S M V E C
SCHOOL OF ARTS AND SCIENCE
(Approved by Government of Puducherry, Affiliated to Pondicherry University)
Madagadipet, Puducherry - 605107

BACHELOR OF SCIENCE
IN
CHEMISTRY

ACADEMIC REGULATIONS 2024
(R-2024)
CURRICULUM AND SYLLABI

Department	**Chemistry**	Programme: B.Sc., Chemistry						
Semester	**First**	Course Category Code: **MJD** *End Semester Exam Type: **TE**						
Course Code	**A24CHT101D**	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**GENERAL CHEMISTRY - I**	**4**	**-**	**-**	**4**	**25**	**75**	**100**
Pre requisite	Higher Secondary Chemistry Book							
Course Objectives	• To understand about atomic various models, atomic structure and stability of atom							
	• To gain knowledge on periodicity and periodic properties of elements							
	• To improve knowledge on organic nomenclature, structure, properties and polar effects of molecules							
	• To understand the molecular symmetry and operations							
	• To learn about basic concepts in the stereochemistry							

Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 Develop knowledge on the various atomic model and electronic configuration	**K3**
	CO2 Analyze periodicity and periodic properties of elements	**K3**
	CO3 Apply the knowledge on organic nomenclature in the various field	**K3**
	CO4 Understand molecular symmetry and various symmetry operations	**K3**
	CO5 Use the basic concepts of stereochemistry in the organic molecules	**K2**

UNIT-I	**ATOMIC STRUCTURE**	**Periods:12**
Rutherford model of the atom- defects of Rutherford model - Discovery of neutron, Bohr model of an atom- merits and demerits- Hydrogen atom spectra – Sommerfeld modification- de Broglie's concept- dual nature, quantum numbers- shapes of s, p, d atomic orbitals. Arrangement of electrons in atoms- Hund's rule – Pauli exclusion principle- Heisenberg's uncertainty principle. Aufbau principle and n+l rule. Electronic configuration of atoms up to atomic number 30 and stability of half filled and completely filled orbitals		**CO1**
UNIT-II	**PERIODICITY AND PERIODIC PROPERTIES**	**Periods:12**
Cause of periodicity. Classification of elements in to s, p, d and f blocks. : Atomic properties- Elementary ideas of Covalent radius Van der Waals radius-Ionic radius and their periodic trends. Ionisation Energy, Electron affinity, Electro negativity and their periodic trends–Pauling and Mulliken-Jaffe scale of Electro negativity.		**CO2**
UNIT-III	**ORGANIC NOMENCLATURE, STRUCTURE AND PROPERTIES**	**Periods:12**
Classification and nomenclature of organic compounds – IUPAC systems. Structure and shape of aliphatic organic molecules: Hybridization – Definition, sp^3 hybridization of carbon (methane) – sp^2 hybridization in alkenes (ethane) and sp hybridization in alkynes (ethane). Electronic Displacement Effects: Inductive Effect, Electromeric Effect, Resonance and Hyper conjugation. Reactive Intermediates: Carbocations, Carbanions, free radicals, carbenes and nitrenes (Structure and stability).		**CO3**
UNIT-IV	**STEREOCHEMISTRY**	**Periods:12**
Conformations of ethane and butane. Wedge, Newmann, Sawhorse and Fischer and their Interconversion. chirality due to stereo centre (upto two carbon atoms). Enantiomerisms, Diastereomerisms and Meso compounds. Threo and erythro; D and L; cis – trans nomenclature; Configuration: CIP Rules: R/ S (for only one chiral carbon atoms) and E / Z Nomenclature (for ethene). Optical and Geometrical isomerism.		**CO4**
UNIT-V	**STATES OF MATTER (GAS AND LIQUID)**	**Periods:12**
Gaseous State: Postulates and derivation of the kinetic gas equation - Kinds of velocities - mean, RMS, most probable velocities (definition only) – Collision frequency – mean free path - Deviation of real gas from ideal behaviour- Derivation of Van der Waal's equation. **Liquid State**: Physical properties of liquids – Vapour pressure – surface tension – coefficient of viscosity – Effect of temperature and pressure on viscosity – concentration terms – molarity (M), Normality (N), molality (m), formality, mole fraction, percentage concentration.		**CO5**

Lecture Periods:60	**Tutorial Periods: -**	**Practical Periods:-**	**Total Periods:60**

Text Books

1. Principles of Inorganic Chemistry, B. R. Puri, L. R. Sharma and K. C. Kalia, Shoban Lal Nagin Chand and Co., New Delhi, 2018.

2. R. T. Morrison and R. N. Boyd, Organic Chemistry, 7th edn., Printice-Hall of India Limited, New Delhi, 2010.
3. Principles of Physical Chemistry, B.R Puri, L.R Sharma, M.S. Pathania, 47 th edition, 2016, Vishal publishing.

Reference Books

1. Inorganic Chemistry, D. F. Shriver, P. W. Atkins, W. H. Freeman and Co, London, 2010.
2. Inorganic Chemistry, J. E. Huheey, E. A. Kieter and R. L. Keiter, Harper Collins, New York, 2006, 4th edn.
3. Madan R.D., "Modern Inorganic Chemistry", S. Chand & Company, New Delhi, 2nd Edition, 2004.
4. I.L.Finar, "Organic chemistry Vol 1", Pearson Edition, Singapore, 6th Edition, 2005.
5. P.L. Soni, "Text Book of Organic Chemistry", Sultan Chand, New Delhi, 1st Edition, 2005.
6. J. March and M. Smith, Advanced Organic Chemistry, 6th edn. John-Wiley and sons, 2007.
7. G. D. Tuli, B. S. Bahl, Arun Bahl, "Essentials of Physical Chemistry", S.Chand Publication, 24th Edition, 2000.
8. Stereochemistry of carbon compounds by L.Eliel Mac Graw Hill

Web References

1. https://bit.ly/3vB6v0N
2. https://bit.ly/3juWayu
3. https://byjus.com/chemistry/processes-of-metallurgy/
4. https://bit.ly/3Gb99iy
5. https://www.organic-chemistry.org/
6. https://nptel.ac.in/content/storage2/courses/122101001/downloads/lec-36.pdf

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	1	3	2	2	3	3	3	2
2	3	2	2	3	3	3	2	2
3	3	2	3	2	3	3	2	3
4	2	3	3	2	2	3	3	3
5	3	2	3	2	2	2	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Assessment Pattern as per Bloom's Taxonomy

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

***** Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**Chemistry**	Programme: B.Sc., Chemistry						
Semester	**First**	Course Category Code: **MJD** *End Semester Exam Type: **TE**						
Course Code	**A24CHT102D**	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**ANALYTICAL CHEMISTRY**	**4**	**-**	**-**	**4**	**25**	**75**	**100**
Pre requisite	Basic Knowledge in the Higher Secondary standard Level							
Course Objectives	• To understand about handling of various chemicals and data analysis							
	• To gain knowledge on separation and purification of organic molecules by various methods							
	• To improve knowledge on various quantitative titration							
	• To understand the principles of gravimetric analysis and various precipitation procedures							
	• To learn about basic concepts of thermal analysis used in the chemical industries							

Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 Develop knowledge on the handling of various chemicals and data analysis	**K3**
	CO2 Analyze separation and purification of organic molecules by various methods	**K3**
	CO3 Apply the knowledge of various quantitative analyses in the chemical industries	**K3**
	CO4 Understand principles of gravimetric analysis and various precipitation procedures	**K2**
	CO5 Use the basic concepts of thermal analysis chemical industries	**K2**

UNIT-I	**HANDLING OF CHEMICALS AND DATA ANALYSIS**	**Periods:12**
Safety and hygiene in the Chemistry Lab -Storage and handling of chemicals, handling of acids, ethers, toxic and poisonous chemicals. Antidotes, threshold vapour concentration and first aid procedure. Calibration of volumetric apparatus: burette, pipette and standard flask. Errors in chemical analysis - Accuracy and precision, Types of errors – Determinate and indeterminate errors. Methods of eliminating or minimizing errors. Precision: mean, median, average deviation and coefficient of variation. Significant figure and its relevance. Normal error curve and its importance.		**CO1**

UNIT-II	**SEPARATION AND PURIFICATION TECHNIQUES**	**Periods:12**
Chromatographic techniques and applications - Principles of adsorption and partition chromatography: Paper, Thin layer, Column chromatography and HPLC chromatography. General purification techniques - Purification of solid organic compounds: re-crystallization, sublimation. Use of miscible solvents. Use of drying agents and their properties. Purification of liquids.		**CO2**

UNIT-III	**QUANTITATIVE TITRIMETRY**	**Periods:12**
Methods of expressing concentration of solutions – Molarity, molality, formality, normality, mole fraction, ppm and ppb. Law of volumetric analysis. Requirements for titrimetric analysis. Primary and secondary standards. Limitation of volumetric analysis. Types of Acid base titrations. Buffer solutions. Henderson equation. Preparation of acidic and basic buffers. Relative strength of acids and bases from Ka and Kb values. Theory and choice of indicators. Complexometric titrations - Stability of complexes. Titration involving EDTA. Usage of metal ion indicators.		**CO3**

UNIT-IV	**QUANTITATIVE GRAVIMETRY**	**Periods:12**
Principles of gravimetric analysis- gravimetric factor- calculation involved- conditions for precipitation- theory of precipitation- types of precipitants- advantages- Purity of precipitates– Co-precipitation and Post precipitation- precipitation Precipitation from homogeneous solution; crucibles- types and maintenance- washing of the precipitates-Drying and ignition of precipitates.		**CO4**

UNIT-V	**THERMAL ANALYSIS**	**Periods:12**
Thermo Analytical Methods: Principles of TGA and DTA – Hondas balance – precautions in using thermo Balance – Outlines of Instrumentation (block diagram only) – Application in $CaC_2O_4.H_2O$ and $(CH_3COO)_2Ca.H_2O$ - Thermometric titration – Principle and instrumentation – Conditions for Thermometric Titration – Titration of HCl Vs NaOH– Applications of thermometric titration.		**CO5**

Lecture Periods:60	**Tutorial Periods:-**	**Practical Periods:-**	**Total Periods:60**

Text Book

1. U. N. Dash, Analytical Chemistry: Theory and Practice, Sultan Chand and sons Educational Publishers, New Delhi, 2011.
2. R. Gopalan, P. S. Subramanian and K. Rengarajan, Elements of Analytical Chemistry, Sultan Chand, New Delhi, 2007.
3. B. Sivasankar, Instrumental Methods of Analysis, Oxford University Press, 2012.

Reference Books

1. D. A. Skoog, D. M. West and F. J. Holler, Analytical Chemistry: An Introduction, 5th edn., Saunders college publishing, Philadelphia, 1998.
2. R.A. Day and A.L. Underwood, Quantitative Analysis, 6thedn., Prentice Hall of India Private Ltd., New Delhi, 1993.
3. H. Kaur, Instrumental Methods of Chemical Analysis, Pragati Prakashan, Meerut, 2010.
4. V.K. Srivastava, K.K. Srivastava, Introduction to Chromatography: Theory and Practice, S. Chand and Company, New Delhi, 1987.

Web References

1. https://bit.ly/3pz9NR1
2. https://bit.ly/3vCz4uA
3. https://bit.ly/3lBgbos
4. https://bit.ly/3lENibe

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	3	3	2	2	1	3	3	3
2	2	2	2	3	-	2	2	2
3	3	3	3	2	1	3	3	2
4	1	2	2	1	-	1	2	3
5	3	3	3	1	2	2	3	1

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

***** Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**Mathematics**	Programme: B.Sc. Chemistry						
Semester	**First**	Course Category Code: **MID**				*End Semester Exam Type: **TE**		
Course Code	**A24MAD102C**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**ALLIED MATHEMATICS I**	**3**	**1**	**-**	**4**	**25**	**75**	**100**
(Common to B.Sc. Physics and B.Sc. Chemistry Branches)								

Prerequisite	Basic Electrical Engineering, Laplace Transform	
Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 Find Eigen values and Eigen vectors, diagonalization of a matrix.	**K2**
	CO2 Find expansion of trigonometric values and solution of trigonometric solution.	**K3**
	CO3 Analyze and solve Differential Equations.	**K4**
	CO4 Understand the different types of integration.	**K3**
	CO5 Solve double and Triple integral problems.	**K3**

UNIT-I	**MATRICES**	**Periods: 12**
Definitions - Rank of a Matrix- Consistency of system of equations - Characteristic equation -Eigen values and Eigen vectors of a real matrix- Diagonalization of matrices - Properties of Eigen values and Eigen vectors.		**CO1**

UNIT-II	**TRIGNOMETRY**	**Periods: 12**
Expansions of cos nθ, sin nθ, tan nθ in terms of θ - Powers of sines and cosines of θ in terms of functions of multiples of θ – Expansions of sin θ and cos θ in a series of ascending powers of θ.		**CO2**

UNIT-III	**DIFFERENTIAL EQUATION**	**Periods: 12**
Linear differential equations with constant coefficients - simultaneous linear differential equations - Solution by variation of parameter method.		**CO3**

UNIT-IV	**DEFINITE INTEGRALS**	**Periods: 12**
Definite integrals – Integration by parts - Reduction formula.		**CO4**

UNIT-V	**MULTIPLE INTEGRALS**	**Periods: 12**
Multiple Integrals - change of order of integration - Applications: Areas by double integration and volumes by triple integration(Cartesian).		**CO5**

Lecture Periods: 45	**Tutorial Periods: 15**	**Practical Periods: -**	**Total Periods: 60**

Text Books

1.S. Durai Pandian and Laxmi Durai Pandian (1984) *Trigonometry*. Emerald Publishers, Chennai.

2. M.K. Venkataraman, Engineering Mathematics (First Year), 2rd Edition, The National PublishingCompany, Madras, 2001.

3. Shanti Narayan, "Integral Calculus", S Chand & Co. New Delhi, 2001.

Reference Books

1. A. Singaravelu "Algebra and Trigonometry", Vol.-I Meenakshi Agency, Chennai (2003).
2. P.R. Vittal,"Trigonometry, Margham" Publications, Chennai.(2004)
3. P. Kandasamy, K. Thilagavathy, "Mathematics of B.SC", Vol I & II, S. Chand Company Ltd, NewDelhi — 2004.
4. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley, Tenth edition, 2019
5. B.V.Ramana, "Higher Engineering Mathematics", Tata McGraw-Hill, New Delhi, Sixth edition 2018.

Web References

1. https://nptel.ac.in/courses/111/105/111105122/
2. https://www.khanacademy.org/math/precalculus/x9e81a4f98389efdf:trig/x9e81a4f98389efdf:inverse-trig/v/inverse-trig-functions-arcsin
3. https://www.khanacademy.org/math/statistics-probability

4. http://www.yorku.ca/yaoguo/math1025/slides/chapter/kuttler-linearalgebra –slides-Systemsofquation-handout.pdf

5. https://nptel.ac.in/courses/111/105/111105122/

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	3	2	3	2	-	2	3	1
2	3	2	3	2	1	3	2	1
3	3	2	3	3	-	2	3	1
4	2	3	2	-	3	3	2	2
5	3	2	-	3	1	3	2	1

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

***** Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**ENGLISH**	Programme: **B.Sc. Chemistry**						
Semester	**First**	Course Category Code: **MLD**			End Semester Exam Type: **TE**			
Course Code	**A24ENM101C**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**ENGLISH FOR COMPETITIVE EXAMS**	**3**	**0**	**0**	**3**	**25**	**75**	**100**

Prerequisite	Newspaper reading, basic grammar and basic knowledge on Maths	
Course Objectives	This course prepares students for competitive exams like UGC-NET, SLET, UPSC Civil Services by developing English proficiency.	
	To Enhance their knowledge of grammar and stylistics to write better answers	
	To enhance comprehension skills and analyze complex texts	
	To Refine language through improved vocabulary	
	To have comprehend knowledge of the language	
Course Outcomes	***On completion of the course, the students will be able to***	BT Mapping (Highest Level)
	CO1 Demonstrate strong reading comprehension skills and analyse complex texts effectively.	**K3**
	CO2 Write well-structured essays, precise answers, reports, and letters using clear language and grammatical structure.	**K3**
	CO3 Translate passages accurately from English to native language and vice versa.	**K3**
	CO4 Use a wide range of vocabulary and understand idioms, phrases, and figures of speech	**K3**
	CO5 Apply grammar rules and concepts like synonyms, antonyms, concord, and error spotting to produce linguistically sound written work.	**K3**

UNIT-I	**READING COMPREHENSION**	**Periods: 09**
Reading for main idea and details; strategies; Types of reading - skimming, scanning, intensive and extensive reading; Reading comprehension practice using different types of passages		**CO1**
UNIT-II	**FUNCTIONAL GRAMMAR**	**Periods: 09**
Parts of speech; Articles; Prepositions; Subject-verb Agreement; Active/Passive Voice; Idioms and Phrases; Synonyms and Antonyms		**CO2**
UNIT-III	**WRITTEN COMMUNICATION**	**Periods: 09**
Report Writing; Formal and Informal Letters; Summarizing and Paraphrasing; Precis Writing; Notice; Poster making		**CO3**
UNIT-IV	**LISTENING AND SPEAKING SKILL**	**Periods: 09**
Listening and Hearing; Importance of listening skills; Features of effective speech; Simple social exchanges; Dialogue practice; Making persuasive arguments; Elocution		**CO4**
UNIT-V	**STUDY SKILL**	**Periods: 09**
Expanding vocabulary - Note-making; Summarizing; Quoting; Making a references list; Answering exam questions; Understanding the question; Planning the answer; Evaluating the answer.		**CO5**

Lecture Periods: 45	**Tutorial Periods: 0**	**Practical Periods: 0**	**Total Periods: 45**

Text Books

1. Aggarwal, R.S. *Objective General English*. S. Chand Publishing, 2022.
2. Bhatnagar, R.P and Bhargava, Rajul. *English for Competitive Examinations*. Macmillan India Ltd.
3. Green, David. *Contemporary English Grammar: Structures & Composition*. Trinity Press, 2018.
4. Narayanaswami, V. R. *Strengthen Your Writing*. Orient Blackswan, 2009.
5. Sadanand,Kamlesh and Susheela Punitha. *Spoken English; A Foundation Course Part I*.Orient Blackswan; 2011.

Reference Books

1. Swan, Michael. *Practical English Usage*. Oxford University Press, 2013
2. Thorpe, E. and Thorpe, S. *English for Competitive Examinations*. Pearson, 2012.
3. Wallace, Michael J. *Study Skills in English*. Cambridge University Press, 2004.

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https://www.shortform.com/summaries
https://www.duarte.com/resources/
https://www.memorize.academy/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3
1	1	2	2	2	1	2	1	2
2	1	2	1	1	2	1	2	2
3	1	2	1	1	2	2	1	2
4	2	2	2	2	2	1	1	2
5	1	2	1	1	2	2	1	1

Correlation Level

High	Moderate	Low
3	2	1

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

***** Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**TAMIL**	Programme: B.Sc. Chemistry						
Semester	**First**	Course Category Code: **AEC**			*End Semester Exam Type: **TE**			
Course Code	**A24TAT101C**	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**TAMIL – I**	**2**	**0**	**0**	**2**	**25**	**75**	**100**
(Common to **B.A, B.Sc., BBA., B.COM., BCA., B.COM CS.,**)								

Prerequisite	பன்னிரெண்டாம் வகுப்பில் தமிழை ஒரு பாடமாகப் பயின்றிருக்க வேண்டும்.
Course Objectives	• செவ்விலக்கிய தன்மை கொண்ட தமிழ்மொழியின் சிறப்பினை எடுத்துரைப்பதாக இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.
	• இரண்டாயிரம் ஆண்டுகாலத் தமிழின் தொன்மையையும் வரலாற்றையும் அதன் விழுமியங்களையும் பண்பாட்டையும் எடுத்துரைப்பதாக இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.
	• தமிழ் இலக்கியம் உள்ளடக்கத்திலும், வடிவத்திலும் பெற்றமாற்றங்கள், அதன் சிந்தனைகள், அடையாளங்கள் ஆகியவற்றைக் காலந்தோறும் எழுதப்பட்ட இக்கியங்களின் வழியாகக் கூறுவதற்கு இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.
	• வாழ்வியல் சிந்தனைகள், ஒழுக்கவியல் கோட்பாடுகள், சமத்துவம், சூழலியல் எனப் பல கூறுகளை மாணவர்களுக்கு எடுத்துரைக்கும் விதத்தில் இப்பாடத்திட்டம் உருவாக்கப்பட்டுள்ளது.
	• சிந்தனை ஆற்றலைப் பெருக்குவதற்குத் தாய்மொழியின் பங்களிப்பினை உணர்த்த இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.

Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 இலக்கியங்கள் உணர்த்தும் வாழ்வியல் நெறிமுறைகளைப் பேணி நடத்தல்.	**K3**
	CO2 நமது எண்ணத்தை வெளிப்படுத்தும் கருவியாகத் தாய்மொழியைப் பயன்படுத்துதல்.	**K3**
	CO3 தகவல் தெடர்புக்குத் தாய்மொழியின் முக்கியத்துவத்தை உணர்தல்.	**K2**
	CO4 தாய்மொழியின் சிறப்பை அறிதல்.	**K2**
	CO5 இலக்கிய இன்பங்களை நுகரும் திறன்களை வளர்த்தல்.	**K3**

UNIT-I	**இக்கால இலக்கியம்- மரபுக்கவிதைகள்- புதுக்கவிதைகள்- சிறுகதை**	**Periods: 09**

மரபுக்கவிதைகள் - பாரதியார்-வெள்ளிப் பனிமலையின் மீதுலாவுவோம்... (13 பாடல்கள்)- பாரதிதாசன்-புரட்சிக்கவி (பேரன்புக் கொண்டவரே...முதல் - கவிஞனுக்கும் காதலிக்கும் மீட்சிதந்தார் வரை) தங்கப்பா - பனிப்பாறை நுனிகள் - வாழ்க்கை ஓவியம். **புதுக்கவிதைகள்-**அப்துல் ரகுமான் - வடலூரும் வார்தாவும் - யுகி - உயிர்ப்பு (இயற்கையின் எலும்பு முறிப்பு) – **சிறுகதை** -ஆர்.சூடாமணி - சாம்பலுக்குள். **CO1**

UNIT-II	**நாடகம் -உரைநடை- நாவல்**	**Periods: 09**

நாடகம் - பிரபஞ்சன் - முட்டை - **உரைநடை** - இரா.வேங்கடாசலபதி - அந்தக் காலத்தில் காப்பி இல்லை –**நாவல்** - இரா.முருகவேள் - மிளிர்கல் **CO2**

UNIT-III	**பக்தி இலக்கியம் -சைவம்- வைணவம் - கிறித்துவம் - இஸ்லாம்**	**Periods: 09**

பக்தி இலக்கியம் -சைவம்-திருஞானசம்பந்தா - முதல் திருமுறை - தோடுடையசெவியன்...பாடல் மட்டும் - திருநாவுக்கரசர் - நான்காம் திருமுறை - கூற்றாயினவாறு...பாடல் மட்டும்- சுந்தரர் - ஏழாம் திருமுறை - பித்தாபிறைசூடி...பாடல் மட்டும் - மாணிக்கவாசகர் - திருவாசகம் - புல்லாய் புழுவாய்...பாடல் மட்டும் - திருமூலர் - திருமந்திரம் - ஆர்க்கும் இடுமின்...பாடல் மட்டும் - காரைக்காலம்மையார்-திருவிரட்டை மணிமாலை - அன்பால் அடைவதெவ்வாறு...பாடல் மட்டும். **வைணவம்** - பொய்கையாழ்வார் - வையம் தகளியாய்...பாடல் மட்டும் -பூதத்தாழ்வார் - அன்பே தகளியாய்...பாடல் மட்டும் - பேயாழ்வார் - திருக்கண்டேன் பொன்மேனி...பாடல் மட்டும் - நம்மாழ்வார் - திருவாய்மொழி - உளன் எனின்...பாடல் மட்டும் - பெரியாழ்வார் - பெரியாழ்வார் திருமொழி - வாக்குத் தூய்மை...பாடல் மட்டும் -ஆண்டாள் - நாச்சியார் திருமொழி– என்பு உருகி இனவேல்...பாடல் மட்டும் - **கிறித்துவம்** - இரட்சண்ய மனோகரம் - ஆவிக்குறுவெந்துயர்...முதல் உனையல்லது பற்றுதோ வரை - **இஸ்லாம்** - குணங்குடி மஸ்தான் சாகிபு– ரகுமான் கண்ணி -அடைத்த மனக்கோட்டை...முதல் என்கண் வரை **CO3**

UNIT-IV	**சிற்றிலக்கியம் - முத்தொள்ளாயிரம் - உலா- கலம்பகம்- பள்ளு- இடைக்காலப் புலவர்கள்**	**Periods: 09**

சிற்றிலக்கியம் - முத்தொள்ளாயிரம் - 1.வேரறுகைபம்பிச் சுரையாய்...2.மாலை விலைபகர்வார்... 3.என்னை உரையல் ...எனத் தொடங்கும் பாடல்கள் மட்டும் - **உலா** - குலோத்துங்கசோழன் உலா - தாளை அரவிந்தச் சாதி...முதல் நிலவென்றாள் வரை - **கலம்பகம்** -திருவரங்கக்கலம்பகம் - உருமாறிப் பலபிறப்பும்...முதல் ஆடீர் வாசல் வரை - **பள்ளு** - முக்கூடற்பள்ளு - நாட்டுவளம் - கறைபட்டுள்ளது...எனத்தொடங்கும் பாடல் மட்டும் -**தூது**-அழகர் கிள்ளைவிடு தூது - இன்சொல்லை.....முதல் உபதேசமாக உரைப்பாய் வரை **இடைக்காலப் புலவர்கள்** - இராமலிங்க அடிகள் - மஹாதேவமாலை–படித்தேன்...முதல் பொய் **CO4**

உலகியல் வரை – வீரமாமுனிவர் திருக்காவலூர்க் கலம்பகம் - தழை–போதவிழ்ப்...எனத்தொடங்கும் பாடல் மட்டும் - மு.முஹம்மதுதஹா - ∴கௌதுமுஹிய்யித்தீன் பிள்ளைத் தமிழ் - வயிறுபுடைக்க உண்கின்றீர்...பாடல் மட்டும்.		
UNIT-V	**மொழிப்பயிற்சி-இலக்கிய வரலாறு**	**Periods: 09**
மொழிப்பயிற்சி - 1.வலிமிகும் இடங்கள் ,வலிமிகா இடங்கள்.- 2.அகரவரிசைப்படுத்துதல்.-3.நேர்காணல் - **இலக்கிய வரலாறு** - இக்கால இலக்கியம், பக்தி இலக்கியம், சிற்றிலக்கியம் குறித்த பாடப்பகுதியை ஒட்டியது.		**CO5**

Lecture Periods: 45	Tutorial Periods:-	Practical Periods:-	TotalPeriods:45

Text Books

1. **பாரதியார் – பாரதியார் கவிதைகள், Kindle Edition**, Published June 2, 2020.
2. **சிவகுமார். எஸ்., - கொங்குதேர் வாழ்க்கை,** பாடல் தொகுப்பு நூல் - தொகுதி -1 யுனைடெட் ரைட்டர்ஸ், சென்னை -86. முதற்பதிப்பு 2003.
3. **சூடாமணி.ஆர். - தனிமைத் தளிர், தேர்ந்தெடுத்த சிறுகதைகள்,** காலச்சுவடு பதிப்பகம், முதல் பதிப்பு: செப்டம்பர் 2013.
4. **பிரபஞ்சன் - ஜீவநதி (நாடகங்கள்) – கவிதா பப்ளிகேஷன், 8, மாசிலாமணி தெரு, பாண்டிபஜார், தி.நகர், சென்னை -600 017**
5. **முருகவேள். இரா., - மிளிர்கல்,** ஐம்பொழில் பதிப்பகம், திருப்பூர், இரண்டாம் பதிப்பு, 2014.

Reference Books

1. **வல்லிக்கண்ணன், புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும், ஸ்ரீசெண்பகா பதிப்பகம்**, ஜனவரி,1, 2020.
2. **சிற்பிபாலசுப்பிரமணியம் மற்றும் நீலபத்மநாபன் (ப.ஆசி.) – புதிய தமிழ் இலக்கிய வரலாறு, தொகுதி-1,2,3,** சாகித்திய அகாதெமி, புதுடெல்லி, 2013.
3. **பாக்கியமேரி, வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு (செம்மை மற்றும் விரிவுப் பதிப்பு),** பாரிநிலையம். சென்னை,
4. **ஆனந்தன், முனைவர்.சு., - தமிழ் இலக்கிய வரலாறு,** கண்மணி பதிப்பகம், திருச்சி-2. இருபத்தி மூன்றாம் பதிப்பு– 2015.
5. **பரந்தாமனார், அ.கி., - நல்ல தமிழ் எழுத வேண்டுமா,** பாரி நிலையம், சென்னை, 1998.

Web References

1. http://www.tamilvu.org
2. http://www.tamilweb.com
3. http://www.tamilkodal.com
4. www.store.tamillexican.com
5. www.kala.tamilforu.blogspot.com
6. www.noolagam.com

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO 3
1	3	3	3	3	3	3	3	3
2	3	3	3	3	3	3	3	3
3	3	2	3	3	2	3	3	3
4	2	3	2	1	2	2	3	2
5	3	3	3	3	3	3	3	3

Correlation Level: 1: Low, 2: Moderate, 3: High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**FRENCH**	Programme: B.Sc. Chemistry						
Semester	**First**	Course Category Code: **AEC**			*End Semester Exam Type: **TE**			
Course Code	**A24FRT101C**	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**FRENCH I**	**2**	**0**	**0**	**2**	**25**	**75**	**100**
(Common to B.A.., B.SC., and BCA Branches)								

Prerequisite	French language in class 12th		
Course Objectives	To introduce the basics of French language to the students		
	To enable the students to read, understand and write simple sentences		
	To help them to grasp the fundamentals of French grammar		
	To make the students to formulate correct phrases		
	To introduce them French and Francophone countries and their cultures		
Course Outcomes	***On completion of the course, the students will be able to***		BT Mapping (Highest Level)
	CO1	have a general understanding of the language	**K1**
	CO2	analyze and interpret simple phrases written in French	**K2**
	CO3	have the basics of French grammar	**K3**
	CO4	communicate and ask basic questions in French language	**K4**
	CO5	appreciate the diversity and multiplicity of French and Francophone world	**K5**

UNIT-I	**S'introduire**	**Periods:09**	
1. Le francais, les Francais, la France 2. Je m'appelle Elise, et vous ? 3. Saluer, se presenter, remercier 4. Vous dansez ? D'accord 5. Interroger quelqu'un et donner des informations			**CO1**
UNIT-II	**Demander des questions sur quelqu'un**	**Periods:09**	
1. Monica, Yokiko et compagnie 2. Dire ce qu'on l'aime 3. Les voisins de Sophie 4. Demander des informations sur quelqu'un			**CO2**
UNIT-III	**Expliquer quelque chose**	**Periods:09**	
1. Tu vas au Luxembourg ? 2. Dire où on va, dire d'où on vient 3. Nous venons pour l'inscription 4. A vélo, en train, en avion… 5. Expliquer un itinéraire, proposer quelque chose			**CO3**
UNIT-IV	**Poser des questions et commander**	**Periods:09**	
1. Pardon monsieur, le BHV s'il vous plait 2. Au marché 3. Acheter quelque chose, demander le prix 4. On déjeune ici ? 5. Aller au restaurant, comprendre un menu			**CO4**
UNIT-V	**Inviter et proposer quelque chose**	**Periods:09**	
1. On va chez ma copine ? 2. Proposer quelque chose 3. Demander et donner des informations sur quelqu'un 4. Chez Susana 5. Etre invité chez quelqu'un			**CO5**

Lecture Periods: 45	**Tutorial Periods:**	**Practical Periods:-**	**Total Periods: 45**

Text Books

1. Sylvie Poisson Quinton and Michèle Maheo, *Festival 1 Méthode de Français*, CLE editions, 2009
2. Nathalie Hirschsprung and Tony Tricot, *Cosmopolite 1*, Hachette editions, 2017
3. Caroline Veltcheff and Stanley Hilton, *Preparation du Delf A1*, Hachette editions, 2011

Reference Books

1. Régine Mérieux and Yves Loiseau, *Latitudes 1*, Didier editions, 2017
2. Annie Berthet and Emmanuelle Daili, *Alter Ego + A1*, Hachette editions, 2012
3. Bruno Giradeau, *Réussir le Delf A1*, Didier editions, 2019
4. Richard Lescure, *Delf A1 150 Activités,* Langers and CLE, 2005
5. Manisha Verma, *La grammaire élémentaire française*, Notion Press, 2010

Web References

1. https://www.tv5monde.com
2. https://www.rfi.fr
3. https://www.lemonde.fr
4. https://www.frenchpodcasts.com
5. https://www.coursera.org

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (PO)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	3	3	3	3	3	3	3	3
2	3	3	3	3	2	3	3	3
3	3	3	3	3	3	3	2	3
4	2	3	2	2	3	3	3	3
5	3	3	3	3	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

***** Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**Chemistry**	Programme: B.Sc., Chemistry						
Semester	**First**	Course Category Code: **SEC** *End Semester Exam Type: **TE**						
Course Code	**A24CHS101D**	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**VOLUMETRIC ANALYSIS PRACTICAL**	**0**	**0**	**6**	**3**	**50**	**50**	**100**
Pre requisite	Higher Secondary Chemistry Book							
Course Objectives	• To understand about concentration of the solutions							
	• To gain knowledge on acid and base titration with indicator usage							
	• To improve knowledge on permanganometry titration							
	• To understand the principles of chromatography							
	• To learn about basic concepts of crystallization in the purification techniques							

Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 Develop knowledge on preparation of solutions with different concentration	**K2**
	CO2 Analyze acid base titration in the industry level	**K3**
	CO3 Apply the knowledge of permanganometry titration in the chemical industries	**K3**
	CO4 Apply and analyze the chromatography separation concepts	**K3**
	CO5 Use the basic concepts of crystallization in the purification techniques with required apparatus	**K2**

List of Experiments **Periods: 30**

1. Preparation of standard solutions of different Molarities and Normalities.
2. Estimation of HCl by NaOH using a standard Oxalic acid solution
3. Estimation of Na_2CO_3 by HCl using a standard Na_2CO_3 Solution.
4. Estimation of Oxlaic acid by KMnO4 using a standard Oxalic acid solution
5. Estimation of $KMnO_4$ by Thio using a standard Potassium dichromate Solution
6. Estimation of Copper (II) Sulphate by $K_2Cr_2O_7$ solution.
7. Separation of mixtures by Chromatography: Measure the Rf value in each case(combination of two compounds to be given)
8. Identify and separate the components of a given mixture of two amino acids (glycine, aspartic acid, glutamic acid, tyrosine or any other amino acid) by paper chromatography
9. Identify and separate the sugars present in the given mixture by paper chromatography.

Recrystallization of benzoic acid

Lecture Periods:	**Tutorial Periods:**	**Practical Periods:-30**	**Total Periods:30**

Text Books

1. Pandey O.P, Bajpai D.N. &Giri S., “Practical Chemistry (For B.Sc. I, II and III Year Students)”, S. Chand Limited, 1st Edition 1972.
2. Mendam J, Denney RC, Barnes JD, Thomas MJK, “Text book of quantitative chemical analysis”, 6th Edition 2008.
3. Mohammed Awad Ali Khalid, “Redox Principles and advanced application”, 1st Edition, 2017.

Reference Books

1. Venkateswaran. V, Veeraswmay. R, Kulandaivelu. A.R., “Basic Principles of Practical Chemistry”, New Delhi,

Sultan Chand and Sons.,1st Edition,1997.

2. Mendham. J, Denney. R.C, Bames. J.D, and Thomas, M. “Vogel’s Text book of Quantitative Analysis”, Pearson Education. 1st Edition, 1989.
3. Gopalan. R, Subramaniam. P.S, and Rengarajan. K, “Elements of Analytical Chemistry” ,Sultan Chand and Sons.1st Edition, 2004.

Web References

1. https://en.wikipedia.org/wiki/Acid%E2%80%93base_titration
2. https://en.wikipedia.org/wiki/Permanganometry
3. http://staff.buffalostate.edu/nazareay/che112/chromate.htm

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	3	3	2	2	1	3	2	3
2	2	2	3	3	1	2	2	2
3	3	3	3	2	1	2	2	2
4	2	1	2	1	-	1	2	3
5	3	3	3	1	2	3	3	1

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)			End Semester Examination (ESE) Marks	Total Marks
	Model Exam	Record	Attendance		
Marks	30	10	10	50	100

***** Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**ENGLISH**	Programme: B.Sc., Chemistry						
Semester	**First**	Course Category Code: **VAC**			End Semester Exam Type: **TE**			
Course Code	**A24VAC101C**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**UNDERSTANDING INDIA**	**2**	**0**	**0**	**2**	**25**	**75**	**100**
Prerequisite								

Course Objectives	The course aims at enabling the students to acquire and demonstrate the knowledge.		
	Understanding of contemporary India with its historical perspective.		
	The course would also focus on developing an understanding among students of Indian society.		
	Indian knowledge systems and cultural heritage.		
	The constitutional obligations with special emphasis on constitutional values and fundamental rights and duties.		
Course Outcomes	***On completion of the course, the students will be able to***		BT Mapping (Highest Level)
	CO1	Understand India from global, national and local perspectives.	**K3**
	CO2	Understand India in geographical, historical, social, cultural and political settings.	**K4**
	CO3	appreciate the multicultural and multifaceted nature of India.	**K3**
	CO4	Understand about the cultural practice of India	**K3**
	CO5	get a knowledge on India's education system	**K4**

UNIT-I	**GEOGRAPHY OF INDIA**	**Periods: 6**	
• India on the map of the world and its neighbouring countries • Geographical diversities			**CO1**
UNIT-II	**HISTORY OF INDIA**	**Periods: 6**	
• India's Freedom Struggle • An introduction to Indian knowledge systems			**CO2**
UNIT-III	**COMMUNICATING CULTURE**	**Periods: 6**	
• Oral narratives: Myths, tales and folklore • Introduction to the Tribal Cultures of India			**CO3**
UNIT-IV	**INDIAN SOCIAL STRUCTURE**	**Periods: 6**	
• Continuity and change of the Indian Social Structure: Caste, Community, Class and Gender			**CO4**
UNIT-V	**UNDERSTANDING INDIAN POLITY**	**Periods: 6**	
• The evolution of State in India: Nature and origin • Interpretating India: Traditional, Modern and Contemporary • Constitution as a living document			**CO5**

Lecture Periods: 30	**Tutorial Periods: 0**	**Practical Periods: 0**	**Total Periods: 30**

Text Books

1. Ramesh Dutta Dikshit, *Political Geography: Politics of Place and Spatiality of Politics,* Macmillan Education,2020.
2. Deshpande C. D., 1992: India: A Regional Interpretation, ICSSR, New Delhi.
3. Johnson, B. L. C., ed. 2001. Geographical Dictionary of India. Vision Books, New Delhi.
4. Bose D. M., S. N. Sen and B. V. Subbarayappa ed. (1971) *A Concise History of Science in India,* Indian National Science Academy, New Delhi.
5. Chandra, Bipan, Amales Tripathi & Barun De (1972), *Freedom Struggle*, National Book Trust, New Delhi.
6. Husain, S. Abid. (2003). *The National Culture of India*, National Book Trust, New Delhi.
7. Kanak Mital, "A Santhal Myth, Five Elements" & M.D. Subash Chandran, "Peasant Perception of Bhutas, Uttara Kannada" in Prakrti, The Integral Vision, Vol. 1 (Primal Elements – The Oral Tradition,

edited by Baidyanath Saraswati), pp. 119-125; 151-166.
8. A. K. Ramanujan, "'A Flowering Tree': A Woman's Tale", Oral Tradition, 12/1 (1997): 226-243.
9. Stuart H. Blackburn, "The Folk Hero and Class Interests in Tamil Heroic Ballads", Asian Folklore Studies, Vol. 37, No. 1 (1978), pp. 131-149.

Reference Books

1. Gupta, D. (2000). Interrogating caste: understanding hierarchy and difference in Indian society. India: Penguin Books.
2. Rege, S. (1996). Caste and Gender: The Violence Against Women in India. Italy: European University Institute.
3. Xaxa, V. (2008). State, Society, and Tribes: Issues in Post-colonial India. India: Dorling Kindersley (India), licencees of Pearson Education in South Asia.
4. Uberoi, P. (1994). Family, Kinship and Marriage in India. India: Oxford University Press.
5. Robinson, R. (2004). Sociology of Religion in India. India: SAGE Publications.
6. Madhav Khosla. *The Indian Constitution*. New Delhi, Oxford University Press, 2012.
7. Ramachandra Guha. *Makers of Modern India*. Cambridge, Mass., The Belknap Press of Harvard University Press, 2013.
8. Thapar, Romila. *Indian Cultures as Heritage: Contemporary Pasts*. London, Seagull Books, 2021.
9. Venkataraghavan Subha Srinivasan. *The Origin Story of India's States*. Penguin Random House India Private Limited, 25 Oct. 2021.

Web References

1. https://doi.org/10.1177/0038022919680205
2. https://iksindia.org
3. https://www.perlego.com/
4. https://vedicmeet.com/
5. https://www.drishtiias.com/eng

Department	**Chemistry**	Programme: B.Sc., Chemistry						
Semester	**Second**	Course Category Code: **MJD** *End Semester Exam Type: **TE**						
Course Code	**A24CHT203D**	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**GENERAL CHEMISTRY - II**	**4**	**-**	**-**	**4**	**25**	**75**	**100**
Pre requisite	Higher Secondary Chemistry Book							
Course Objectives	• To know the basic concepts of chemical bonding and hybridization • To explain behavior of "S" block elements • To outline Boron family elements • To understand alkanes and cycloalkanes • To know about basic concepts of aromatic compounds							

Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 Explain the basic concepts bonding and hybridization	**K3**
	CO2 Analyze bahaviour of S block elements	**K3**
	CO3 Understand General Characteristics of boron family	**K3**
	CO4 Illustrate nomenclature, physical and chemical properties of alkanes and cycloalkane.	**K3**
	CO5 Outline the chemistry of aromaticity and other chemical properties	**K2**

UNIT-I	**CHEMICAL BONDING AND HYBRIDIZATION**	**Periods:12**

Chemical bond - definition, types of chemical bonds. Ionic or electrovalent bond - Definition, Illustration of the formation of ionic bond (Examples: NaCl, CaF_2), Born Haber cycle. Covalent bond: Definition, types of covalent bond (single, double and triple), Illustration of the formation of covalent bond (Example: HF, H_2O). Coordinate bond: Definition, Illustration of the formation of coordinate bond (Example: H_2O_2, SO_2).Hydrogen bond: Definition, properties, types and significance of hydrogen bonding. Hybridization – concept - VB theory-sp, sp^2, sp^3, sp^3d, sp^3d^2 -VSEPR theory-Geometry of $SnCl_2$, NH_3.Molecular Orbital Theory- Homonuclear (H_2, Li_2) and Heteronuclear (CO, NO) diatomic molecules. **CO1**

UNIT-II	**S -BLOCK ELEMENTS**	**Periods:12**

General characteristics - anomalous behaviour of lithium and beryllium – diagonal relationships of lithium with magnesium and beryllium with aluminium. Preparation, properties and uses of lithium hydride, sodium peroxide, potassium iodide, BeO, $BeCl_2$, calcium carbide, $CaCl_2$, super phosphate of lime, Plaster of Paris and lithopone-Biological importance **CO2**

UNIT-III	**P- BLOCK ELEMENTS (BORON GROUP)**	**Periods:12**

Group 13 (boron group): General Characteristics, extraction of boron, Anomalous behaviour of Boron, Diagonal relationship of boron with silicon, reaction of B with other elements, water, air, acids, alkali, metals and non-metals. Preparation, Properties and structure of diborane. Structure of borazine, boric acid, borohydrides- Hydroboration-Ultramarine. Anomalous behaviour of Aluminium, Inert pair effect of Thallium. **CO3**

UNIT-IV	**ALKANES AND CYCLOALKANES**	**Periods:12**

Alkanes: Preparation (Catalytic hydrogenation, from alkyl halide, By Wurtz reaction, By Corey- House synthesis), Physical and chemical properties (free radical halogenations reaction). Cycloalkanes: Definition, nomenclature, symbols of cycloalkanes Stability: Baeyer's strain theory and its limitations, Sache-Mohr theory. Conformations of cyclohexane. **CO4**

UNIT-V	**AROMATIC COMPOUNDS**	**Periods:12**

Criteria for aromaticity – Huckel's rule– aromatic hydrocarbons – cations and anions – annulenes –heterocyclic compounds – consequences of aromaticity: pKa, solubility and dipole moment – molecular orbital description of aromaticity and anti–aromaticity. Electrophilic aromatic substitution– general mechanism – reaction coordinate diagram – mechanism of halogenation, nitration, sulphonation – principle of microscopic reversibility– Friedel–Craft's acylation – acylation followed by Clemmensen and Wolff–Kishner reductions – Gatterman– Koch carbonylation and Friedel–Craft's alkylation – Stille and Suzuki reactions.	**CO5**

Lecture Periods:60	**Tutorial Periods: -**	**Practical Periods:-**	**Total Periods:60**

Text Books

1. Principles of Inorganic Chemistry, B. R. Puri, L. R. Sharma and K. C. Kalia, Shoban Lal Nagin Chand and Co., New Delhi, 2018.
2. R. T. Morrison and R. N. Boyd, Organic Chemistry, 7th edn., Printice-Hall of India Limited, New Delhi, 2010.
3. Principles of Physical Chemistry, B.R Puri, L.R Sharma, M.S. Pathania, 47 th edition, 2016, Vishal publishing

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Reference Books

1. Inorganic Chemistry, D. F. Shriver, P. W. Atkins, W. H. Freeman and Co, London, 2010.
2. Inorganic Chemistry, J. E. Huheey, E. A. Kieter and R. L. Keiter, Harper Collins, New York, 2006, 4th edn.
3. Madan R.D., "Modern Inorganic Chemistry", S. Chand & Company, New Delhi, 2nd Edition, 2004.

Web References

1.https://www.utdallas.edu/~scortes/ochem/OChem1_Lecture/Class_Materials/05_orbitals_hybrid_geom.pdf

2. https://universe.bits-pilani.ac.in/uploads/Dubai/rusalraj/Aromatic%20Compounds.pdf

3. https://colapret.cm.utexas.edu/courses/Chap2.pdf

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	1	3	3	2	3	3	3	2
2	2	2	2	3	2	2	2	2
3	3	3	3	2	3	3	3	3
4	2	3	3	3	2	3	2	2
5	3	2	3	2	2	2	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Assessment Pattern as per Bloom's Taxonomy

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

***** Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**Chemistry**	Programme: B.Sc., Chemistry						
Semester	**Second**	Course Category Code: **MJD** *End Semester Exam Type: **TE**						
Course Code	**A24CHT204D**	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**PHYSICAL CHEMISTRY- I**	**4**	**-**	**-**	**4**	**25**	**75**	**100**
Pre requisite	Higher Secondary Chemistry Book							
Course Objectives	• To analyze the basic concepts of nuclear chemistry • To explain Nernst distribution law with application • To outline catalysis process • To understand physical properties like distribution, polarization, magnetism, etc • To know about chemistry of polymer							

Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 Explain the basic concepts of nuclear chemistry	**K3**
	CO2 Analyze Nernst distribution law and its applications	**K3**
	CO3 Relate the functions, types and reaction mechanism of catalysts	**K3**
	CO4 Illustrate physical properties of molecules like distribution, polarization, magnetism	**K3**
	CO5 Outline the chemistry of polymer	**K2**

UNIT-I	**NUCLEAR CHEMISTRY & NATURAL RADIOACTIVITY**	**Periods:12**
NUCLEAR CHEMISTRY: Composition of the nucleus - Nuclear forces, Mass defect -'Binding energy – Binding energy per nucleon (Problems related to this) Nuclear stability and Binding energy. NATURAL RADIOACTIVITY: Types of radioactive rays, Detection and measurement of radioactivity - GM counter method and Wilson cloud chamber method, Fajan's - Russell - Soddy group displacement law – illustration, Laws of radioactive disintegration - derivation of radioactive disintegration constant, average life and half-life period (related simple problems).		**CO1**

UNIT-II	**DISTRIBUTION LAW**	**Periods:12**
Nernst Distribution law - thermodynamic derivation – limitations, association of solute in one of the solvent, dissociation of solute in one of the solvent, solute enters into chemical combination with one of the solvent - Applications of Nernst distribution law.		**CO2**

UNIT-III	**CATALYSIS**	**Periods:12**
Definition- different types of catalysts – homogenous and heterogeneous catalysis, acid-base catalysis, enzyme catalysis- Michaelis-Menton mechanism, auto catalysis- catalytic poisoning- promoters.		**CO3**

UNIT-IV	**MOLECULAR PROPERTIES AND STRUCTURE**	**Periods:12**
Electrical properties of molecules - polarization of a molecule in an electric field, Derivation of Clausius - Mosotti equation, Dipole moments and molecular structure, Magnetic properties of molecules - Magnetic permeability - Magnetic susceptibility - Measurement of magnetic susceptibility, Diamagnetism, Paramagnetism, Ferro magnetism and Anti-Ferromagnetism		**CO4**

UNIT-V	**POLYMER CHEMISTRY**	**Periods:12**
Classification of polymers – Functionality – Tacticity, addition and condensation polymerization, Thermoplastic resin and thermosetting resin, number average and weight average molecular weights, Moulding of polymers – injection and compression.		**CO5**

Lecture Periods:60	**Tutorial Periods: -**	**Practical Periods:-**	**Total Periods:60**

Text Books

1. Puri B.R., Sharma L.R. and Pathania M.S., “Principles of Physical chemistry”, Vishal publication, Jalandhar-Delhi, India, 30th Edition, 2007.

2. Billmeyer Jr., F.W, “A text book of Polymer Chemistry”, John Willey and Sons, UK. 3rd Edition,1984.
3. Glasstone S. A., “Text book of Physical Chemistry”, McMillan India Ltd., 1st Edition, 1999..

Reference Books

1. Bahl B.S., Tuli G.D. and ArunBahl, “Essential of Physical chemistry”, S.Chand publications, Ram nagar, New Delhi, India. 1st Edition,2004.
2. Arnikar H.J.,“Essentials of Nuclear Chemistry”, New Age international (P) Ltd., New Delhi, India. 4th Edition,2005.
3. Gowarikar V., et al., “Polymer Science”, Willey Eastern Limited, New York, USA. 1st Edition, 1986.

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1. https://web.gccaz.edu/~lisys52871/00152note/nuclearchangnotes.pdf
2. https://chemistryonline.guru/distribution-law/
3. https://nptel.ac.in/content/storage2/courses/103103026/pdf/mod1.pdf

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	1	3	2	2	3	3	2	2
2	3	2	3	3	2	3	2	2
3	3	3	3	2	3	2	2	3
4	2	3	3	3	2	3	2	3
5	3	2	3	2	2	2	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Assessment Pattern as per Bloom’s Taxonomy

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

***** Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**Mathematics**	Programme: **B.Sc. Chemistry**						
Semester	**Second**	Course Category Code: MID				*End Semester Exam Type: **TE**		
Course Code	**A24MAD205C**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**ALLIED MATHEMATICS II**	**3**	**1**	**0**	**4**	**25**	**75**	**100**
(Common to B.Sc. Physics and B.Sc. Chemistry Branches)								

Prerequisite	Basic Mathematics Knowledge	
Course Objectives	To find solutions of Solenoidal and Irrotational.	
	To bring the knowledge of vector calculus and its application in theorems	
	To understand the concept of complete integrals and general integrals.	
	To learn linear differential equations of higher order with constant coefficients	
	To introduce the concept of correlation and regression.	
Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 Understand the concept of Scalar point functions and Vector point functions	**K3**
	CO2 Apply the various techniques of vector integration in solving Line and surface integrals.	**K3**
	CO3 Understand the use of Lagrange's equations	**K3**
	CO4 Solve higher order differential equations.	**K3**
	CO5 Solve problems related to central tendency and measures of dispersion.	**K2**

UNIT-I	**VECTOR ANALYSIS**	**Periods:12**	
Scalar point functions - Vector point functions – Gradient, divergence and curl - Directional derivatives - Unit to normal to a surface – Solenoidal and Irrotational vector field.			**CO1**
UNIT-II	**VECTOR ANALYSIS (continued)**	**Periods:12**	
Line and surface integrals – Gauss Divergence theorem, Stoke's theorem and Green's theorems (without proofs) - Simple problem based on these Theorems.			**CO2**
UNIT-III	**PARTIAL DIFFERENTIAL EQUATION**	**Periods:12**	
Formation of partial differential equation - complete integrals and general integrals - Equations solvable for p, equations solvable for y and equations solvable for x - Lagrange's equations.			**CO3**
UNIT-IV	**PARTIAL DIFFERENTIAL EQUATION(continued)**	**Periods:12**	
Partial derivatives - Total derivatives - Differentiation of implicit functions - Maxima and Minima of two variables - Partial differential equations of higher order with constant coefficients.			**CO4**
UNIT-V	**STATISTICS**	**Periods:12**	
Measures of central tendency – Arithmetic Mean, Median and Mode – Measures of dispersion – Range and its Coefficient, Standard deviation –Measures of Skewness – Pearson's coefficient of Skewness – Correlation – Rank correlation and regression.			**CO5**

Lecture Periods:45	**Tutorial Periods:15**	**Practical Periods:-**	**Total Periods:60**

Text Books

1. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley, Tenth edition, 2019
2. P. Duraipandian and S. Udayabaskaran, (1997) Allied Mathematics, Vol. I &II. Muhil Publishers, Chennai
3. B.V.Ramana," Higher Engineering Mathematics", Tata McGraw-Hill, New Delhi, Sixth edition 2018.
4. N.P. Bali and Manish Goyal," A Text Book of Engineering Mathematics", Lakshmi Publications, New Delhi, Ninth Edition, 2018

Reference Books

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

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1. http://www.yorku.ca/yaoguo/math1025/slides/chapter/kuttler-linearalgebra –slidesSystemsofquation-handout.pdf
2. https://nptel.ac.in/courses/122/104/122104017/
3. https://nptel.ac.in/courses/111/105/111105122/
4. https://www.khanacademy.org/math/statistics-probability
5. https://www.khanacademy.org/math/precalculus/x9e81a4f98389efdf:trig/x9e81a4f98389efdf:inverse-trig/v/inverse-trig-functions-arcsin

COs/POs/PSOs Mapping

Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	2	2	3	2	3	2	3	2
2	3	3	3	3	1	3	3	1
3	2	3	2	3	3	2	2	2
4	2	3	2	3	3	2	2	2
5	3	2	3	2	1	3	2	1

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

***** Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**ENGLISH**	Programme: **B.Sc. Chemistry**						
Semester	**Second**	Course Category Code: **MLD**			End Semester Exam Type: **TE**			
Course Code	**A24ENM202C**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**PROFESSIONAL COMMUNICATION IN ENGLISH**	**3**	**0**	**0**	**3**	**25**	**75**	**100**
Prerequisite								

Course Objectives	To develop proficiency in all four language skills [LSRW] in the context of professional communication in English.		
	To enhance speaking skills to communicate effectively in various professional settings such as interviews and discussions.		
	To improve reading and comprehension skills to understand spoken and written English in professional and general contexts.		
	To enhance writing skills to effectively convey ideas and information through various written mediums like letters, resumes, emails and reports and		
	To explore the different types of writing.		
Course Outcomes	***On completion of the course, the students will be able to***		BT Mapping (Highest Level)
	CO1	Apply communication skills in order to overcome communication barriers, and adapt individual communication style to different professional contexts effectively.	**K3**
	CO2	Demonstrate proficiency in listening to understand spoken English in various contexts and also to be able to synthesize and summarize important points.	**K3**
	CO3	Exhibit effective speaking skills by communicating eloquently and confidently in professional contexts like seminars, group discussions and interviews by learning to generate ideas and present them in a structured manner.	**K3**
	CO4	Display improved reading skills by comprehending and analysing texts to extract relevant information and identify main ideas to evaluate critically.	**K3**
	CO5	Produce well-written documents like business letters, emails, resumes, essays, reports and professional correspondence utilizing appropriate language and formatting.	**K3**

UNIT-I	**BASIC COMMUNICATION SKILLS**	**Periods: 09**	
Introduction; relevance of communication; communication process; types of communication; barriers to communication; overcoming barriers; frames of reference.			**CO1**
UNIT-II	**LISTENING**	**Periods: 09**	
Types of listening; barriers to effective listening; listening and note taking; identifying important points; extracting salient points to summarize.			**CO2**
UNIT-III	**SPEAKING**	**Periods: 09**	
Public speaking; Setting clear objectives; generating ideas; preparing the speech; seminars; purpose of seminars; making notes to speak from; presentations; structure of presentations; group discussions; types of group discussions and topics; group dynamics; interviews; types of interviews; basic interview structure			**CO3**
UNIT-IV	**READING**	**Periods: 09**	
Comprehension, skimming, scanning, intensive reading, extensive reading, determining vocabulary from word parts and context clues; identifying the central argument as well as details			**CO4**
UNIT-V	**WRITING**	**Periods: 09**	
Functional grammar; spelling and punctuation: vocabulary; common errors; e-mails; resumes; report writing; note-making; description; narration; essay and paragraph writing.			**CO5**

Lecture Periods: 45	**Tutorial Periods: 0**	**Practical Periods: 0**	**Total Periods: 45**

Text Books

1. Billingham, Jo, and Beatrice Baumgartner Cohen. Giving Presentations. Oxford University Press, 2003.
2. Cholij, Mark. Towards Academic English: Developing Effective Writing Skills. CUP, 2007.
3. Dutt, Kiranmai P, et al. A Course in Communication Skills. Cambridge University Press, 2008.
4. Mohan, Krishna, and Meera Banerji. Developing communication skills. Macmillan, 2016.

5. Murphy, Raymond. Intermediate English Grammar. Cambridge University Press, 2012.

Reference Books

1. Prasad, Hari Mohan. How to Prepare for Group Discussion and Interview. Tata McGraw-Hill Publishing Company, 1998.
2. Seely, John. Oxford Guide to Effective Writing and Speaking: How to Communicate Clearly. Oxford University Press, 2013.
3. Tickoo, Champa, and Jaya Sasikumar. Writing with a Purpose. Generic Publishers, 2014. Ur, Penny. Discussions That Work. Cambridge University Press, 1981
4. Ogidi, O. C. Study Speaking: A Course in Spoken English for Academic Purposes. CUP, 1993.

Web References

1. https://unm5.unm.edu/5-research-COMMUNICATION-skills.html
2. https://ebooks.inflibnet.ac.in/mgmtp07/chapter/importance-types-of-listening/
3. https://www.baycollege.edu/_resources/pdf/academics/academic-resources/open-education/principles-public-speaking.pdf
4. https://www.summitlearning.org/docs/63364

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3
1	3	2	2	3	2	2	2	3
2	3	3	2	2	3	2	3	3
3	3	2	3	2	1	2	1	2
4	3	3	3	3	2	1	2	2
5	3	2	2	2	3	2	2	3

Correlation Level

High	Moderate	Low
3	2	1

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

***** Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**TAMIL**	Programme: **B.Sc. Chemistry**						
Semester	**Second**	Course Category Code: **AEC**			*End Semester Exam Type: **TE**			
Course Code	**A24TAT202C**	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**TAMIL – II**	**2**	**0**	**0**	**2**	**25**	**75**	**100**
(Common to **B.A, B.Sc., BBA., B.COM., BCA., B.COM CS.,**)								

Prerequisite	பன்னிரெண்டாம் வகுப்பில் தமிழை ஒரு பாடமாகப் பயின்றிருக்க வேண்டும்.
Course Objectives	• செவ்விலக்கிய தன்மை கொண்ட தமிழ் மொழியின் சிறப்பினை எடுத்துரைப்பதாக இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது. • இரண்டாயிரம் ஆண்டுகாலத் தமிழின் தொன்மையையும் வரலாற்றையும் அதன் விழுமியங்களையும் பண்பாட்டையும் எடுத்துரைப்பதாக இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது. • தமிழ் இலக்கியம் உள்ளடக்கத்திலும், வடிவத்திலும் பெற்றமாற்றங்கள்,அதன் சிந்தனைகள்,அடையாளங்கள் ஆகியவற்றைக் காலந்தோறும் எழுதப்பட்ட இக்கியங்களின் வழியாகக் கூறுவதற்கு இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது. • வாழ்வியல் சிந்தனைகள்,ஒழுக்கவியல் கோட்பாடுகள்,சமத்துவம், சூழலியல் எனப் பல கூறுகளைமாணவர்களுக்கு எடுத்துரைக்கும் விதத்தில் இப்பாடத்திட்டம் உருவாக்கப்பட்டுள்ளது. • சிந்தனை ஆற்றலைப் பெருக்குவதற்குத் தாய்மொழியின் பங்களிப்பினை உணர்த்த இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.

Course Outcome	On completion of the course, the students will be able to		BT Mapping (Highest Level)
	CO1	இலக்கியங்கள் உணர்த்தும் வாழ்வியல் நெறிமுறைகளைப் பேணிநடத்தல்.	**K3**
	CO2	நமது எண்ணத்தை வெளிப்படுத்தும் கருவியாகத் தாய்மொழியைப் பயன்படுத்துதல்.	**K3**
	CO3	தகவல் தெடர்புக்குத் தாய்மொழியின் முக்கியத்துவத்தை உணர்தல்.	**K2**
	CO4	தாய்மொழியின் சிறப்பை அறிதல்.	**K3**
	CO5	இலக்கிய இன்பங்களை நுகரும் திறன்களை வளர்த்தல்.	**K3**

UNIT-I	**காப்பியம்**	**Periods: 09**	
சிலப்பதிகாரம்	- வழக்குரைகாதை–காவியுகுநீரும்...முதல் தோற்றான் உயிர்வரை (8 வரிகள்)		**CO1**
மணிமேகலை	-பளிக்கறைபுக்ககாதை–மதுமலர்க் கூந்தல்...முதல் புறமறிப் பாராய் வரை(106-121வரிகள்)		
பெரியபுராணம்	-இளையான குடிமாறநாயனார் புராணம் - உள்ளம் அன்புகொண்டு...(17ஆவது பாடல் மட்டும்)		
கம்பராமாயணம்	- கும்பகர்ணவதைப்படலம் - உறங்குகின்ற கும்பகன்ன... (45ஆவதுபாடல் மட்டும்)		
தேம்பாவணி	-பாலமாட்சிப்படலம் - ஊட்டினார்அருள்...(229 பாடல் மட்டும்)		
சீறாப்புராணம்	- மழையழைப்பித்தப் படலம் - வேயினைமுறித்து எனத் தொடங்கும (15ஆவதுபாடல் மட்டும்)		

UNIT-II	**பதினெண் கீழ்க்கணக்கு நூல்கள்**	**Periods: 09**	
திருக்குறள்	- வலியறிதல் (48),நெஞ்சொடுகிளத்தல் (125)		**CO2**
நாலடியார்	- அரும்பெறல்...(பாடல் எண்:34)		
சிறுபஞ்சமூலம்	-பூவாதுகாய்க்கும்...(பாடல் எண்:22)		
ஐந்திணைஐம்பது	- சுனைவாய்ச் சிறுநீரை...(பாடல் எண்:38)		
கார்நாற்பது	- கருவிளைகண்மலர்போல் பூத்தன...(பாடல் எண்:34)		
களவழிநாற்பது	- ஞாட்பினுளெஞ்சிய (பாடல் எண்:2)		

UNIT-III	**சங்க இலக்கியம் - எட்டுத்தொகை**	**Periods: 09**	
ஐங்குறுநூறு	-பாடல் எண்:44 -தோழி கூற்று		**CO3**
குறுந்தொகை	- பாடல் எண்:224 - தலைவி கூற்று		
நற்றிணை	- பாடல் எண்:284 - தலைவன் கூற்று		
அகநானூறு	- பாடல் எண்:145 - செவிலி கூற்று		
புறநானூறு	- பாடல் எண்:102 -ஔவையார்		
பரிபாடல்	- பாடல் எண்:3 - திருமால் வாழ்த்து (1-11வரிகள்)		

UNIT-IV	**பத்துப்பாட்டு**	**Periods: 09**	
பொருநராற்றுப்படை- வாரியும் வடித்தும்...முதல் பெருந்தகுபாடினிவரை(25-47)			**CO4**
சிறுபாணாற்றுப்படை- பைந்தனைஅவரை...முதல் வென்றிவேலூர் எய்தின் வரை (164-173)			
பெரும்பாணாற்றுப்படை-பார்வையாத்த...முதல் பதம் மிகப் பருகுவீர்வரை (95-105)			
குறிஞ்சிப்பாட்டு	-அண்ணல் நெடுங்கோடு...முதல் சிவந்தகண்ணேம்வரை(54-61)		
மதுரைக்காஞ்சி	-மைபடுபெருந்தோள்...முதல் பெரும்பெயர்மதுரைவரை (687-699)		
நெடுநல்வாடை	-குளிர்காலக்காட்சி- கல்லென் துவலைத்...முதல் பண்ணுமுறைநிறுப்பவரை (64-70)		

UNIT-V	மொழிப்பயிற்சி,இலக்கிய வரலாறு	Periods: 09	
1.முதல்,கரு,உரிப்பொருள் அறிதல் 2.அலகிட்டுவாய்ப்பாடு 3.அணிகள் அறிதல் **இலக்கிய வரலாறு** காப்பியம்,அறஇலக்கியம்,சங்க இலக்கியம் குறித்தப் பாடப்பகுதியை ஒட்டிய இலக்கிய வரலாறு.			**CO5**
Lecture Periods: 45	**Tutorial Periods:-**	**Practical Periods:-**	**Total Periods:45**

Text Books

1. **சிவகுமார்,எஸ்., -கொங்குதேர்வாழ்க்கை,**பாடல் தொகுப்பு நூல் - தொகுதி -1,யுனைடெட் ரைட்டர்ஸ், சென்னை -86. முதற்பதிப்பு.2003.
2. **சாமிநாதையர் டாக்டர் உ.வே.குறுந்தொகை மூலமும் உரையும்,** டாக்டர்உ.வே.சாமிநாதையர் நூல் நிலையம், வெளியீட்டெண்: 277,பெசன்ட் நகர், சென்னை– 600 090.எட்டாம் பதிப்பு– 2020.
3. **வேங்கடராமன், வித்துவான்.ஹெச். (பதி.) - நற்றிணை மூலமும் உரையும்,**டாக்டர்உ.வே.சாமிநாதையர் நூல் நிலையம், வெளியீட்டெண்: 277, பெசன்ட் நகர், சென்னை– 600 090. எட்டாம் பதிப்பு– 2020.
4. **திருவள்ளுவர்- சேயோன் டாக்டர் - திருக்குறள்,**மயிலைத் திருவள்ளுவர்தமிழ்ச் சங்கம்,184,பிராட்வே,சென்னை 600 108
5. **வேங்கடசாமிநாட்டார்,ந.மு., - கார்நாற்பது,களவழிநாற்பது–**சாரதாபதிப்பகம்,சாந்திஅடுக்ககம், ஸ்ரீகிருஷ்ணபுரம் தெரு, இராயப்பேட்டை,சென்னை -14. முதற்பதிப்பு: 2005.

Reference Books

1. **சிற்பிபாலசுப்பிரமணியம் மற்றும் நீலபத்மநாபன் (ப.ஆசி.) –புதியதமிழ் இலக்கியவரலாறு, தொகுதி-1,2,3,**சாகித்திய அகாதெமி, புதுடெல்லி, 2013.
2. **பாக்கியமேரி, வகைமைநோக்கில் தமிழ் இலக்கியவரலாறு (செம்மை மற்றும் விரிவுப் பதிப்பு),**பாரிநிலையம். சென்னை,
3. **ஆனந்தன். சு. முனைவர்., - தமிழ் இலக்கியவரலாறு,** கண்மணிபதீப்பகம், திருச்சி-2. இருபத்தி மூன்றாம் பதிப்பு– 2015.
4. **பரந்தாமனார்,அ.கி.,நல்லதமிழ் எழுதவேண்டுமா,**பாரிநிலையம், சென்னை, 1998.
5. **சம்பத், இரா., (பதி) -தொல்காப்பியக் கவிதையியல் வடிவம்-பாடுபொருள்-உத்தி-வகைமை,**புதுச்சேரி மொழியியல் பண்பாட்டு ஆராய்ச்சி நிறுவனம், புதுச்சேரி-605 001. முதற்பதிப்பு–அக்டோபர் 2015.

Web References

1. http://www.tamilvu.org
2. http://www.tamilweb.com
3. http://www.tamilkodal.com
4. 4. www.store.tamillexican.com
5. 5.www.kala.tamilforu.blogspot.com
6. 6.www.noolagam.com

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO 3
1	3	3	3	3	3	3	3	3
2	3	3	3	3	3	3	3	3
3	3	2	3	3	2	3	3	3
4	2	3	2	3	2	2	3	2
5	3	2	3	2	3	3	3	3

Correlation Level: 1:Low, 2:Moderate, 3:High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

***** Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**French**	Programme: **B.Sc. Chemistry**						
Semester	**Second**	Course Category Code:**AEC**			*End Semester Exam Type: **TE**			
Course Code	**A24FRT202C**	Periods/ Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**FRENCH II**	**2**	**0**	**0**	**2**	**25**	**75**	**100**

(Common to B.A.., B.SC., AND BCA Branches)

Prerequisite	French-I	
Course Objective	• To introduce the basics of French language to the students	
	• To enable the students to read, understand and write simple sentences	
	• To help them to learn the fundamentals of French grammar	
	• To make the students to formulate correct phrases	
	• To introduce them French and Francophone countries and their cultures	

Course Outcomes	***On completion of the course, the students will be able to***		BT Mapping (Highest Level)
	CO1	Have a general understanding of the language	**K3**
	CO2	Analyze and interpret simple phrases written in French	**K3**
	CO3	Have the basics of French grammar	**K3**
	CO4	Communicate and ask basic questions in French language	**K3**
	CO5	Appreciate the diversity and multiplicity of French and Francophone	**K3**

UNIT-I	**Periods:09**
1. Qu'est-ce qu'on offre? 2. L'interro-négation. 3. On Solde 4. Le comparatif. 5. Les fêtes	**CO1**
UNIT-II	**Periods:09**
1. Découvrir Paris en bus avec l'open tour. 2. Les verbes pronominaux 3. Si vous gagnez, vous ferez quoi? 4. Le futur simple 5. Les superlatifs.	**CO2**
UNIT-III	**Periods:09**

1. Parasol ou parapluie 2. Le climat en France. 3. Quand il est midi à Paris? 4. L'emploi du temps:métro, boulot, restau. 5. Parler du temps qu'il fait.	**CO3**
UNIT-IV	**Periods:09**
1. Vous allez vivre à Paris? 2. Les régions de France 3. L'avenir du français. 4. La place des adjectifs. 5. Souvenirs d'enfance.	**CO4**
UNIT-V	**Periods:09**
1. J'ai fait mes études à Lyon. 2. Retour des Antilles 3. Raconter ses vacances. 4. Au voleur! Au voleur! 5. Les journaux en France.	**CO5**

Lecture Periods:45	**Tutorial Periods:**	**Practical Periods:-**	**Total Periods:45**

Text Books

1. Sylvie Poisson Quinton and Michèle Maheo, ***Festival 1 Méthode de Français***, CLE editions, 2009 (Leçon-13 to Leçon-24) (p.74-131)

Reference Books

1. Régine Mérieux and Yves Loiseau, *Latitudes 1*, Didier editions, 2017
2. Annie Berthet and Emmanuelle Daili, *Alter Ego + A1*, Hachette editions, 2012
3. Bruno Giradeau, *Réussir le Delf A1*, Didier editions, 2019

Web References

1. https://www.tv5monde.com
2. https://www.rfi.fr
3. https://www.lemonde.fr
4. https://www.frenchpodcasts.com
5. https://www.coursera.org

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (PO)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	3	3	3	3	3	1	2	3
2	3	3	3	3	3	1	2	3
3	3	3	3	3	3	1	2	3
4	2	3	3	3	3	1	2	3
5	1	2	1	1	1	1	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

***** Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**Chemistry**	Programme: B.Sc., Chemistry						
Semester	**Second**	Course Category Code: **SEC** *End Semester Exam Type: **PE**						
Course Code	**A24CHS202D**	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**ORGANIC QUALITATIVE ANALYSIS PRACTICAL**	**0**	**0**	**6**	**3**	**50**	**50**	**100**
Pre requisite	Higher Secondary Chemistry Book							
Course Objectives	• To identify the functional groups of unknown organic compounds. • To know the elements present in the compounds • To understand saturated / unsaturated compounds • To realize the nature of aliphatic / aromatic compounds • To visualize confirmatory tests of various functional groups							

Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 Learn to approach a problem systematically and to interpret the result logically	**K2**
	CO2 Detect various functional groups present in an organic compound	**K3**
	CO3 Understand about Saturation and unsaturation nature of compounds	**K3**
	CO4 Identify aliphatic and aromatic compounds	**K3**
	CO5 Visualize confirmatory tests of various functional groups	**K2**

List of Experiments — **Periods: 30**

ANALYSIS OF ORGANIC COMPOUNDS

- Preliminary tests
- Detection of elements present
- Aromatic or Aliphatic
- Saturated or Unsaturated
- Nature of the functional group
- Confirmatory tests and Preparation of derivatives for the functional groups.

THE FOLLOWING FUNCTIONAL GROUP COMPOUNDS MAY BE GIVEN:

Aldehydes, Ketones, Amines, Amides, Diamide, Carbohydrates, Phenols, Acids, Esters and Nitro compounds.

Lecture Periods:	**Tutorial Periods:**	**Practical Periods:-30**	**Total Periods:30**

Text Books

1. Rageeb Md. Usman, Dr. Sunila T, "Practical Hand Book of Systematic Organic Qualitative Analysis", Unicorn Publication Pvt. Ltd,1st Edition, 2015.
2. Israel Arthur Vogel , "Vogel's Textbook of Practical Organic Chemistry", Wiley Edition: 1st Edition, 1989.
3. Arthur Israel Vogel, "Elementary Practical Organic Chemistry"Prentice Hall Press; 3rd Edition, 1980.

Reference Books

1. Venkateswaran. V, Veeraswmay. R, Kulandaivelu. A.R., "Basic Principles of Practical Chemistry", New Delhi, Sultan Chand and Sons.2nd Edition, 1997.
2. Mendham. J, Denney. R.C, Bames. J.D, and Thomas, M. "Vogel's Text book of Quantitative Analysis", Pearson Education,1st Edition,1989.
3. Gopalan.R, Subramaniam.P.S and Rengarajan.K, "Elements of Analytical Chemistry", Sultan Chand and Sons,1st Edition, 2004.

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.1. https://assets.cambridge.org/97805212/91125/frontmatter/9780521291125_frontmatter.pdf
2. https://www.csub.edu/chemistry/organic/manual/Lab14_QualitativeAnalysis.pdf
3. http://rushim.ru/books/praktikum/Mann.pdf

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	3	3	2	2	1	3	2	3
2	2	2	3	3	1	2	2	2
3	3	3	3	2	1	2	2	2
4	2	1	2	1	-	1	2	3
5	3	3	3	1	2	3	3	1

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)			End Semester Examination (ESE) Marks	Total Marks
	Model Exam	Record	Attendance		
Marks	30	10	10	50	100

***** Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**Chemistry**	Programme:B.Sc. Chemistry						
Semester	**SECOND**	Course Category Code: **VAC**				End Semester Exam Type: **TE***		
Course Code	**A24VAC202C**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**ENVIRONMENTAL STUDIES**	**2**	**-**	**-**	**2**	**25**	**75**	**100**

(Common to B.A.., B.SC.,B.Com ., B.B.A and BCA Programmes)

Prerequisite	Basic Knowledge and awareness on Environmental Studies.		
Course Objective	To gain knowledge on the importance Multidisciplinary nature of Environmental Studies		
	To know the Natural Resources, Renewable and Non-renewable Resources		
	To know about Ecosystems		
	To know the Biodiversity and its conservation		
	To gain knowledge on Environmental Pollution		
Course Outcome	**On completion of the course, the students will be able to:**		BT Mapping (Highest Level)
	CO1	Understand the Multidisciplinary nature of environmental studies.	**K2**
	CO2	Explains about the Natural Resources, Renewable and Non-renewable Resources.	**K2**
	CO3	Describes the concepts of Ecosystems.	**K2**
	CO4	Able to discuss on Biodiversity and its conservation	**K2**
	CO5	Describes the concepts of Environmental Pollution.	**K2**

UNIT - I	**Multidisciplinary nature of environmental studies**	**Periods:6**
Definition, scope and importance; Need for public awareness. Environmental ethics: Issues and possible solutions. Environment Protection Act.		**CO1**
UNIT - II	**Natural Resources, Renewable and Non-renewable Resources**	**Periods: 6**
Forest resources: Use and over-exploitation, deforestation, Timber extraction. Water resources: Use and over-utilization of surface and ground water, floods, drought, dams-benefits and problems. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture. Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources. Land resources: Land as a resource, land degradation, soil erosion and desertification.		**CO2**
UNIT - III	**Ecosystems**	**Periods: 6**
Concept of an ecosystem. Structure and function of an ecosystem. Energy flow in the ecosystem. Food chains, food webs and ecological pyramids. Characteristic features, structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystems.		**CO3**
UNIT - IV	**Biodiversity and its conservation**	**Periods: 6**
Introduction - Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India, India as a mega-diversity nation. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic values. Hot-sports of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.		**CO4**
UNIT - V	**Environmental Pollution**	**Periods: 6**
Definition, cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution and Nuclear hazards. Solid waste management: Causes, effects and control measures of urban and industrial wastes. Disaster management: floods, earthquake, cyclone and landslides.		**CO5**

Lecture Periods: 30	**Tutorial Periods: -**	**Practical Periods: -**	**Total Periods: 30**

Text Books

1. Odum, E. P., Barrett G., W., 2011, Fundamentals of Ecology, 5th edition, Cengage Learning.

2. Sharma, P. D., 2011. Ecology and Environment, Rastogi Publications.
3. Basu Mahua, Savarimuthu Xavier 2017. Fundamentals of Environmental Studies. 2nd Edition Cambridge Publications.

Reference Books

1. Karunanidhi N. 2004. Environmental Studies. Jazym Publications.
2. Rajamannar 2004. Environmental Studies. EVR College Publications.
3. Kalavathy S. 2004. Environmental Studies. Bishop Heber College Publications.

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1. https://onlinecourses.swayam2.ac.in/cec24_ge05/preview
2. https://onlinecourses.nptel.ac.in/noc23_hs155/preview
3. https://moef.gov.in/
4. https://www.india.gov.in/official-website-ministry-environment-and-forests-0
5. https://igod.gov.in/sector/_xNsIHQBsvhI6u6Q3tfu/organizations

** TE - Theory Exam*

COs/POs/PSOs Mapping

Cos	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	2	1	2	3	1	2	3	2
2	3	3	2	3	2	1	2	2
3	2	3	3	2	1	3	1	3
4	3	2	2	2	2	2	2	3
5	3	3	3	2	2	3	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment	Attendance		
Marks	10		5	5	5	75	100

Department	**Chemistry**	Programme: **B.Sc. Chemistry**						
Semester	**Second**	Course Category Code: **EEC**			*End Semester Exam Type:			
Course Code	**A24CHC202D**				Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**Microsoft Excel Expert**	**0**	**0**	**4**	**0**	**100**	**0**	**100**
Prerequisite	Basic Computer knowledge							

Microsoft Office Specialist Program

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Microsoft Excel Expert (Microsoft 365 Apps and Office 2019): Exam MO-201

The Microsoft Office Specialist: Excel Expert Certification demonstrates competency in creating, managing, and distributing professional spreadsheets for a variety of specialized purposes and situations. The exam covers the ability to customize Excel environments to meet project needs and to enhance productivity. Expert workbook examples include custom business templates, multiple-axis financial charts, amortization tables, and inventory schedules.

An individual earning this certification has approximately 150 hours of instruction and hands-on experience with the product, has proven competency at an industry expert-level and is ready to enter into the job market. They can demonstrate the correct application of the principal features of Excel at an expert-level and can complete tasks independently.

Microsoft Office Specialist Program certification exams use a performance-based format testing a candidate's knowledge, skills and abilities using the Microsoft 365 Apps and Office 2019 programs:

- Microsoft Office Specialist Program exam task instructions generally do not include the command name. For example, function names are avoided, and are replaced with descriptors. This means candidates must understand the purpose and common usage of the program functionality in order to successfully complete the tasks in each of the projects.
- The Microsoft Office Specialist Program exam format incorporates multiple projects as in the previous version, while using enhanced tools, functions, and features from the latest programs.

Objective Domains

Manage Workbook Options and Settings

1.1 Manage workbooks
- 1.1.1 Copy macros between workbooks
- 1.1.2 Reference data in other workbooks
- 1.1.3 Enable macros in a workbook
- 1.1.4 Manage workbook versions

1.2 Prepare workbooks for collaboration
- 1.2.1 Restrict editing
- 1.2.2 Protect worksheets and cell ranges
- 1.2.3 Protect workbook structure
- 1.2.4 Configure formula calculation options
- 1.2.5 Manage comments

1.3 Use and configure language options
- 1.3.1 Configure editing and display languages
- 1.3.2 Use language-specific features

Microsoft Office Specialist Program is the only official Microsoft-recognized certification program for Microsoft Office globally.

Microsoft

Microsoft Excel Expert (Microsoft 365 Apps and Office 2019)

Manage and Format Data

2.1 Fill cells based on existing data

- 2.1.1 Fill cells by using Flash Fill
- 2.1.2 Fill cells by using advanced Fill Series options

2.2 Format and validate data

- 2.2.1 Create custom number formats
- 2.2.2 Configure data validation
- 2.2.3 Group and ungroup data
- 2.2.4 Calculate data by inserting subtotals and totals
- 2.2.5 Remove duplicate records

2.3 Apply advanced conditional formatting and filtering

- 2.3.1 Create custom conditional formatting rules
- 2.3.2 Create conditional formatting rules that use formulas
- 2.3.4 Manage conditional formatting rules

Create Advanced Formulas and Macros

3.1 Perform logical operations in formulas

- 3.1.1 Perform logical operations by using nested functions including the IF(), IFS(), SWITCH(), SUMIF(), AVERAGEIF(), COUNTIF(), SUMIFS(), AVERAGEIFS(), COUNTIFS(), MAXIFS(), MINIFS(), AND(), OR(), and NOT() functions

3.2 Look up data by using functions

- 3.2.1 Look up data by using the VLOOKUP(), HLOOKUP(), MATCH(), and INDEX() functions

3.3 Use advanced date and time functions

- 3.3.1 Reference date and time by using the NOW() and TODAY() functions
- 3.3.2 Calculate dates by using the WEEKDAY() and WORKDAY() functions

3.4 Perform data analysis

- 3.4.1 Summarize data from multiple ranges by using the Consolidate feature
- 3.4.2 Perform what-if analysis by using Goal Seek and Scenario Manager
- 3.4.3 Forecast data by using the AND(), IF(), and NPER() functions
- 3.4.4 Calculate financial data by using the PMT() function

3.5 Troubleshoot formulas

- 3.5.1 Trace precedence and dependence
- 3.5.2 Monitor cells and formulas by using the Watch Window
- 3.5.3 Validate formulas by using error checking rules
- 3.5.4 Evaluate formulas

3.6 Create and modify simple macros

- 3.6.1 Record simple macros
- 3.6.2 Name simple macros
- 3.6.3 Edit simple macros

Manage Advanced Charts and Tables

4.1 Create and modify advanced charts

- 4.1.1 Create and modify dual axis charts
- 4.1.2 Create and modify charts including Box & Whisker, Combo, Funnel, Histogram, Map, Sunburst, and Waterfall charts

4.2 Create and modify PivotTables

- 4.2.1 Create PivotTables
- 4.2.2 Modify field selections and options
- 4.2.3 Create slicers
- 4.2.4 Group PivotTable data
- 4.2.5 Add calculated fields
- 4.2.6 Format data

4.3 Create and modify PivotCharts

- 4.3.1 Create PivotCharts
- 4.3.2 Manipulate options in existing PivotCharts
- 4.3.3 Apply styles to PivotCharts
- 4.3.4 Drill down into PivotChart details

Microsoft