2-}$, $[MnCl_4]^{2-}$, $[CoF_6]^{3-}$,$[Cu(NH_3)_4]^{2+}$. Limitations of VB theory.

UNIT II: COORDINATION CHEMISTRY – II 15 Hrs

Crystal field theory-important features of CFT – octahedral complexes – effect of crystal field splitting - applications and limitations of CFT – spectrochemical series. distribution of electrons in t_{2g} and e_g orbitals in octahedral complexes – number of unpaired electrons and high spin and low spin complexes. Distortion of octahedral complexes (Jahn-Teller distortion). Tetrahedral complexes – molecular orbital theory – study of complexes. $[Co(NH_3)_6]^{3+}$ and $[CoF_6]^{3-}$ - chelates.

UNIT III: COORDINATION CHEMISTRY – III 15 Hrs

Labile and inert complexes – crystal field effects on substitution reaction rates. Substitution reaction of cobalt (III) and platinum complexes – trans effect. Associative and dissociative mechanism - conjugate base. Inner sphere and outer sphere electron transfer reactions.

UNIT IV: ERROR ANALYSIS AND THEORY OF ANALYTICAL CHEMISTRY 15 Hrs

Error analysis: Definition and terms – absolute error and relative error – precision and accuracy – classification of errors – determination of accuracy of methods – sources and minimization of errors – mean deviation – standard deviation – analysis of experimental results – Graphical method. Curve fitting – method of least squares. **Theory of analytical chemistry:** Formation of precipitates- co precipitation and post precipitation – precipitation from homogeneous solutions.

UNIT V: BIOINORGANIC CHEMISTRY 15 Hrs

Introduction – essential and trace elements in biological systems –-function and toxicity of the following elements in biological system – F, Na, Al, Mg, Cl, K, Ca, Cr, Mn, Cu, Zn, Ni, Co, As, Mo, Cd, Sn, Hg, and Pb. Problems in biological systems – agriculture – biochemistry of iron- haemoglobin and myoglobin as oxygen carriers – metals in medicine – metals used in diagnosis and chemotherapy with particular reference to anticancer drugs.

Text Books:

1. Text book of Inorganic Chemistry by P.L.Soni, Mohan Katyal, Sultan Chand & Sons, New Delhi, 2010 Edition.
2. Selected topics in Inorganic Chemistry by Malik, Tuli, and Madan, Sultan Chand & Sons, New Delhi, First Edition- 2006
3. Advanced Inorganic chemistry by Satyaprakash Volume II Sultan Chand & Sons, New Delhi. First edition - 2008
4. Principles of Inorganic Chemistry, Puri, Sharma, Kalia Milestone Publishers and distributors Pvt Ltd. New Delhi. 30^{th} Edition – 2006

Reference Books:

1. Advanced Inorganic chemistry by Satyaprakash Volume I First edition -2008 Sultan Chand &Sons, New Delhi.
2. Text book of Modern inorganic chemistry Dr.R.D. Madan third edition - 2011Sultan Chand & Sons, New Delhi
3. Inorganic quantitative analysis by Vogel, 6^{th} Edition, 2002.

B.Sc. Chemistry CBCS Syllabus - **SEMESTER - V**
(For those who joined in June 2017 and after)

PART- III : Core Based Subject		
Subject Title : **Physical Chemistry – III**		
Subject code : **07CT53**	Hours per week : **5**	Credit : **4**
Sessional Marks **: 25**	Summative Marks**: 75**	Total Marks:**100**

Objectives:

To enable the students

- *To understand the basic concept of Electrochemistry*
- *To gain basic knowledge about Photochemistry*
- *To gain basic knowledge of Phase rule*

UNIT I: ELECTRICAL CONDUCTANCE 15 Hrs

Electrical transport, conductance in metal and in electrolytic solutions. Specific, equivalent and molar conductance – definitions and experimental determinations – variation of equivalent conductance with dilution and its limiting value. Theories of electrolytic dissociation – Grothus theory – Arrhenius theory – their merits and defects – strong and weak electrolytes – anomaly of strong electrolytes – Debye – Huckel theory – Onsager equation (No derivation) – Oswalt's law and its applications – Kohlraush's law of ionic mobilities and its applications. Absolute velocity of ions and its determination – transport numbers of ions and their determinations. Applications of conductivity measurements: degree of dissociation – solubility of sparingly soluble salt – degree of hydrolysis – basicity of acids and conductometric titrations.

UNIT II: ELECTROCHEMICAL CELLS 15 Hrs

Electrochemical series – single electrodes and electrode potentials – oxidation and reduction potentials. Thermodynamics and electromotive forces: relation between chemical and electrical energies – calculation of different values of ΔG – calculation of emf – Nernst equations for both oxidation and reduction-standard electrode potential and its characteristics – types of electrodes: metal-metal ion – Gas – metal-insoluble salt – redox– glass electrode. Electrochemical cells: chemical cells-definition – cell reaction and representation of electrodes and cells, emf of cells – conventions regarding signs of emf calculations of cell emf with the aid of Nernst equation – experimental determination of emf of cells. Measurements of single electrode potentials – calculations of ΔG, ΔH, ΔS and equilibrium constant from EMF data-concentration cells. Liquid junction potential and salt bridge.

UNIT III: APPLICATIONS OF EMF MEASUREMENTS 15 Hrs

Determination of solubility product of a sparingly soluble salts– determination of pH using hydrogen electrode, glass electrode, calomel electrode and quinhydrone electrode – determination of degree of hydrolysis – determination of valency of the ion – potentiometric titrations-acid-base, redox, precipitation titrations – determination of transport number. Commercial cells-primary and secondary cells-Westron-cadmium cell and lead storage cells-over voltage, decomposition potential-hydrogen over voltage-theories of electrolyte-separation of metals-electrochemical principle of corrosion and passivity. Elementary idea of polorography.

UNIT IV: PHOTOCHEMISTRY 15 Hrs

Definition of photochemical reactions-laws of photochemistry-Lambert's law and Beer's law, Lamberts-Beer's law, Grothus-Drapper law, Stark-Einstein law-quantum efficiency and its determination-consequences of light absorption by atoms and molecules-Jablonski diagram-comparison between thermal and photochemical reactions. Kinetics of photochemical reactions: Gaseous reactions, hydrogen-halogen reaction(HCl, HBr, HI)- reactions in liquid phase (solutions). Isomeric transformationof maleic acid and fumaric acid, polymerization of anthracene – photochemical effect on solids Photochemical equilibrium, flash photolysis, photosensitization - chemiluminescence fluorescence – phosphorescene –thermoluminescence. Radiation chemistry and biological applications of photochemistry.

UNIT V: PHASE RULE 15 Hrs

Statement and significance of the terms involved. Thermodynamic derivation of phase rule-comparison between the law of mass action and phase rule. Phase diagrams of one component and two component systems – phase diagrams of water, sulphur systems – Pb-Ag, KI/H_2O systems – Salt hydrate and freezing mixtures – Gas solid equilibria – Three component systems-partially miscible liquid pairs-two solid and one liquid systems.

Text Books:

1. Essentials of Physical chemistry Arun Bahl, B.S.Bhal & G.D.Tuli, S.Chand Publishing Company, New Delhi, 2010 Edition.
2. Advanced Physical chemistry Gurdeep raj XIV edition S.Chand Publishing Company, New Delhi, 2008 Edition.

Reference Book

1. Principles of Physical chemistry by Puri & Sharma, Vishal Publishing Co. 2008.

B.Sc. Chemistry CBCS Syllabus - **SEMESTER - V**
(For those who joined in June 2017 and after)

PART- III : Core Subject Practical		
Subject Title : **Gravimetric Estimations**		
Subject code : **07CP54**	Hours per week **: 3**	Credit : **2**
Sessional Marks : **40**	Summative Marks: **60**	Total Marks:**100**

Objectives:

To enable the students

- *To develop skill in gravimetric analysis*

1. Estimation of Lead as Lead Chromate.
2. Estimation of Barium as Barium Chromate.
3. Estimation of Calcium as Calcium Oxalate monohydrate.
4. Estimation of Copper as Cuprous thiocyanate.

Reference Book:

1. O .Thomas and Mani Text Book of Practical Chemistry Scientific Publication, IVth Revised Edition, 1976.

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B.Sc. Chemistry CBCS Syllabus - **SEMESTER - V**
(For those who joined in June 2017 and after)

PART- III : Core Subject		
Subject Title : **Organic Analysis**		
Subject code : **07CP55**	Hours per week : **3**	Credit **: 2**
Sessional Marks **: 40**	Summative Marks: **60**	Total Marks:**100**

Objectives:

To enable the students

- To carry out the analysis of given organic compounds

Analysis of an organic compound containing one or two functional groups and confirmation by the preparation of a solid derivative – acids, phenols, aldehydes, ketone, esters, nitro compounds, amines (primary, secondary and tertiary), aniline, aliphatic diamide, side chain and nuclear halogen compounds, diamide containing sulphur and monosaccharide.

Reference Book:

1. A.O. Thomas and Mani Text Book of Practical Chemistry Scientific Publication, IVth Revised Edition, 1976.

PART- III : Elective Subject		
Subject Title : **Computer Application in Chemistry and Green Chemistry**		
Subject code : **07EP51**	Hours per week : **5**	Credit : **5**
Sessional Marks : **25**	Summative Marks: **75**	Total Marks:**100**

Objectives:

To enable the students

- *To gain basic knowledge about computer application in chemistry*
- *To understand the basic concept of Green Chemistry*

UNIT I 15 Hrs

Introduction to computer – Characteristics – Types of computer – Parts of computer – Input devices – Out put devices.

UNIT II 15 Hrs

Memory unit – types of memory – Hardware –Software – Algorithm – Flowchart – Programming languages – Number system – Decimal – Binary system – Octal number system

UNIT III 15 Hrs

Salient features of windows and MS word for typing texts and equation in Chemistry – Tabular columns – Advanced concepts. Basic concept of creating and accessing databases using MS access – Significance of chemdraw – Drawing chemical structure and pasting them in the text.

UNIT IV 15Hrs

Introduction to Green Chemistry – The need for Green Chemistry – Sustainability and cleaner production – Green Chemistry and Eco-efficiency – Environmental protection laws, changes ahead for a chemist – Green Chemistry education.

UNIT V 15 Hrs

Introduction, Inception and evolution of Green Chemistry, Introduction – Twelve Principles of Green Chemistry – Atom economy – Scope of Green Chemistry

Text Books:

1. Essentials of Physical chemistry Arun Bahl, B.S.Bhal & G.D.Tuli, S.Chand Publishing Company, New Delhi, 2010 Edition.
2. Green Chemistry - Rashmi Sanghi & MM Srivastava, Narosa publishing House 2003

Reference Books:

1. Green Chemistry - Rashmi Sanghi & MM Srivastava, Narosa publishing House. Hill Publishing Company, New Delhi, 2003.
2. K.V.Raman, "Computers in Chemistry", Tata-McGraw Hill Publishing Company, New Delhi, 1993.

B.Sc. Chemistry CBCS Syllabus - **SEMESTER V– PAPER - III**
(For those who joined June 2017 onwards)

PART- IV : Skill Based		
Subject Title : **Drug Chemistry**		
Subject code : **07SB5A**	Hours per week **: 2**	Credit : **2**
Sessional Marks : **25**	Summative Marks**: 75**	Total Marks:**100**

UNIT: 1 DRUG CHEMISTRY Drugs and the medicinal chemist the why and the wherefore: drug targets: why should drug work? Where do drugs work- cell structure-drug targets at the molecular level-Intermolecular bonding forces-Electro static and ionic bonds-hydrogen bonds-Van der waals interactions- Dipole-dipole interactions-Reppulsive interaction-role of water and hydrophopic interactions-Drug targets: Lipids as drug targets-carbohydrates as drug targets.proteins and nucleic acid as drug targets.

UNIT: 2 Pain Relievers: Aspirin – Chemistry, Chicken Soup, and the Common Cold – Antibacterial Drugs: Penicillins and Cephalosporins – Tetracyclines: Four Rings and Other Things – Viruses and Antiviral Drugs – Chemicals Against Cancer – Hormones: The Regulators – The Steroids

UNIT: 3 Chemistry and Social Revolution: The Pill – Drugs and the Human Mind: Alcohol – Anesthetics: Under and Out – The Barbiturates: Sedation, Sleep, and Synergism – The Opium Alkaloids: Narcotics

UNIT: 4 Synthetic Narcotics: Analgesia and Addiction – A Natural High: The Brain's Own Opiates – Some Chemistry of the Nervous System – Brain Amines: Depression and Mania – Antianxiety Agents – Stimulant Drugs: Amphetamines

UNIT: 5 The "Mindbenders": LSD – Marijuana: Some Chemistry of Cannabis – Drugs and Deception: Chemistry and Quality Control – The Placebo Effect

Reference Book:

1. Chemistry for Changing Times by John W. Hill, Doris K. Kolb, Eight Edition- Page No.537 – 586.2. An introduction to medicinal chemistry, third edition, by Graham L.Patric, Oxford university press (P3-23).

PART – IV : Skill Based Subject		
Subject Title : **Industrial Chemistry Preparation**		
Subject code : **07SB5B**	Hours per week **: 2**	Credit : **2**
Sessional Marks **: 25**		Total Marks:**25**

Objectives:

To enable the students

- *To develop skill in industrial chemistry preparations*

List of Experiments

1. Preparation of Cleaning Powder
2. Preparation of Mixed Fruit Jam
3. Preparation of Washing Powder
4. Preparation of Fountain Pen Ink
5. Preparation of Liquid Blue
6. Preparation of Syrup
7. Preparation of White Phenyl
8. Preparation of Black Phenyl
9. Preparation of Lipstick
10. Preparation of Nail polish
11. Preparation of Shampoo

*Study material will be provided

B.Sc. Chemistry CBCS Syllabus - **SEMESTER V– PAPER - III**
(For those who joined June 2017 and after)

PART- IV: Skill Based Subject		
Subject Title : **Polymer Chemistry**		
Subject code : **07SB5C**	Hours per week : **2**	Credit **: 2**
Sessional Marks : **25**	Summative Marks: **75**	Total Marks:**100**

UNIT I: INTRODUCTION TO POLYMERS

Importance of polymers: Basic concept – Monomers and polymers – definition. Classification of polymers on the basis of microstructures, macrostructures and applications (thermosetting and thermoplastics). Distinction among plastics, elastomers and fibers. Homo and heteropolymers. Copolymers Chemistry of polymerization: Free radical, ionic, coordination step polymerization.Polyaddition and polycondensation miscellaneous ring-opening & group transfer polymerizations.

UNIT II: PHYSICAL PROPERTIES AND REACTIONS OF POLYMERS

Properties: Glass transition temperature (Tg)- Definition – Factors affecting Tg-relationships between Tg and molecular weight and melting point. Importance of Tg. Molecular weight of polymers: Number average, weight average, sedimentation and viscosity average molecular weights. Molecular weights and degree of polymerisation. Reactions: hydrolysis – hydrogenation – addition – substitutions-cross-linking vulcanization and cyclisations reactions. Polymer degradation: Basic idea of thermal, photo and oxidative degradations of polymers.

UNIT III: POLYMERIZATION TECHNIQUES AND PROCESSING

Polymerisation techniques: Bulk, solution, suspension, emulsion, melt condensation and interfacial polycondensation polymerizations. Polymer processing: Calendering – die casting, rotational casting – compressing, injection moulding.

UNIT IV: CHEMISTRY OF COMMERCIAL POLYMERS

General methods of preparation, properties and uses of the following Polymers: Teflon, Polymethylmethacrylate. Polystyrene, PAN, polyesters, polycarbonates, Polyimides, (Kevlar), polyurethanes, PVC, epoxy resins, Rubber-styrene and neoprene rubbers, Phenol-formaldehydes and urea-formaldehyde resins.

UNIT V: ADVANCES IN POLYMERS

Biopolymers – biomaterials. Polymers in medical field. High temperature and fire-resistant polymers. Silicones, Conducting polymers-carbon Fibers, (basic idea only).

Reference Books:

1. Gowariker V.R Viswanathan N.V. and Jayader Sreedhar, Polymer Science. Willey Eastern Ltd., New Delhi, 1978.
2. Sharma, B.K., Polymer Chemistry, Goel Publishing House, Meerut, 1989.
3. Arora M.G., Singh M. and Yadav M.S., Polymer Chemistry, 2nd Revised edition, Anmol Publications Private Ltd., New Delhi, 1989.Methods and Meida.
4. Billmeyer F.W. Text book of polymer science, Jr. John Wiley and Sons, 1984

Part – IV : Common Subject Theory		
Subject Title : **Environmental Studies**		
Subject Code: **ESUG51**	Hours per week: **2**	Credit: 2
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

2hrs/week 24hrs

Objectives

- *Disseminate information of Environment of national and international issues*
- *Environmental consciousness creation among the students*
- *Facilitation of environmental leadership among students*

Unit-I 5 hrs

Introduction – Nature, scope and importance of Environmental studies – Natural Resources and conservation – forest, water and energy.

Unit-II 5 hrs

Ecosystem – concept – structure and function, energy flow, food chain, food web and ecological pyramids

Unit-III 5hrs

Biodiversity – definition, types – values – India, a mega diversity zone – Hotspots – Endangered and endemic species – threat to biodiversity and conservation

Unit-IV 5 hrs

Environmental pollution – Air pollution- causes and effect – Ozone depletion – Global warming – acid rain – Water pollution – Noise pollution – Solid waste management – Nuclear hazard

Unit-V 4hrs

Human population and the environment – Population growth – variation among nations – effects of population explosion – family welfare programme – environment and human health.

Text book:

- Environment studies – R.Murugesan (2009), Milleneum Pub. Madurai-16

B.Sc. Chemistry Part-II English CBCS Syllabus - **SEMESTER** – **VI**

(For those who join in June 2017 and after)

PART II – Paper I		
Subject Title **: English for Professional Excellence**		
Subject Code:**P2LE61, P2CE61**	Hours per week: 1	Credit: 1
Sessional Marks: **100**		Total Marks: **100**

Total number of hours: 15 hours

Objectives:

- *To make students face Competitive Examinations with confidence*
- *To prepare students to face interviews*
- *To make students familiar with books and authors in English literature*
- *To make students prepare resume*
- *To motivate students to participate in Group Discussion*
- *To make students read books on Personality Development*

Unit – I

- Sentence Completion
- Sentence Fillers
- Synonym
- Antonym
- Idioms and Phrases
- Substitution

Unit – II

- Sentence Arrangement
- Jumbled sentences
- Paragraph Reconstruction
- Analogy

Text Book

Objective English for Competitive Examinations, Hari Mohan Prasad
Uma Rani Sinha, Tata McGraw Hill Education Private Limited, New Delhi.

Unit III

- Interview Skills – mock – interview.
- Debate, Group Disscussion, Resume Writing

Unit IV

- Books and authors in English literature

B.Sc. Chemistry CBCS Syllabus - **SEMESTER - VI**
(For those who joined in June 2017 and after)

PART – III : Core Subject Theory IX		
Subject Title : **Organic Chemistry-III**		
Subject code : **07CT61**	Hours per week : **5**	Credit : **4**
Sessional Marks : **25**	Summative Marks: **75**	Total Marks:**100**

Objectives:

To enable the students

- *To know about the polymers*
- *To have basic idea on dyes*
- *To basic knowledge of Heterocyclic compounds*
- *To have gain about vitamins*
- *To familarice with fundamental concept of Spectroscopy*

UNIT I: POLYMERS 15Hrs

Polymers – Definition – Classification of polymerization reactions – Addition and condensation polymerization reactions – Types of polymers – Mechanism of cationic, anionic and free radical polymerization – Thermo and thermo setting polymers - Preparation of caprolactam, Nylon 66, Polyester, epoxide resin – Biomedical applications of polymers (elementary treatment) – Natural rubber and synthetic rubber – Properties of polymers – Conducting polymers (a brief study).

UNIT II: DYES AND MOLECULAR REARRANGEMENT 15Hrs

Dyes - Theory of color and constitution - Chromophore, auxochrome – Classification according to application and structure – Preparation and uses of azo dyes, methyl orange, malachite green and indigo dyes – Indigotin, anthraquinone dyes – Alizarin, phthalein dyes – Fluorescein.

Detailed mechanism of the following rearrangements: Wagner – Meerwin, Hofmann, Curtius, Beckman, Benzilic acid, Claisen, Benzidine, Fries and Orton rearrangements.

UNIT III: HETEROCYCLIC COMPOUNDS AND ALKALOIDS 15 Hrs

Heterocyclic compounds: Single ring heterocyclics – Nomenclature, preparation and properties of pyrrole, furan, thiophene and pyridine – Condensed ring heterocycles – Nomenclature, preparation and properties of indole, quinoline and isoquinoline

Alkaloids: Definition, occurrence, extraction of alkaloids isolation – Properties and elucidation of structure and synthesis of coniine, piperine.

UNIT IV: TERPENES, VITAMINS, HORMONES AND CHEMOTHERAPY 15 Hrs

Terpenes: Introduction, classification, occurrence, Isolation and general properties – Isoprene rule – Synthesis of citral, properties and structure of geraniol, limonene, menthol and camphor.

Vitamins and Hormones: Definition, classification and biological importance of thyroxine, ascorbic acid, thiamine, testosterone and progesterone (Structural elucidation & synthesis not required).

Chemotherapy: Definition, preparations and application of the following drugs: Sulpha drugs, sulphanilamide, sulphapyridine and sulphathiazole.

UNIT V: UV –VISIBLE, IR AND NMR SPECTROSCOPY 15Hrs

UV-visible spectroscopy: Introduction, electronic transition, effect of conjugation, concept of chromophore and auxochrome, bathochromic, hypsochromic, hyperchromic and hypochromic shifts. UV-vis spectra of conjucated dienes and solvent effect. Colour and light absorption.

IR Spectroscopy: Molecular vibrations – Finger print region-Identification of functional groups and interpretation of IR spectra.

NMR Spectroscopy: NMR phenomenon – chemical shift – factors influencing chemical shift (electro negativity, anisotropic effect), spin-spin coupling – application of NMR to simple molecules like ethyl alcohol, ethyl bromide, acetaldehyde, 1,1,2-tribromoethane and toluene. Simple problems involving UV, IR and NMR data.

Text Book:

1. Advanced Organic Chemistry by Bahl & Arun Bahl, S.Chand & Company Ltd, New Delhi, 2012 Edition.

Reference Book

2. Text book of Organic chemistry by P.L.Soni, H. M. Chawla S. Chand & Company Ltd, 2007.

PART – IV Core Subject Theory X		
Subject Title : **Physical Chemistry - IV**		
Subject code : **07CT62**	Hours per week : **5**	Credit : **4**
Sessional Marks : **25**	Summative Marks: **75**	Total Marks:**100**

Objectives:

To enable the students

- *To have basic concept of chemical kinetics*
- *To understand the concept of about Group theory*
- *To familiar with fundamental concept of Spectroscopy*

UNIT I: CHEMICAL KINETICS 15 Hrs

Rate of a reaction – distribution between molecular and ionic reactions. Rate law and rate constant, order and molecularity of reactions. Reactions of first order and pseudo unimolecular reactions: derivation of rate constant and half-life period – catalytic decomposition of H_2O_2 – hydrolysis of esters by acids, inversion of cane sugar and mutarotation of glucose. Reactions of second order: Derivation of rate constant and half-life period – saponification of ester. Reactions of third order: derivation of rate constant (equal concentrations of reactants only) and half-life period. Reactions between ferric chloride and stannous chloride. methods of determining the orders of reactions. Reactions of zero-order – examples. Influence of temperature on the rate of a reaction – Arrhenius rate equation and its significance – measurement of parameters. Theory of reaction rates: Collision theory and activation theory – unimolecular reactions – Lindemann's hypothesis – salt effect – theory of absolute reaction rates.

UNIT II: GROUP THEORY 15 Hrs

Symmetry elements – symmetry operation – rotation – reflection – rotation reflection – center of inversion – identity operation. definition of group – point group – point groups for water and ammonia.

UNIT III: MOLECULAR SPECTROSCOPY 15Hrs

Electromagnetic radiation (EMR)-absorption and emission spectra – band spectra-types of molecular spectra – rotational spectra – rotational spectra of diatomic molecules – frequencies separation – determination of moment of inertia and bond lengths.

UNIT IV: IR SPECTROSCOPY 15 Hrs

Vibrational spectra – IR spectra of diatomic molecule – rotation vibration spectra of diatomic molecule – applications of IR spectroscopy. Raman spectra – comparison of Raman and IR spectra.

UNIT V: NMR, ESR AND MASS SPECTROMETRY 15 Hrs

Nuclear magnetic reasonance spectroscopy: Introduction and instrumentation – chemical shift – NMR frequency – spin-spin coupling – spectra of ethanol.

Electron Spin resonance spectroscopy: Principle of hyperfine splitting – ESR spectra of hydrogen and methyl radical.

An introduction to mass spectrometry: Parent peaks – base peaks – isotopic peaks – metastable peaks – fragmentations – nitrogen rule and Mclafferty rearrangement.

Text Books:

1. Essentials of Physical chemistry Arun Bahl, B.S.Bhal & G.D.Tuli, S.Chand Publishing Company, New Delhi 2008
2. Principles of Physical Chemistry by B.R.Puri, L.R.Sharma, and S.Pathania, Vishal Publishing Co., New Delhi 2004

Reference Books:

1. Principles of physical chemistry by Puri & Sharma, Vishal-Publication, Co., 2004.
2. Text book of physical chemistry by P.L.Soni, Sultan Chand & Sons, 2004.
3. Chemical application of group theory by F.A.Cotton, John-Wiley & Sons, 3rd Edition, 2006.
4. Group theory in chemistry by Ramakrishnan and Gopinathan, Vishal-Publication, Co., 2006
5. Advanced physical chemistry, Gurdeep Raj Krishna Prakashan Mandir, Meerut XIV edition 2007.

B.Sc. Chemistry CBCS Syllabus - **SEMESTER - VI**

(For those who joined in June 2017 and after)

PART- III : Elective Subject Practical		
Subject Title : **Practical Physical Chemstry**		
Subject code : **07EP61**	Hours per week : **6**	Credit : **5**
Sessional Marks **: 40**	Summative Marks**: 60**	Total Marks:**100**

PHYSICAL CHEMSTRY EXPERIMENTS:

I. Determination of Molecular weight by a) Transition Temperature method [$Na_2S_2O_3$, $5H_2O$]. b) Rast Macro method – Naphthalene as Solvent

II. Phase diagram involving

a) Simple eutectic b) Compound formation

III. Critical solution temperature (CST)

Determination of CST of phenol – water system and effect of impurity on CST – Determination of Strength of NaCl.

IV. Thermo Chemistry

Heat of solution – $K_2Cr_2O_7$, $(NH_4)_2\ C_2O_4$ and $H_2C_2O_4$.

V. Partition Co-efficient experiments:

a) Study of the equilibrium constant for the reaction

$$KI+I_2 \leftrightarrow KI_3$$

By determining the partition Co-efficient of I_2 between water an CCl_4

Determination of strength of given KI.

VI. Kinetics Determination of relative strength of acids by hydrolysis of ester.

VII. Conductivity Determination of cell constant and conductivity titration between as acid and a base (HCl Vs NaOH)

Reference Book:

1. A.O.Thomas and Mani Text Book of Practical Physical Chemistry Scientific Publication, IVth Revised Edition, 1976.

PART- III : Elective Subject Practical		
Subject Title : **Nano Chemistry**		
Subject code : **07EP62**	Hours per week : **5**	Credit : **5**
Sessional Marks : **25**	Summative Marks: **75**	Total Marks:**100**

Objectives:

To enable the students

- *To know about the nanochemistry*
- *To study about the nanobiology and nano sensor*

UNIT I : INVESTIGATING AND MANIPULATING MATERIALS IN THE NANOSCALE 15 Hrs

Introduction – difference between nanotechnology and biology – electronic microscopies – scanning electron microscopy (SEM) - transmission electron microscopy (TEM).

UNIT II: SEMICONDUCTORS QUANTUM DOTS 15 Hrs

Introduction – synthesis of quantum dots – synthesis in confined media – molecular precursors. – electronic structure of nanocrystals – how does we study quantum dots – uses.

UNIT III: NANOBIOLOGY 15 Hrs

Interaction between biomolecules and nano particles surfaces – nobel metal materials – semiconductor – nanocrystals – magnetic nanoparticles – application of nanobiology.

UNIT IV: NANOSENSORS 15 Hrs

What is sensor – what make them possible –electrochemical sensors – sensor based on physical properties – nano biosensors – smart dust – sensors of the future**.**

UNITV: NANOMEDICINE 15 Hrs

Nanoshells – nanopores – tectodendrimers – nanotechnology in diagnostics application – gold nanoparticles - magnetic nano particles.

Text Book:

1. Nano the essential T.Pradeep, Tata Mc Graw Hill Company. Ltd., New Delhi. 2007

Reference Book:

1. Nanoscale Materials in Chemistry Edited by Kenneth J.Klabunde, Wiley – Interscience. A John Wiley and Sons, Inc. 605 Third Avenue, New York. – 2003.

PART – IV: Skill Based Subject		
Subject Title : **Chemistry and General Aptitude for Competitive Examination**		
Subject code : **07SB6A**	Hours per week : **2**	Credit : **2**
Sessional Marks : **25**	Summative Marks: **75**	Total Marks:**100**

Objectives:

To enable the students

- *To recall basic/advanced chemistry to prepare for Entrance examination for higher studies*
- *To develop aptitude, mental ability and reasoning ability in order to prepare for various competitive exams like TNPSC and banking sector etc.*
- *To prepare for state level and national level competitive exams*

UNIT 1: CHEMISTRY-I

Introduction – Branches of chemistry – The importance of chemistry

Matter and its nature – Classification – composition of earth – elements – compounds – some important elements and compounds – mixtures – Avogadro's hypothesis and mole concept.

Chemical Reactions and the chemical equations – Balancing chemical equations – rate of reaction – energy changes in reactions.

Structure of the atom – Dalton's atomic theory – Thomson's atomic model – Rutherford's atomic model – modern atomic theory – isotopes and isobars.

Periodic Table of Elements – Periodic trends in properties.

Chemical Bonding – Electrovalent (Ionic) bond – covalent (chemical) bond – shapes of molecules – theories of chemical bonding.

Oxygen and Air – Composition of air – air and life – respirations (inhaled and exhaled Air).

Hydrogen and Water – Hydrogen – isotopes of hydrogen – solubility and solutions – osmosis – molar and normal solutions – formality – molality (m) – mole fractions.

Carbon and Its Compounds – allotropes of carbon – carbon monoxide (CO) – carbon cycle in nature and photosynthesis – carbon dioxide and the environment – fuels – rocket fuels – hydrocarbons.

Nitrogen and Its Compounds – ammonia – nitrogen Cycle.

UNIT 2: CHEMISTRY-II

Acids, Bases and Salts – Acids – bases – theories of acids and bases – salts – pH.

Occurrence of Metals – Properties of metals – extractions of metals.

Petroleum and Natural Gas – Uses of various fractions – other fractions.

Iron and Steel – Rusting of iron – cement and glass.

Colloids, Micelles and Nanotechnology – Colloids and colloidal State – micelles-associated colloids – emulsions – gels – applications of colloids – advaced materials, nanoscience and nanotechnology.

Agricultural Chemistry – Chemical control – fertilisers.

Medicinal Chemistry – Diseases – drugs – common drugs – radiopharmaceuticals.

Food Chemistry – Food additives.

Biochemistry and Life Processes – Chemical basis of life – biological role of sodium, potassium, magnesium and calcium – buffers.

Polymers and Plastics – Polymers – plastics – applications – rubber – liquefied petroleum gas (LPG) – petrochemicals.

Electrochemistry – Electrolysis – characteristics of electrolysis – applications of electrolysis.

Dyes; Basic concept of colour and constitution.

UNIT 3: CHEMISTRY-III

Biotechnology – Introduction – applications of biotechnology – fermentation biotechnology.

International Symbols for Units – The CGS System or cm-g-s – The MKSA system or m-kg-s – The Degree Kelvin – international systems of units (SI-Units) – the mole.

Carbohydrates – Classification – sugars – polysaccharides.

Proteins – Acidic and basic amino acids – amino acids as dipolar ions – peptides – proteins – structures of proteins.

Nucleoproteins and Nucleic acids – The genetic code.

Important Bioactive Compounds – Alkaloids – terpenoids – steroids – carotenoids – tannins – lignans – flavonoids – cyanogenesis and cyanogenic glycosides – coumarins.

Fats – Soaps.

Important laws governing Gases, Liquids and Solutions – gases – colligative properties.

Bioterrorism.

Thermodynamics – Thermodynamic system – thermodynamic processes – the laws of thermodynamics – thermodynamic potentials.

Important concepts and topics.

UNIT 4: GENERAL APTITUDE-I

Numerical ability-Simplification-numbers-ratio and proportion-percentages-profit and loss-average and mixtures

UNIT 5: GENERAL APTITUDE-II

Mental ability-Time and work-simple interest and compound interest-geometry and mensuration-statistics-data interpretation-alpha-numeric reasoning-visual reasoning

Reference Books:

1. Objective Chemistry by M.Sivakumar Sura's publication, 2005.
2. Objective Chemistry by M.L Srivastava, Rastogi publication 2000.
3. Manual for TNPSC examinations by M. Karthikeyan, McGraw Hill Education, 2016

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(For those who joined June 2017 and after)

PART- IV: Skill Based Subject		
Subject Title : **Leather Chemistry**		
Subject code : **07SB6B**	Hours per week : **2**	Credit : **2**
Sessional Marks : **25**	Summative Marks: **75**	Total Marks:**100**

UNIT 1: INTRODUCTION TO LEATHER CHEMISTRY

Importance of leather industry – scope of leather chemistry – distinction between hides, skins and leather – a detailed study of the structure and composition of hide and skins – Proteins and their characteristics – Anatomy and histology of protein constituents of leather.

UNIT 2: TANNING PROCESSES

Basic principle involved in pre-tanning – soaking, liming, deliming, bating and depickling. Types of tanning – Vegetable and mineral tanning – different types of vegetable tanning – materials – classification and chemistry of vegetable tanning – factors and physico – chemical principles involved in vegetable tanning – Fixation of vegetable tanning – Synthetic tanning – classification – General methods.

UNIT 3: CHEMISTRY OF TANNING

The preparation and chemistry of chrome tanning liquids – olation, oxolation and hydrolysis of chrome liquids. Effect of adding tanning agents. Role of pH in the reaction of chromium complexes with hide proteins. Factors governing chrome tanning. Chemistry of neutralization process. A brief survey of chemistry of other tanning agents like Al, Zr and Te salts and their relative merit in contrast with chrome tanning.

UNIT 4: PRESERVATION AND PROCESSING OF LEATHER

Chemical methods of curing and presentation of hides and skins in acid and alkaline solutions. Principle of methods employed in curing, liming, deliming, bating and pickling – Process of dyeing leather- Use of mordants – Dyeing auxiliaries such as leveling, wetting and dispersing agents – Dye fixations.

UNIT 5: ENVIROMENTAL IMPACT OF TANNERY INDUSTRIES & PROJECT WORK

Tannery effluent and treatment – Types of water pollution – Different types of tannery effluents and wastes – Solid waste – Origin and disposal.

Project: A small group project on collecting tannery effluents from various sources and their chemical analysis.

Reference Books:

1. Woodroffe, John Wiley, Fundamental of leather Science.
2. Visit to a leather processing unit to understand the process of tanning and leather processing.
3. Visit to CLRI to have an idea of the research and development in leather industry.

B.Sc. Chemistry CBCS Syllabus - **SEMESTER VI– PAPER III**
(For those who joined June 2017 and after)

PART- IV: Skill Based Subject		
Subject Title : **Dairy Chemistry**		
Subject code : **07SB6C**	Hours per week **: 2**	Credit : **2**
Sessional Marks : **25**	Summative Marks**: 75**	Total Marks:**100**

UNIT I: COMPOSITION OF MILK

Milk – definition – general composition of milk – constitutents of milk – lipids, proteins, carbohydrates vitamins and minerals – physical properties of milk – colour, odour, acidity, specific gravity, viscosity and conductivity – Recmaged effect – factors affecting the composition of milk – adulterants, preservatives and neutralizer – examples and their detection – estimation of fat, acidity and total solids in milk.

UNIT II: PROCESSING OF MILK

Microbiology of milk – destruction of micro organisms in milk – physico – chemical changes taking place in milk due to processing – boiling, pasteurization – types of pasteurization – Bottle, Batch and HTST (High Temperature Short Time) – Vacuum pasteurization – Ultra High Temperature Pasteurization.

UNIT III: MAJOR MILK PRODUCTS

Cream – definition – composition - chemistry of creaming process-gravitational and centrifugal methods of separation cream-estimation of fat in cream.

Butter – definition – compostion – theory of churning – desibutter – salted butter – estimation of acidity and moisture content in butter.

Ghee – major constitutents – common adulterants added to ghee and their detection – rancidity – definition – prevention – antioxidants and synergists – natural and synthetic.

UNIT IV: SPECIAL MILK

Standardised milk definition – mertis – reconstituted milk – definition – flow diagram of manufacture – Homogenised milk – flavoured milk – vitaminised milk – toned milk – Incitation milk – vegetable toned milk – humanised milk – condensed milk – definition compostion and nutritive value.

UNIT V: FERMENTED AND OTHER MILK PRODUCTS

Fermented milk products –fermentation of milk – definition, conditions, cultured milk – definition of culture –examples conditions – cultured cream – cultured butter milk – Bulgaxious milk – acidophilous milk – Yoheer indigeneour products – Khoa and chchana definition – Preparation of Khoa and chahana sweets – Gulabjamun, chana sweet, Rassogilla. Ice cream – definition – percentage composition types – ingredients –manufacture of ice-cream stabilizers – emulsifiers and their role milk powder – definition – need for making milk powder – drying process – types of drying dairy detergents – characteristics – classification – washing procedure – sterilization – chrloramine T and hypochlorite solution. Visit to a pasteurization factory / milk product company and submission of a report.

Reference Books:

1. Robert Jenness and Patom S., Wiley, Principles of Dairy Chemistry, New York.
2. Rangappa K.S. and Acharya K.T., Indian Dairy Products.
3. Wond F.P., Fundamentals of Dairy Chemistry, Springer.
4. Lampert L.M., Modern Daily Products, Chemical Publishing Company Inc., New York.
5. Warner, Wiley, Principles of Dairy Processing, New York.

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(For those who joined June 2017 and after)

PART- IV: Skill Based Subject		
Subject Title : **Industrial Chemistry**		
Subject code : **07SB6D**	Hours per week **: 2**	Credit **: 2**
Sessional Marks **: 25**	Summative Marks**: 75**	Total Marks:**100**

UNIT I: INDUSTRIAL REQUIREMENTS

Requirements of an industry – location – water –industrial water treatment – safety measures – pilot plans. Fuels – types of fuels with examples – coal carbonization of coal – coal far distillation – liquid fuels – gaseous fuels – selection of fuels – nuclear fuels.

UNIT II: ENERGY

Energy – sources of energy – renewable and non-renewable energies – non conventional energies. Industria catalysts – Types of catalysts – Functions and applications of Raney Nickel, Pd, $CuCrO_4$, TiO_2, Al, V and Pt based catalysts and zeolites.

UNIT III: PETROCHEMICAL INDUSTRIES

Crude oil – constitution and distillation – composition – of different distillates – pour points, depressants, drag reducers, viscosity reducers, ignition point, flash point octane number – cracking – catalysts used in petroleum industries – structure, selectivity and applications.

UNIT IV: OILS, SOAPS AND DETERGENTS

Manufacture of soaps – toilet and transparent soaps – Detergents – synthetic detergents – surface active agents and their classification – manufacture of anionic, cationic and non ionic detergents and shampoo.

UNIT V: OTHER INDUSTRIAL PRODUCTS

Sugar industry – manufacture of sugar from cane sugar and beet roof. Manufacture of leather – hides – Vegetables and chrome tanning finishing. Manufacture of DDT, dinitrophenols, BHC, gamaxane, Malathion, parathion, schradan and dementon.

Reference Books:

1. Sharma B.K., Industrial Chemistry, Goel publishing House, 2003, Meerut.
2. Drydens C.E., Outlines of Chemical Technology, Gopala Rao, Eastwest press, New Delhi.
3. Shreve R.V., Chemical Process Industries, Tata Mc Graw Hill publishing company, Mumbai.
4. Steines H., ntroduction to Petrochmicals, Pergaman Press.
5. Alan Cottrel, An Introduction to Metallurgy, Orient Longman (2000).

PART – IV : Skill Based Subject		
Subject Title : **Water Analysis**		
Subject code : **07SB6E**	Hours per week : **2**	Credit :**2**
Sessional Marks : 25		Total Marks:**25**

Objectives:

To enable the students

- *To learn about the basic chemistry of water and water analysis*

Name of the Experiments

1. Determination of total hardness of water sample
2. Determination of permanent hardness of water sample
3. Determination of temporary hardness of water sample
4. Estimation of chloride content in water
5. Estimation of alkalinity in water sample
6. Estimation of total suspended solids (TSS)
7. Estimation of total dissolved solids (TDS)
8. Determination of pH of the water sample
9. Determination of conductivity of the water sample

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(For those who joined in June 2017 and after)

PART- IV: Skill Based Subject		
Subject Title : **Analytical Methods in Chemistry**		
Subject code : **07SB6F**	Hours per week : **2**	Credit : **2**
Sessional Marks **: 25**	Summative Marks: **75**	Total Marks:**100**

Objectives:

To enable the students

- *To learn about the theory of analytical chemistry*
- *To have an idea about the principles and applications of UV and CV*
- *To know about laboratory hygiene and safety*

UNIT I: INTRODUCTION TO ANALYTICAL CHEMISTRY 6 Hrs

Types of analytical methods: Importance of analytical methods in qualitative and quantitative analysis: Chemical and instrumental methods – advantages and limitations of chemistry and instrumental methods

UNIT II: CHROMATOGRAPHY TECHNIQUES 6 Hrs

Thin layer chromatography – principle, choice of adsorbent and solvent, preparation of chromatoplates, R_f-values, factors affecting the R_f-values. Significance of R_f-values. Column chromatography – principle, types of adsorbents, preparation of the column, elution, recovery of substances and applications.

UNIT III: SPECTRO ANALYTICAL TECHNIQUES 6 Hrs

Principles – Beer – Lambert's Law – verification of Beer Lambert's law – qualitative (determination of λ_{max} values of simple organic compounds) and quantitative (determination of concentration of manganese, ferrous and nickel ions).

UNIT IV: ELECTROANALYTICAL CHEMISTRY 6 Hrs

Cyclic voltammetry basic principles- testing the reversibility of a reduction – oxidation process.

UNIT V: LABORATORY HYGIENE AND SAFETY 6 Hrs

Storage and handling of corrosive, flammable, explosive, toxic, carcinogenic and poisonous chemicals. Simple First aid procedures for accidents involving acids, alkalies, bromine, burns and cut by glass. Threshold vapour concentration – safe limits. Waste disposal.

Reference Books:

1. Text book of Quantitative Chemical Analysis by VOGEL'S 6th Edition (2002).
2. Fundamentals of Analytical Chemistry by Skoog, West, Holler 8th Edition. 2003
3. Practical Physical Chemistry by B.Viswanathan, P.S. Raghavan –Viva Books Private Limited. 2005 Edition

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(For those who joined June 2017 and after)

PART- IV: Skill Based Subject		
Subject Title : **Stereochemistry**		
Subject code : **07SB6G**	Hours per week : **2**	Credit : **2**
Sessional Marks **: 25**	Summative Marks: **75**	Total Marks:**100**

UNIT I:

Representation of three-dimensional molecules: Introduction – molecular model – two – Dimensional representations – Problems in drawing structure (Wedge, Sawhorse, and Newman Projection formula).

UNIT II:

Conformation of acyclic compounds: restricted rotation about single bonds – staggered conformation – eclipsed conformation.

UNIT III:

Conformation of cyclic compounds: Angle strain – cyclohexane – equatorial and axial bonds of cyclohexane conformational interconversions of cyclohexane – other cyclohexanes – bicyclic and polycyclic compounds.

UNIT IV:

Geometrical Isomerism: cis – trans isomerism in cycloalkanes – Restricted rotation about double bonds – designation of configuration – strained carbocycles.

UNIT V:

Chirality and Optical Activity: Asymmetry and enantiomers – Optical Activity – absolute Configuration – relative Configuration – several chiral centres – Torsional Asymmetry – Fisher Projection Formulas

Reference Book:

Organic Chemistry by Stauley H Pine, 5th Edition P: 132 -181 Tata McGraw-Hill Publishing Company Limited, New Delhi.

B.Sc. Botany & Zoology Allied Chemistry CBCS Syllabus - **SEMESTER I**

(For those who joined in June 2017 and after)

PART III – Allied Course Theory		
Subject Title **: Inorganic, Organic and Physical Chemistry**		
Subject Code:**07AT01**	Hours per week:4	Credit:4
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

To enable the students

- *To become familiar in to the basic Principles Of Titrimetry*
- *To gain basic knowledge about Organic basic principles*
- *To have gain the basic concept of intermediates*
- *To be familiar with catalysis*

UNIT I: GENERAL PRINCIPLES OF TITRIMETRY 12 Hrs

Concept of Molecular weight, Formula weight, Equivalent weight – Concentrations terms – Molarity, Normality, Weight percentage. Principle of Titrimetry – Primary and secondary standards – Preparing standard solutions – Standardising the secondary standard solutions.

UNIT II: ORGANIC BASIC PRINCIPLES I 12 Hrs

Empirical formula – molecular formula – structural formula – Calculation of Empirical Formula and Molecular Formula from percentage composition. Isomerism – Structural isomerism – Chain isomerism – Position isomerism – Functional isomerism – Metamerism – Stereoisomerism.

UNIT III: ORGANIC BASIC PRINCIPLES II 12 Hrs

Nucleophiles – Electrophiles: Definition, types and examples. Types of reactions: Substitution – Addition – Elimination – Rearrangement and Polymerization – illustration with examples. Resonance and tautomerism.

UNIT IV: ORGANIC INTERMEDIATES 12 Hrs

Nature of valency of carbon in organic compounds – Tetrahedral arrangement of valency of carbon – bond breaking and bond forming in organic reactions – Homolytic cleavage – Heterolytic cleavage – Definition, types and examples of carbocation, carbanion and free radical.

UNIT V: CATALYSIS AND PHOTOCHEMISTRY 12 Hrs

Catalysis: Definition – different types of catalysis – acid base catalysis – surface catalytic reactions – definition and examples – autocatalyst –catalytic poisoning – promoters.

Photochemistry: Definition of photochemical reactions – comparison of thermal and photochemical reactions – Jablonski diagram - Chemiluminescence – Bioluminescence – Photosynthesis – Radioactivity – Applications of radioactive isotopes in biology and medicine.

Text Book:

1. Ancillary chemistry Dr. K.Ratinamuthu (Study material will be provided) Semester – I and II

Refference Books:

1. Advanced Organic Chemistry by Bahl & Arun Bahl, S.Chand & Company Ltd, NewDelhi, 2012 Edition.
2. Text book of Inorganic Chemistry by P.L.Soni, Mohan Katyal, Sultan Chand & Sons, NewDelhi, 2010 Edition.
3. Essentials of Physical chemistry Arun Bahl, B.S.Bhal & G.D.Tuli, S.Chand Publishing Company, New Delhi, 2010 Edition.

B.Sc. Botany & Zoology Allied Chemistry CBCS Syllabus - **SEMESTER II**
(For those who joined in June 2017 and after)

PART III – Allied Course Theory – II		
Subject Title **: Inorganic, Organic and Physical Chemistry – I**		
Subject Code:**07AT02**	Hours per week: **4**	Credit**: 4**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

To enable the students

- *To learn the basic Principles Of Titrimetry*
- *To gain basic knowledge about pesticides*
- *To have gain the basic concept of amino acids*
- *To be basic concept of chemical bonding*
- *To know about the pollution and the effect.*

UNIT I: ACIDS AND BASES 12 Hrs

Definition of acids and bases- Arrhenius concept -Lowry-Bronsted and Lewis concept – Cady – Elsey concept – Lux Flood concept – Usinovich concept of acids and bases- P^H concept.

UNIT II: PESTIDCIDES, ANDFUNGICIDES 12 Hrs

Pesticides: Definition – Classification – Organic and inorganic pesticides – Mechanism of action – Characteristics – Safe handling of pesticides – Impact of pesticides on soil, plants and environment –Fungicides: Definition – classification – mechanism of action – sulfur, copper, mercury compounds.

UNIT III: AMINOACIDS, PROTEINS AND VITAMINS 12 Hrs

1. Classification – (Gabriel Phthalimide synthesis) – properties of amino acids – polypeptides – proteins – classification.
2. Vitamins Classification and biological functions of vitamins A, B_6, B_{12}, C, D, E and K(Structural elucidation not required).

UNIT IV: CHEMICAL BONDING 12 Hrs

Ionic Bond – Lattice Energy – Born-Haber Cycle – Properties of Ionic Compounds - Covalent bond – polar covalent bond – characteristics of covalent bond – Fajan's Rule – hydrogen bond – Metallic bond.

UNIT V: POLLUTIONS 12 Hrs

Air pollution: Definition – Composition of air – Chemical reactions occurring in air due to sunlight– Sources of air pollution – Classification and effects of air pollutants – Effects of CFC – Ozone layer- Green house effect.

Water pollution: Types – sources –water – sewage – industrial effluents – inorganic pollutants- water pollution control – water treatment.

Text Book:

1. Ancillary chemistry K.Ratinamuthu (Study material will be provided).

Refference Books:

1. Advanced Organic Chemistry by Bahl & Arun Bahl, S.Chand & Company Ltd, NewDelhi, 2012 Edition.
2. Text book of Inorganic Chemistry by P.L.Soni, Mohan Katyal, Sultan Chand & Sons, NewDelhi, 2010 Edition.
3. Essentials of Physical chemistry Arun Bahl, B.S.Bhal & G.D.Tuli, S.Chand Publishing Company, New Delhi, 2010 Edition.

PART III – Allied Course Theory – I		
Subject Title **: Inorganic, Organic and Physical Chemistry – I**		
Subject Code: **07AT01**	Hours per week: **4**	Credit: **4**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

To enable the students

- *To learn the basic Principles of Titrimetry*
- *To gain basic knowledge about Chemical Bonding*
- *To understand the theory of Nuclear Chemistry*
- *To be familiar with Selected Organic Compounds*

UNIT I: PRINCIPLES OF TITRIMETRY 12 Hrs

Concept of molecular weight, Formula weight, Equivalent weight – Concentrations of solutions – Molarity, Normality, Weight percentage. Principle of titrimetry – Primary and secondary standards – Preparing standard solutions – Standardising the secondary standard solutions .

UNIT II: CHEMICAL BONDING – I 12 Hrs

V.B. Theory – postulates of V.B. Theory – application to the formation of simple molecules like H_2 and O_2 – Overlap of atomic orbitals – s-s, s-p and p-p overlap – principle of hybridization – sp, sp^2 and sp^3 hybridisation.

UNIT III: CHEMICAL BONDING – II 12 Hrs

Valence shell electron pair repulsion theory (VSEPR theory).

M.O. Theory: Formation of Molecular orbitals – bonding, anti-bonding and non-bonding molecular orbitals – Molecular orbital diagrams for H_2, He_2 and O_2

UNIT IV: NUCLEAR CHEMISTRY 12 Hrs

1. Composition of nucleus – nuclear forces – mass defect – binding energy – nuclear stability.
2. Soddy's group displacement law – illustration – law of radioactive disintegration.
3. Nuclear fission: Definition – application of fission – the principle of atom bomb.
4. Nuclear fusion: Definition – emission of energy – stellar energy – hydrogen bomb.
5. Applications of radioactivity – In medicine, agriculture, industry and analytical fields – carbon dating.

UNIT V: STUDY OF SOME SELECTED ORGANIC COMPOUNDS 12 Hrs

Preparation, properties and uses of TNT, BHC, Aspirin, Phenolphthalein, Malachite green, Crown Ethers and Lithium Aluminium hydride

Text Book:

1. Ancillary chemistry Dr. K.Ratinamuthu (Study material will be provided) Semester I and II

Refference Books:

1. Advanced Organic Chemistry by Bahl & Arun Bahl, S.Chand & Company Ltd, New Delhi, 2012 Edition.
2. Text book of Inorganic Chemistry by P.L.Soni, Mohan Katyal,Sultan Chand & Sons, New Delhi, 2010 Edition.
3. Essentials of Physical chemistry Arun Bahl, B.S.Bhal & G.D.Tuli, S.Chand Publishing Company, New Delhi, 2010 Edition.

B.Sc. Zoology CBCS Syllabus - **SEMESTER – VI**
(For those who join in June 2017 and after)

PART – IV : Common Subject Theory		
Subject Title **: Value Education**		
Subject Code: **VEUG61**	Hours per week: **2**	Credit: **2**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

UNIT I - The heart of Education:

Introduction – Eternal Value – Integrated approach to value education - one for all and all for one – Responsibilities of a citizen – Habit Vs wisdom – purifying mind pollution – Respect for all Religions – Parents, teachers and fellow students – The need and benefit of exercise and meditation for students.

UNIT IIThe Value of Body and Life Energy

Introduction – what are the causes for paid, Disease and death? Three Basic needs for all living Beings – Personal Hygeine Five Factors of Balance in Life – The need and benefits of physical Exercise – The value and Base of Life energy – The value and Base of Bio-magnetism - You are your own best caretaker.

The Marvelous nature of mind

Introduction- Bio-magnetism – The base of the mind – characterisation of the Genetic Centre – metal frequency – practice for a creative mind - benefits of meditation.

UNIT IIIAnalysis of Thought

Introduction – An Explosition on the nature of thought– six roots for thoughts – Introspection for analysis of thoughts-practical techniques for analysis of thoughts.

Benefits of Blessings - Effects of good vibrations – Make Blessing a Daily Habit

UNIT IV:Moralisation of Derive

Introduction – moralization of desire - Analyse your desires – Summary of practice.

Neutralision of Anger:

Introduction – meaning – characteristics of Anger – Anger is a Destructive emotion – Anger spoils our relationship with others – Some common misconception about anger – will power and method success through awareness – method of neutralisation of anger.

UNIT V:Eradication of Worries

Worry is a mental disease – Nature's Law of cause and effect – factors beyond our control – How to deal with problems – analyse your problem and eradicate worry

Harmonious Relationships

Introduction – Three angles of life – The value of harmony in personal relations – Love and Compassion – pleasant face and loving words – appreciation and gratitude to parents and teachers – Bringing needed reforms in educational institutions – Why should we serve others? Brotherhood – A scientific Basis for Universal Brotherhood protection of the environment – non-violence and the five fold moral culture.

Text Book: Value Education for Health, Happiness and Harmony

(Based on the Philosophy and Teachings of Swami Vethanthiri Maharisi)

Published By: Brain Trust, Aliyar A Wing of World Community Service Centre

B.Sc. Chemistry CBCS Syllabus - **SEMESTER – VI**

(For those who join in June 2017 and after)

PART – V : Common Subject Theory		
Subject Title **: Extension Activities**		
Subject Code: **EAUG61**	Hours per week:	Credit: **1**
Sessional Marks:	Summative Marks: **100**	Total Marks: **100**

UNIT-I: Community Development-I

Definition – structure and composition – community based issues – need for awareness – Developmental Programmes.

UNIT – II: Community Development–II

Rural Scenario – need of the Community – need for the community service – role of youth in community building – communal harmony – literacy – Educational Recreation.

UNIT – III:Volunteer Empowerment

Women's Emancipation – formation of Youth Clubs – Self-Help Groups – Youth and Development.

UNIT – IV: Social Analysis:

Social issues – cultural invasion – media infiltration – human rights Education/Consumer Awareness – Adolescents Reproductive – HIV/AIDS/STD – Social harmony/National integration – Blood Donation.

UNIT – V:Introduction to NSS:

Basic Concepts – profile – aims – objectives – symbol – Motto – structure – Regular activities – Special Camping Programme – Adventure Programme – National Days and Celebrations.(Applicable to NSS Students)

(OR)

NCC - Origin – Organisation – Ministry of Defence – Armed forces – commands – Defence establishments in Tamil Nadu Civil Defence – Aid to civil authorities – Disaster management – Leadership – Man management – Adventure activities – Social service

Reference: National Service Scheme Manual (Revised), Ministry of Human Resources Development, Government of India.

B.Sc. Physics Allied Chemistry CBCS Syllabus - **SEMESTER II**

(For those who joined in June 2017 and after)

PART III – Allied Course Theory – II		
Subject Title **: Inorganic, Organic and Physical Chemistry**		
Subject Code: **07AT02**	Hours per week: **4**	Credit:**4**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives:

To enable the students

- *To be familiar with fundamentals of periodic properties*

- *To gain basic knowledge about Photochemistry*
- *To understand the theory of Solid State*
- *To be familiar with Electrochemistry*
- *To gain basic knowledge about chromatography techniques*

UNIT I: PERIODIC PROPERTIES AND CHEMICAL BONDING 12 Hrs

Periodic properties - interpretation of periodic properties of the elements in terms of their electronic configuration – atomic radius – van der Waals radius - ionic radius ionization potential – electron affinity - electronegativity – determination of electronegativity by Pauling and Mulliken's methods.

UNIT II: PHOTOCHEMISTRY 12 Hrs

Definition of photochemical reactions-comparison of thermal and photochemical reactions - laws of photochemistry-Lamber's law and Beer's law, lamberts-Beer's law, Grothus-Drapper law – quantum efficiency and its determination – consequences of light absorption by atoms and molecules – Jablonski diagram- chemiluminescence – bioluminescence – photosynthesis.

UNIT III: **SOLID STATE** 12 Hrs

Classification and properties of solids, crystalline state – amorphous substances – polymorphism of the elements allotropy. Crystallography – definition-unit cell-face and edge of crystal-interfacial angle – crystal lattice – space lattice.

UNIT IV: ELECTROCHEMISTRY **1**2 Hrs

Faraday's law of electrolytes – Specific and equivalent conductance – electrochemical cells – Nernst equation – convention regarding the sign of EMF cell – electrodes – reference electrodes – hydrogen and calomel electrodes – pH measurement using glass electrode.

UNIT V: **CHROMATOGRAPHY TECHNIQUES** 12 Hrs

Definition – principle and application – partition and adsorption chromatography – thin layer chromatography – column chromatography – paper chromatography.

Text Book:

1. Ancillary chemistry Dr. K.Ratinamuthu (Study material will be provided) Semester I & II.

Refference Books:

1. Advanced Organic Chemistry by Bahl & Arun Bahl, S.Chand & Company Ltd, New Delhi, 2012 Edition.
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