MANONMANIAM SUNDARANAR UNIVERISTY,
TIRUNELVELI-12

SYLLABUS

UG - COURSES – AFFILIATED COLLEGES

Course Structure for B. Sc. Chemistry
(Choice Based Credit System)
(with effect from the academic year 2026-2027 onwards)

Semester-I				
Part	**Subject Status**	**Subject Title**	**Subject Code**	**Credit**
I	LANGUAGE	TAMIL	H1TL11	3
II	ENGLISH	ENGLISH	H2EN11	3
III	CORE	GENERAL CHEMISTRY-1	HCCH11	5
III	CORE	PRACTICAL - QUANTITATIVE INORGANIC ESTIMATION	HCCHP1	3
III	ELECTIVE MATHEMATICS/ ZOOLOGY	ALLIED MATHEMATICS I	HEMA11	5
		ALLIED ZOOLOGY I	HEZO11	3
		PRACTICAL - ALLIED ZOOLOGY	HEZOP1	2
IV	SEC 1	FOOD CHEMISTRY	HSCH11	2
IV	FC	FOUNDATION COURSE IN CHEMISTRY	HFCH11	2

Total Marks: 100 Internal Exam: 25 marks + External Exam: 75 marks

A. **Scheme for internal Assessment**:
Maximum marks for written test: **20 marks**
3 internal tests, each of **I hour** duration shall be conducted every semester.
To the average of the **best two** written examinations must be added the marks scored in. The **assignment** for 5 marks.

The break up for internal assessment shall be:
Written test- 20 marks; Assignment -5 marks Total - 25 marks

B. Scheme of External Examination
3 hrs. examination at the end of the semester
A – Part : 1 mark question two - from each unit
B – Part : 5 marks question one - from each unit
C – Part : 8 marks question one - from each unit

- **Conversion of Marks into Grade Points and Letter Grades**

S.No	Marks	Letter Grade	Grade point (GP)	Performance
1	90-100	O	10	Outstanding
2	80-89	A+	9	Excellent
3	70-79	A	8	Very Good
4	60-69	B+	7	Good
5	50-59	B	6	Above Average
6	40-49	C	5	Pass
7	0-39	RA	-	Reappear
8	0	AA	-	Absent

- **Cumulative Grade Point Average (CGPA)**

$$\mathbf{CGPA} = \frac{\mathbf{\Sigma\,(GP \times C)}}{\mathbf{\Sigma C}}$$

- **GP** = Grade point, **C** = Credit
- CGPA is calculated only for Part-III courses
- CGPA for a semester is awarded on cumulative basis

- **Classification**
  a) First Class with Distinction : CGPA $\geq$ 7.5*****
  b) First Class : CGPA $\geq$ 6.0
  c) Second Class : CGPA $\geq$ 5.0 and $<$ 6.0
  d) Third Class : CGPA$<$ 5.0

PART - I பொதுத்தமிழ் I
நீதி இலக்கியங்களும் பக்தி இலக்கியங்களும்

அலகு 1

இலக்கிய அறிமுகம்

அ. நீதி இலக்கியங்கள் அறிமுகம் பதினெண் கீழ்க்கணக்கு நூல்கள்

1. திருக்குறள்
2. நாலடியார்
3. நான்மணிக்கடிகை
4. இன்னா நாற்பது
5. இனியவை நாற்பது
6. திரிகடுகம்
7. ஆசாரக் கோவை
8. பழமொழி
9. சிறுபஞ்சமூலம்
10. ஏலாதி
11. முதுமொழிக்காஞ்சி
12. கார் நாற்பது
13. ஐந்திணை எழுபது
14. ஐந்திணை ஐம்பது
15. திணைமொழி ஐம்பது
16. திலைமாலை நூற்றைம்பது
17. கைந்நிலை
18. களவழி நாற்பது

பிற நீதிநூல்கள்

1. ஆத்திசூடி - ஔவையார்
2. கொன்றைவேந்தன் - ஔவையார்
3. மூதுரை - ஔவையார்
4. நல்வழி - ஔவையார்
5. அறநெறிச்சாரம் - முனைப்பாடியார்
6. வெற்றிவேற்கை - அதிவீரராம பாண்டியர்
7. நீதிநெறிவிளக்கம் - குமரகுருபரர்
8. நன்னெறி - துரைமங்கலம் சிவப்பிரகாசர்
9. உலகநீதி - உலகநாதன்
10. நீதிநூல் - மாயூரம் வேதநாயகம்பிள்ளை

புதிய ஆத்திசூடிகள்

1. புதிய ஆத்திசூடி - பாரதியார்
2. இளையார் ஆத்திசூடி - பாரதிதாசன்
3. தமிழ்சூடி - வ.சுப.மாணிக்கம்
4. நெறிசூடி - நாரா. நாச்சியப்பன்
5. அறிவியல்சூடி - ச.மெய்யப்பன்
6. ஆய்வுகுடி - தமிழண்ணல்
7. நீதிசூடி - புலவர் சோம. இளவரசு

ஆ. பக்தி இலக்கியங்கள் அறிமுகம்

1. பன்னிரு திருமுறைகள்
2. சைவத் திருமடங்கள்
3. நாலாயிரத் திவ்வியப் பிரபந்தம்
4. கிறித்துவ சமயத் தமிழ் இலக்கிய வளர்ச்சி
5. இஸ்லாம் சமயத் தமிழ் இலக்கிய வளர்ச்சி

அலகு 2

நீதி இலக்கியங்கள் (செய்யுள்))

1. திருக்குறள் அறன் வலியுறுத்தல் (4 வது அதிகாரம்) 10 குறள்கள்
2. நாலடியார் - கல்வி (14 ஆவது அதிகாரம்) 10 பாடல்கள்
3. நான்மணிக்கடிகை நிலத்துக்கு அணிஎன்ப - 9ஆவது பாடல்
4. பழமொழி நானூறு தந் நடைநோக்கார் - 288 ஆவது பாடல்
5. இனியவை நாற்பது இளமையை மூப்பென்று -37ஆவது பாடல்
6. முதுமொழிக்காஞ்சி எளிய பத்து 10 பாடல்கள்
7. நல்வழி முதல் ஐந்து பாடல்கள்
8. நீதிநெறி விளக்கம் முதல் ஐந்து பாடல்கள்

அலகு -3

பக்தி இலக்கியங்கள்

1. முதல் 3 பாடல்கள் 1 திருநாவுக்கரசர் நின்ற திருத்தாண்டகம்
2. மாணிக்கவாசகர் - சிவபுராணம் முதல் 10 வரிகள்
3. பொய்கையாழ்வார் முதல் திருவந்தாதி - முதல் 2 பாடல்கள்
4. பூதத்தாழ்வார் இரண்டாம் திருவந்தாதி முதல் 3 பாடல்கள்
5. ஆண்டாள் - திருப்பாவை முதலாவது பாடல்
6. திரு.வி.க - கிறிஸ்து மொழிக்குறள் - 5 குறள்கள்
7. குணங்குடி மஸ்தான் சாகிபு பராபரக்கண்ணி 5 கண்ணிகள்

அலகு -4

உரைநடை

நூற்றாண்டு கண்ட ஆளுமைகள் த.அறம் (1-4)

1. இலக்கியப் பேரொளி தொ.மு.சி. ரகுநாதன்
2. திசைகாட்டி கு.அழகிரிசாமி
3. பொதுவுடைமைக் கவிஞர் தமிழ் ஒளி
4. கரிசல் இலக்கியத் தந்தை கி ராஜநாராயணன்
5. சங்க இலக்கியத்தில் குலக்குறியீடு பேராசிரியர் பா. ஆனந்தகுமார்.

அலகு -5

மொழிப்பயிற்சி ஒற்றுப்பிழைத் தவிர்த்தல்

1. வல்லினம் மிகும் இடங்கள்
2. வல்லினம் மிகா இடங்கள்
3. ஈர்ஒற்று வரும் இடங்கள்
4. ஒரு.ஒர் வரும் இடங்கள்
5. அதுஇ அஃது வரும் இடங்கள்
6. தான்இ தாம் வரும் இடங்கள்

MALAYALAM
PAPER I- PROSE, COMPOSITION AND TRANSLATION

Unit 1

This unit focus on the importance of Malayalam fiction, -the origin and development of Malayalam Short story –renaissance in short story—Thakazhi-Basheer-Karoor- -Navothana katha:

For detailed study:

1. Marappavakal- Karoor Neelakantappilla.
2. Uthuppante kinar.-Karoor Neelakantappilla.
3. Ezhunnallathuduty-Karoor Neelakantappilla.

Unit II

Kathayum adhunikathayum- To familiarize – Romanticism -Modernism, Plot and narration in modern short stories

For detailed study:

1. Neippayasam –Madhavikutty
2. Kadaltheerathu-.O.V.Vijayan
3. Radha radhamathram-M.Mukundan

Unit III

Samakala katha– Post modernism- Globalization-Women –Dalit- Cyber – Environmental issues in short stories- The theme, structure and narrative style of the authors -comparison-

For detailed study:

1. Viyarppadayalangal-Sara Joseph
2. Jwala - Priya .A.S
3. Vartha sareeram –Santhosh Echikkanam
4. Otta vaikkol viplavam –V.J.James

Unit IV

This unit briefs the history of Malayalm Novel- major works, romantic period- of M T Vasudevan Nair , narrative style of Nalukettu- craft and characterization in Nalukettu

Unit V

This unit focus on Translation, Word level and syntactic level and also discuss the writing style of Essay- introduce proverbs and paraphrasing in Malayalam

Recommened Texts

1. Marappavakalum mattu kathakalum – Karoor Neelakantapilla. (only 3 stories (a.)Marappavakal (b)Uthuppante kinar (c) Ezhunnallathuduty))
2. Nalukettu- .Novel -M.T.Vasudevan Nair

Reading list (print and online)

1. Adhunika Malayala Sahithya Charithram Prasthanangalilude – Dr. K.M.George (Ed.)
2. Cherukadha Innale Innu - M.Achuthan
3. Kadha Thedunna Kadha - N.Prabhakaran
4. M.T. Vakkinte Vismayam – V.R.Sudheesh
5. Kadhayum Kalavum –K.S.Ravikumar
6. Malayala Novalilee Desakaalangal- E. Ramkrishnan
7. Maranunna Malayala Noval- K.P. Appan
8. Andhanaya Daivam- P.K.Rajasekharan
9. Shyalee shilppam- Dr.K.M. Prabhakra Warier
10. Bhasha gadhyam- C.V. Vasudeva Bhattathiri
11. Karur Kadha patanam- M.M.Basheer

GENERAL HINDI – I

इकाई 1: बुनियादी हिन्दी (Unit 1: Basic Hindi)
दिन, दिशा, तरकारी, फल, रंग,
शरीर के अंग और रिश्तेदारों के नाम,
दिनों के नाम, महीनों के नाम,
लिंग, वचन । (change the gender & Singular plural)

इकाई 2: व्याकरण 1 (Unit 2: Grammar 1)
संज्ञा, सर्वनाम
विशेषण, क्रिया,
क्रिया विशेषण
काल

इकाई 3: कहानियाँ (Unit 3: Stories)
तकिया – चित्तरंजन भारती
उनका स्नेह – चंद्रशेखर दुबे
न्याय – कन्हैयालाल गौड़
बेटी का हिस्सा – श्यामसुंदर अग्रवाल

इकाई 4: हिंदी साहित्य का इतिहास – आदिकाल
(Unit 4: History of Hindi Literature – Adikal)
परिचय
प्रमुख विशेषताएँ
प्रमुख कवि एवं रचनाएँ
सामाजिक परिस्थितियाँ

इकाई 5: अपठित गद्यांश (answer the following questions according to the Comprehension Passages)
पाँच अपठित गद्यांश 1-5

Text Book:
Material prepared by the Course Teacher.

Reference Books:

1. Unit 1 - Hindi Vathyayan ,Dr.K.M.Chandra Mohan, Viswavidyalaya Prakashan, Chowk, Varanasi
2. Unit 2 – Madhyama Patya pustak, Dhakshin Bharath Hindi Prachar Sabha, Thyagarajanagar, Chennai, 2022
3. Unit 3 - Visharad poorvardh patya pusthak- pahala pathra - kahani Dhakshin Bharat Hindi Prachar Sabha, Chennai, 2025
4. Unit 4 - Hindi Sahithya ka Ithihas, Dr. Mohan Singh, Millind Prakashan, Hyderabad.
5. Unit 5 – Madhyama Patya pustak, Dhakshin Bharath Hindi Prachar Sabha, Thyagarajanagar, Chennai, 2022

PART - II GENERAL ENGLISH - I

UNIT – I

PROSE

1. The Power of Prayer - APJ Abdul Kalam
2. On the love of life - William Hazlitt
3. Nature (Chapter 1) - R. W. Emerson
4. Forgetting - Robert Lynd

UNIT – II

POETRY

1. The Flower-School - Rabindranath Tagore
2. Love After Love - Derek Walcott
3. Don't Quit - Edgar Albert Guest
4. Night - Wole Soyinka

UNIT – III

SHORT STORY

1. The Missing Mail - R K Narayan
2. Two Gentlemen of Verona - A.J. Cronin.
3. A Real Durban - Jhumpa Lahiri
4. Girls at War - Chinua Achebe

UNIT – IV

GRAMMAR PARTS OF SPEECH

1. Noun, Kinds of Nouns, Gender, Number, Case
2. Pronoun - Personal, Emphatic, Demonstrative, Indefinite, distributive, Relative and Interrogative
3. Adjective, kinds of Adjectives - Degrees of Comparison

UNIT – V

COMPOSITION

1. Paragraph Writing
2. Story Writing (Hints Developing)
3. Reproduction of a Story Poem
4. Letter Writing

TEXT BOOKS & WEB RESOURCES

1. Web Resources
   Extract from Dr. A.P.J. Abdul Kalam's autobiography, Wings of Fire Hazlitt, William. “On the love of life.” . Quotidiana. Ed. Patrick Madden. 29 Sep 2006. 14 Jun 2026 https://essays.quotidiana.org/hazlitt/love_of_life/
   Nature:https://www.gutenberg.org/files/29433/29433-h/29433-h.htm
   Forgetting:https://archive.org/stream/in.ernet.dli.2015.73174/2015.73174.English-Essays-Of-Today_djvu.txt
2. Wren & Martin High School English Grammar and Composition

GENERAL CHEMISTRY - I

UNIT- I

Atomic structure and Periodic trends

History of atom (J. J. Thomson, Rutherford); Moseley's Experiment and Atomic number, Atomic Spectra; Black-Body Radiation and Planck's quantum theory-Bohr's model of atom; The Franck-Hertz Experiment; Interpretation of H- spectrum; Photoelectric effect, Compton effect; Dual nature of Matter-De- Broglie wavelength-Davisson and Germer experiment Heisenberg's Uncertainty Principle; Electronic Configuration of Atoms and ions-Hund's rule, Pauli' exclusion principle and Aufbau principle; Numerical problems involving the core concepts.

Unit-II

Introduction to Quantum mechanics

Classical mechanics, Wave mechanical model of atom, distinction between a Bohr orbit and orbital; Postulates of quantum mechanics; probability interpretation of wave functions, Formulation of Schrodinger wave equation – Probability and electron density-visualizing the orbitals -Probability density and significance of Ψ and $\Psi 2$.

Modern Periodic Table

Cause of periodicity; Features of the periodic table; classification of elements - Periodic trends for atomic size- atomic radii, Ionic, crystal and Covalent radii; ionization energy, electron affinity, electronegativity-electronegativity scales, applications of electronegativity.

Problems involving the core concepts

UNIT-III

Structure and bonding–I

Ionic bond

Lewis dot structure of ionic compounds; properties of ionic compounds; Energy involved in ionic compounds; Born Haber cycle–lattice energies, Madelung constant; relative effect of lattice energy and solvation energy; Ion polarization – polarising power and polarizability; Fajans' rules - effects of polarisation on properties of compounds; problems involving the core concepts.

Covalent bond

Shapes of orbitals, overlap of orbitals – σ and Π bonds; directed valency - hybridization; VSEPR theory-shapes of molecules of the typeAB2, AB3, AB4, AB5, AB6 and AB7

Partial ionic character of covalent bond-dipole moment, application to molecules of the type A2, AB, AB2, AB3, AB4; percentage ionic character- numerical problems based on calculation of percentage ionic character.

UNIT-IV

Structure and bonding–II

VB theory–application to hydrogen molecule; concept of resonance- resonance, Structures of some inorganic species–CO_2, NO_2, $CO3^{2-}$, NO3 - limitations of VBT;MO theory - bonding, antibonding and nonbonding H_2, C_2, O_2, O_2 +, O^{2-}, O^{2-}, N_2, NO, HF, CO; CO_2. Magnetic characteristics, comparison of VB and MO theories.

Coordinate bond: Definition, Formation of BF_3, NH_3, NH_4 +, H_3O+properties, Metallic bond-electron sea model, VB model; Band theory-mechanism of conduction in solids; conductors, insulator, semiconductor – types, applications of semiconductors,.

Weak Chemical Forces - Vander Waals forces, ion-dipole forces, dipole-dipole interactions, induced dipole interactions, Instantaneous dipole-induced dipole interactions. Repulsive forces; Hydrogen bonding–Types, special properties of water, ice, stability of DNA; Effects of chemical force, melting and boiling points.

UNIT-V

Basic concepts in Organic Chemistry and Electronic effects

Types of bond cleavage – heterolytic and homolytic; arrow pushing in organic reactions; reagents and substrates; types of reagents -electrophiles, nucleophiles, free radicals; reaction intermediates – carbanions, carbocations, carbenes, arynes and nitrynes. Inductive effect –reactivity of alkyl halides, acidity of halo acids, basicity of amines; inductomeric and electromeric effects.

Resonance – resonance energy, conditions for resonance - acidity of phenols, basicity of aromatic amines, of carbonium ions, carbanions and free radicals, reactivity of vinyl chloride, dipole moment of vinyl chloride and nitrobenzene, bond lengths; steric inhibition to resonance.

Hyperconjugation-stability of alkenes, bond length, orienting effect of methyl group, dipole moment of aldehydes and nitromethane Types of organic reactions-addition, substitution, elimination and rearrangements

Recommended Text

1. Madan. R.D, and SathyaPrakash, Modern Inorganic Chemistry, 2nd ed.; S. Chand and Company: New Delhi, 2003.
2. Rao, C.N.R. University General Chemistry, Macmillan Publication: New Delhi, 2000.
3. Puri, B.R. and Sharma, L.R. Principles of Physical Chemistry, 38th ed.; Vishal Publishing Company: Jalandhar,2002.
4. Bruce, P. Y .and Prasad K.J.R. Essential Organic Chemistry, Pearson Education: New Delhi, 2008.
5. Dash U.N, Dharmarha O.P, Soni. P.L. Textbook of Physical Chemistry, Sultan

Chand & Sons: New Delhi,2016

Reference Books

1. Maron, S.H, and Prutton C.P. Principles of Physical Chemistry, 4th ed.; The Macmillan Company: Newyork,1972.
2. Lee, J.D. Concise Inorganic Chemistry, 4th ed.; ELBS William Heinemann: London,1991.
3. Gurudeep Raj, Advanced Inorganic Chemistry, 26th ed.; Goel Publishing House: Meerut, 2001.
4. Atkins, P.W.& Paula, J. Physical Chemistry,10thed.; Oxford University Press: New York, 2014.
5. Huheey. J. E, Inorganic Chemistry: Principles of Structure and Reactivity, 4th ed.; Addison, Wesley Publishing Company: India,1993.

Web site and elearning source

1) https://onlinecourses.nptel.ac.in
2) http://www.mikeblaber.org/oldwine/chm1045/notes_m.htm
3) http://www.ias.ac.in/initiat/sci_ed/resources/chemistry/Inorganic.html
4) https://swayam.gov.in/course/64-atomic-structure-and-chemical-bonding
5) https://www.chemtube3d.com/

QUANTITATIVE INORGANIC ESTIMATION (TITRIMETRY)

Unit- I

Chemical Laboratory Safety in Academic Institutions

Introduction - importance of safety education for students, common laboratory hazards, assessment and minimization of the risk of the hazards, prepare for emergencies from uncontrolled hazards; concept of MSDS; importance and care of PPE; proper use and operation of chemical hoods and ventilation system; fire extinguishers-types and uses of fire extinguishers, demonstration of operation; chemical waste and safe disposal.

Common Apparatus Used in Quantitative Estimation (Volumetric)

Description and use of burette, pipette, standard flask, measuring cylinder, conical flask, beaker, funnel, dropper, clamp, stand, wash bottle, watch glass, wire gauge and tripod stand.

Principle of Quantitative Estimation (Volumetric)

Equivalent weight of an acid, base, salt, reducing agent, oxidizing agent; concept of mole, molality, molarity, normality; primary and secondary standards, preparation of standard solutions; theories of acid-base, redox, complex metric, iodimetric and

iodometric titrations; indicators – types, theory Of acid–base, redox, meta ion and adsorption indicators, choice of indicators.

Unit - II

Quantitative Estimation (Volumetric)

Preparation of standard solution, dilution from stock solution

Permanganometry

1. Estimation of sodium oxalate using standard ferrous ammonium sulphate.
2. Estimation of ferrous sulphate using standard oxalic acid.

Dichrometry

3. Estimation of ferric alum using standard dichromate (external indicator)
4. Estimation of ferric alum using standard dichromate (internal indicator)

Iodometry

5. Estimation of copper in copper sulphate using standard dichromate.

Argentimetry

6. Estimation of chloride in barium chloride using standard sodium chloride/Estimation of chloride in sodium chloride (Volhard's method)

Unit III

Complexometry

7. Estimation of hardness of water using EDTA.
8. Estimation of nickel in steel using standard calcium chloride solution.

ESTIMATIONS

9. Estimation of iron in iron tablets.
10. Estimation of ascorbic acid.

Reference Books:

1. Venkateswaran. V., Veeraswamy. R., Kulandivelu. A.R, Basic Principles of Practical Chemistry,2nded.; Sultan Chand &Sons: New Delhi, 1997.
2. Nad. A. K., Mahapatra. B, Ghoshal. A., An advanced course in Practical Chemistry, 3rd ed., New Central Book Agency: Kolkata,2007.

Web References:

1. http://www.federica.unina.it/agraria/analytical-chemistry/volumetricanalysis
2. https://chemdictionary.org/titration-indicator/

ALLIED MATHEMATICS – I
ALGEBRA AND DIFFERENTIAL EQUATIONS

Unit I

Theory of Equations – Formation of Equations – Relation between roots and coefficients–Reciprocal equations.

Unit II

Transformation of Equations– Approximate solutions to equations –Newton's method and Horner's method.

Unit III

Matrices–Characteristic equation of a matrix –Eigen values and Eigen vectors – Cayley Hamilton theorem and simple Problems.

Unit IV

Differential equation of first order but of higher degree – Equations solvable for p,x,y–Partial differential equations –formations– solutions – Standard form $Pp+Qq=R$.

Unit V

Laplace transformation–Inverse Laplace transform.

Recommended Text

1. Dr. S. Arumugam and A. Thangapandi Isaac–Allied Mathematics Paper-I,New Gamma Publishing House, 2012.

Reference Books

1. S.NarayananandT. K. ManikavachagomPillay - Differential Equations and its applications, S. Viswanathan Printers Pvt. Ltd, 2006.

Website and e-Learning Source

1. https://nptel.ac.in

ALLIED ZOOLOGY - I

UNIT I

Diversity of Invertebrates–I Principles of taxonomy. Criteria for classification– Symmetry and Coelom–Binomial Nomenclature. Classification of Protozoa, Coelenterata, Helminthes and Annelida upto classes with two examples.

UNIT II

Diversity of Invertebrates–II Classification of Arthropoda, Mollusca and Echinodermata upto class level with examples

UNIT III

Diversity of Chordates–I Classification of Prochordata, Pisces and Amphibia upto orders giving two examples.

UNIT IV

Diversity of Chordates–II Classification of Reptilia, Aves and Mammalia upto orders giving two examples.

UNIT V

Animal organization Structure and organization of

(i) Earthworm
(ii) Rabbit
(iii)Prawn

Text Books (Latest Editions)

1. Ekambaranatha Iyer, 2000. A Manual of Zoology, 10th edition, Viswanathan, S., Printers & Publishers Pvt Ltd
2. Jordan, E.L. and Verma P.S, 1995. Invertebrate Zoology, 12th edn. S. Chand& Co.
3. Kotpal, R.L, 1992. Protozoa, Porifera, Coelenterata, Annelida, Arthropoda, Mollusca, Echinodermata.

Reference Books (Latest editions, and the style as given below must be strictly adhered to)

1. Ruppert and Barnes, R.D. (2006). Invertebrate Zoology, VIII Edition. Holt Saunders International Edition.
2. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). The Invertebrates: A New Synthesis, III Edition, Blackwell Science
3. Barrington, E.J.W. (1979). Invertebrate Structure and Functions, II Edition, E.L.B.S. and Nelson
4. Hyman L.H, 1955. The invertebrates - Vol. I to Vol. VII – Mc Graw Hill Book Co.
5. Parker, J. and Haswell , 1978. A text book of Zoology Vol. I - Williams and Williams.

Web Resources

1. https://www.nationalgeographic.com/animals/invertebrates/
2. https://www.britannica.com/science/parasitic-disease
3. https://www.nio.res.in/
4. https://greatbarrierreef.org/

ALLIED ZOOLOGY LAB COURSE - I

UNIT I

Dissection:

1. Cockroach – digestive system
2. Cockroach – nervous system

3. Fish – digestive system (sardine or any other fish)

UNIT II

Mounting:

1. Mouth Parts – Cockroach
2. Mouth Parts – Mosquito/ Honey bee
3. Scales – Placoid, Cycloid and Ctenoid
4. Prawn appendages

UNIT III

Spotters: Paramecium, Plasmodium, Scypha, Leucosolenia, Corals. Taenia solium – entire, Ascaris male and female. Earthworm, Prawn ,Scorpion, Pila, Starfish, Amphioxus, Shark, Frog, Calotes, Pigeon feather and Rabbit.

UNIT IV

Field visit – Study of fauna on the campus

UNIT V

Record / Observation Note (SUBMISSION IS MANDATORY)

Text Books (Latest Editions)

1. Ekambaranatha Iyyar and T. N. Ananthakrishnan, 1995 A manual of Zoology Vol.I (Part 1, 2) S. Viswanathan, Chennai
2. Ganguly, Sinha an d Adhikari , 2011 . Biology of Animals: Volume I, New Central Book Agency; 3rd revised edition. 1008 pp.
3. Sinha, Chatterjee and Chattopadhyay, 2014. Advanced Practical Zoology, Books & Allied Ltd; 3rd Revised edition, 1 07 0 pp.
4. Lal ,S. S, 2016 . Practical Zoology Invertebrate, Rastogi Publications.
5. Verma, P. S. 2010. A Manual of Practical Zoology: Invertebates, S Chand, New Delhi
6. Lal S S, (2009). Practical Zoology Vertebrate, Rajpal and Sons Publishing

Reference Books (Latest editions, and the style as given below must be strictly adhered to)

1. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). The Invertebrates: A New Synthesis, III Edition, Blackwell Science
2. Barnes, R.D. (1982). Invertebrate Zoology, V Edition. Holt Saunders International Edition.
3. Barrington, E.J.W. (1979). Invertebrate Structure and Functions. II Edition, E.L.B.S. and Nelson
4. Boradale, L.A. and Potts, E.A. (1961). Invertebrates: A Manual for the use of Students. Asia Publishing Home.
5. Lal, S.S. 2005. A text Book of Practical Zoology: Invertebrate, Rastogi, Meerut

Web Resources

1. https://nbb.gov.in/
2. https://www.agshoney.com/training.htm

3. https://icar.org.in/
4. http://www.csrtimys.res.in/
5. http://csb.gov.in/
6. https://nisa.icar.gov.in/
7. https://www.nationalgeographic.com/animals/invertebrates/

FOOD CHEMISTRY

UNIT- I Food Adulteration

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

Unit- II Food Poison

Food poisons - natural poisons (alkaloids –nephron toxin) - pesticides, (DDT, BHC, Malathion) -Chemical poisons - First aid for poison consumed victims.

Unit- III Food Additives

Food additives-artificial sweeteners–Saccharin- Cyclomate and Aspartate Food flavours-esters, aldehydes and heterocyclic compounds – Food colours –Emulsifying agents–preservatives-leavening agents. Baking powder– yeast–taste makers–MSG-vinegar.

UNIT-IV Beverages

Beverages-soft drinks-soda-fruit juices-alcoholic beverages-examples. Carbonation-addiction to alcohol– diseases of liver and social problems

UNIT-V Edible Oils

Fats and oils - Sources of oils - production of refined vegetable oils - preservation. Saturated and unsaturated fats-iodine value-role of MUFA and PUFA in preventing heart diseases-determination of iodine value, RM value, saponification values and their significance.

Recommended Text

1. Food chemistry, H.K. Chopra, P.S. Panesar, Narosa publishing house,2010.
2. Jayashree Ghosh, Fundamental Concepts of Applied Chemistry, S. Chand & Co. Publishers, second edition, 2006.
3. Food Chemistry, Dr. L. Rakesh Sharma, Evince pub publishing,2022.
4. Food processing and preservation, G. Subbulakshmi, Shobha. A Udipi, Padmini S. Ghugre, New age international publishers, 2nd edition, 2021.

Reference Books

1. H.D. Belitz, Werner Grosch, Food Chemistry Springer Science & Business Media, 4th Edition, 2009.
2. M.Swaminathan, Food Science and Experimental Foods, Ganesh and Company,1979.
3. Hasen huettl Gerard. L, Hartel Richard. W. Food Emulsifiers and their applications Springer New York 2nd ed. 2008.
4. H.D. Belitz, W. Grosch, P. Schieberle, Food Chemistry, Springer, fourth revised and extended edition, 2009.
5. Principles of food chemistry, John M. de Man, John W. Finley, W. Jefferey Hurst, Chang Yong Lee, Springer, Fourth edition, 2018.

Website and e-learning Source

1. https://onlinecourses.nptel.ac.inhttp://cactus.dixie.edu/smblack/chem1010/lec

FOUNDATION COURSE

UNIT-I

Structure of atom and periodic classification of Elements and properties.

Atom structure-Fundamental particles- atomic mass - atomic number–Isotopes– Isobars– Isotones – Orbitals-Quantum number and their significance. Shapes of s, p and d orbitals- Rules governing electronic configuration in various its atomic orbitals. Periodic table-periodic laws (Mendeleev and Mosley)-Classification of elements into s, p, d and f-blocks. Metals - Non-metals –Periodic Properties-Concept, Variation and factors affecting various periodic properties-Inert pair effect.

Unit-II

Chemical Bonding

Definition-Types of chemical bond-Ionic bond-Ion polarization-Dipole moment and Percentage of ionic character-Covalent bond - Definition–Postulates of Valence bond theory and Concept of hybridization (sp, sp2, sp3, sp3d, sp3d2, dsp2, d2sp3) – Magnetic properties – Paramagnetic–Diamagnetic- Ferromagnetic Co-ordinate covalent bond-Definition– Examples-Coordination compounds (basic concepts only).

UNIT- III Nomenclature and Isomerism in Organic compounds

Carbon compounds-Uniqueness of carbons-Classification of hydrocarbons- IUPAC Nomenclature of Organic compounds

Isomerism: Structural and Stereoisomerism

Structural Isomerism: Chain isomerism, Functional isomerism, Positional isomerism and Meta isomerism.

Stereo isomerism: Geometrical and Optical Isomerism-Chiral Molecule- Enantiomers-Diastereomers- Meso Compounds-Racemic mixture.

UNIT- IV States of Matter

Gaseous state: Kinetic theory of gases- Ideal and Non-ideal gases- Ideal gas equation- Deviation of ideal gas from ideal behaviour - Vander Waal's equation and Liquification of gases.

Liquids: Intermolecular forces, Vapour pressure and Boiling point of liquid- Surface tension –Viscosity- Factors affecting surface tension and viscosity.

Solids: Definition-Characteristics of solids-Amorphous and Crystalline Solids – Space Lattice and unit cells-Close packed structure of solids - Radius ratio rule.

UNIT -V Introduction to Spectroscopy

Electromagnetic radiation-General characteristics of Wave–Wave length – Frequency– Amplitude – Wave number - Electromagnetic spectrum- Absorption and Emission spectrum - Quantization of Energy level - Selection rule - Intensity of the Spectral lines– Width of Spectral lines.

Types of Spectroscopy: Microwave spectroscopy, Infrared spectroscopy, UV-Visible spectroscopy, Nuclear Magnetic Resonance spectroscopy, Electron spin resonance spectroscopy.

Text Books

1. B.R. Puri, L.R. Sharma, K.C. Kalia, Principles of Inorganic Chemistry, Milestone Publishers and Distributors, New Delhi,2012.
2. B.R. Puri and L.R. Sharma, 38thedition, Vishal Publishing company, Jalendar2002.
3. K.S. Tewari, S.N. Mehrothra and N. K. Vishnoi, Textbook of Organic Chemistry, 2nd edition Vikas publishing House, New Delhi, 1998.

Reference books

1. R.D. Madan, Sathya Prakash, Mordern Inorganic chemistry 2ndedition, S. Chand and company, New Delhi, 2003.
2. B.S. Bhal, Arun Bhal, Advanced Organic chemistry, 3rdedition, S. Chand and company, New Delhi, 2003.
3. U.N. Dash, O. P. Dharmarha, P.L. Soni, Textbook of Physical Chemistry, Sultan Chand & sons, New Delhi, 2016.
4. Y.R. Sharma Organic spectroscopy Principles and Chemical applications, S. Chand &Company PVT Ltd, 2002.
5. C.N. Banwell, Fundamentals of spectroscopy Tata Mc Graw Hill, 1983.

Website and e-learning Source

1. https://onlinecourses.nptel.ac.inhttp://cactus.dixie.edu/smblack/chem1010/lec