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 2024-2025 onwards)

Semester-I				
Part	**Subject Status**	**Subject Title**	**Subject Code**	**Credit**
I	LANGUAGE	TAMIL/MALAYALAM/HINDI	F1TL11/ F1MY11/ F1HD11	3
II	ENGLISH	ENGLISH	F2EN11	3
III	CORE	GENERAL CHEMISTRY-1	FCCH11	5
III	CORE	QUANTITATIVE INORGANIC ESTIMATION	FCCHP1	3
III	ELECTIVE	MATHEMATICS/ ZOOLOGY	FEMA11	5
		ALLIED: ZOOLOGY - PAPER – I	FEZO11	3
		ALLIED PRACTICAL	FEZOP1	2
IV	SEC 1	FOOD CHEMISTRY	FSCH11	2
IV	FC	FOUNDATION COURSE IN CHEMISTRY	FFCH11	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

பொதுத்தமிழ் 1
தமிழ் இலக்கிய வரலாறு 1

அலகு 1: தமிழ் இலக்கிய, இலக்கண வரலாறு அறிமுகம்.

1. **இலக்கணம்:**

அ. தொல்காப்பியம், இறையனார், களவியல் உரை, நம்பியகப் பொருள், புறப்பொருள் வெண்பா மாலை, நன்னூல் தண்டியலங்காரம், யாப்பருக்கலக்காரிகை- நூல்கள்

ஆ. மொழிப் பயிற்சி - ஒற்றுப்பிழை தவிர்த்தல்

- வல்லினம் மிகும் இடங்கள்
- வல்லினம் மிகா இடங்கள்
- ஈரொற்று வரும் இடங்கள்
- ஒரு, ஓர் வரும் இடங்கள்
- அது, அஃது வரும் இடங்கள்
- தான், தாம் வரும் இடங்கள்

பயிற்சி: வல்லினம் மிகும் இடங்கள், மிகா இடங்கள் தவறாக வரும்வகையில் ஒரு பத்தி கொடுத்து ஒற்றுப் பிழை திருத்தி எழுதச் செய்தல்.

2. **சங்க இலக்கியம்**-எட்டுத்தொகை, பாத்துப்பாட்டு
3. **அற இலக்கியம்**-பதினெண்கீழ்கணக்கு நூல்கள்
4. **காப்பிய இலக்கியம்** - ஐம்பெருங் காப்பியங்கள், ஐஞ்சிறு காப்பியங்கள், சமயக் காப்பியங்கள்
5. **பக்தி இலக்கியமும்** (பன்னிரு திருமுறைகள், நாலாயிர திவ்வியப் பிரபந்தம் - பகுத்தறிவு இலக்கியமும் (சித்தர் இலக்கியங்கள், புலவர் குழந்தையின் இராவண காவியம்)

அலகு 2: சங்க இலக்கியம்

எட்டுத்தொகை

1. **நற்றிணை**-முதல் பாடல் - நின்ற சொல்லர்
2. **குறுந்தொகை 3 ஆம் பாடல்** - நிலத்தினும் பெரிதே
3. **ஐங்குறுநூறு**-நெல் பல பொலிக! பொன் பெரிது சிறக்க! (முதல் பாடல்)-வேட்கைப் பத்து
4. **கலித்தொகை** -51 - சுடர்தொடீஇக் கேளாய் - குறிஞ்சிக் கலி
5. **புறநானூறு**-189 தெண்கடல் வளாகம் பொதுமையின்றி, நாடா கொன்றோ - 187

பத்துப்பாட்டு:

1. முல்லைப்பாட்டு (முழுவதும்)

அலகு 3: அற இலக்கியம்

1. **திருக்குறள்** - அறன் வலியுறுத்தல் அதிகாரம்
2. **நாலடியார்** -பாடல் 131 (கஞ்சியாழகும்)
3. **நான்மணிக்கடிகை** - நிலத்துக்கு அணியென்ப
4. **பழமொழி நானூறு**-தம் நடை நோக்கார்
5. **இனியவை நாற்பது**-37 இளமையை மூப்பு என்று

அலகு 4: காப்பிய இலக்கியம்

1. **சிலப்பதிகாரம்** - வழக்குரைகாதை

2. **மணிமேகலை** - பாத்திரம் பெற்ற காதை
3. **பெரியபுராணம்**- பூசலார் நாயனார்புராணம்
4. **கம்பராமாயணம்**-குகப் படலம்
5. **சீறாப்புராணம்** - மானுக்குப் பிணை நின்ற படலம்
6. **இயேசு காவியம்**-ஊதாரிப்பிள்ளை

அலகு 5: பக்தி இலக்கியமும், பகுத்தறிவு இலக்கியமும்

பக்தி இலக்கியம்:

1. திருநாவுக்கரசர் தேவாரம்-நாமார்க்கும் குடியல்லோம் எனத் தொடங்கும் பாடல் மட்டும்
2. மாணிக்கவாசகர் திருவாசகம் - நமச்சிவாய வா ஆழ்க நாதன்தான் வாழ்க முதல் சிரம்குவிவார் ஓங்குவிக்கும் சீரோன் கழல் வெல்க வரை
3. பொய்கையாழ்வார்-வையந் தகளியா வார்கடலே
4. பூதத்தாழ்வார் - அன்பே தகனியா
5. பேயாழ்வார் - திருக்கண்டேன் பொன்மேனி கண்டேன்
6. ஆண்டாள் - திருப்பாவை மார்களித் திங்கள் (முதல் பாடல்)

பகுத்தறிவு இலக்கியம்;

1. திருமூலர் - திருமந்திரம் (270,271,274,275 285)
2. பட்டினத்தார் - திருவிடை மருதூர் (காடே திரிந்து - எனத் தொடங்கும் பாடல் பா. எண; 279,280)
3. கடுவெளி சித்தர் - பாபஞ்செய் எதிரி மனமே (பாடல் முழுவதும்)
4. இராவண காவியம் - தாய்மொழிப் படலம் 18 ஏடுகை இல்ல ரில்லை முதல் - 22 செந்தமிழ் வளர்த்தார் வரை

Reference Books:

- மு. வரதராசன், தமிழ் இலக்கிய வரலாறு, சாகித்ய அக்காதமி, புதுடெல்லி
- மது. ச. விமலானந்தன், தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை.
- தமிழண்ணல், புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை;.
- தமிழ் இளகிய வரலாறு - முனைவர் சிற்பி பாலசுப்ரமணியன், முனைவர்.சொ. சேதுபதி
- புதி யதமிழ் இலக்கிய வரலாறு - முனைவர் சிற்பி பாலசுப்ரமணியன, நீல. பத்மநாபன்

Web Sources:

- இணைய தமிழ் நூலகம் - சென்னை நூலகம் - Online Tamil Library - ChennaiLibrary.com
- முகப்பு - சிறுகதைகள் (sirukathaigal.com)
- www.tamilvirtualuniversity.org
- Buy tamil books online 10% to 50% discount, Tamil Novels, Tamil Audio Books online - Buy tamil books online - Established 2010 (noolulagam.com)
- www.katuraitamilblogspot.com

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

HINDI - Hindi ka Samanya Gyan, Vyakaran aur Nibandh

Unit I
Buniyadi Hindi

- Swar
- Vyanjan
- Barah Khadi
- Shabd aur
- Vakya Rachna

Unit II
Hindi Shabdavali

- Rishto ke Naam
- Gharelu padartho ke Naam

Unit III
Vyakaran

- Sadharan Vakya aur Sangya
- Sarvanam
- Visheshan
- Kriya aadi shabdo ka prayog

Unit IV
Chote Gadyansh ka Pathan

- Bacho ki Kahaniya (1 to 5)
- Patra-Patrikao mein prakashit Gadyansho ka Pathan

Unit V
Nibandh

- Sant Tiruvalluvar
- E.V.R Thandai Periyar
- Naari Sashaktikaran
- Paryavaran Sanrakshan
- Vibhinna pratiyogi parikshao ke bare mein jaankari dena

Pratiyogi priksha par adharit nibandho dwara bhasha ki kshamta badhane vale prashikshan kary.

Reference Books

1. Hindi ke Avyay Vakyansh – Chaturbhuj Sahay
2. Subodh Hindi Vyakaran – Phoolchand Jain
3. Sankshipt Hindi Vyakaran – Kamta Prasad
4. Vyavaharik Hindi – Nagappa
5. Abhinav Hindi Vyakran – Nagappa
6. Saral Hindi Vyakaran – Shyamchandra Kapur
7. Vyakaran Pradeep – Ramdev
8. Laghu Bal Kathaye – Ramashankar

9. Manoranjak Kahaniya – Premchand
10. CONCISE GRAMMAR OF THE HINDI LANGUAGE - H.C Scholberg
11. Hindi Grammar – Edwin Greaves

Related Online Contents (MOOCs, SWAYAM, NPTEL, YouTube, Websites, etc.)

1. fr#oYyqoj%https://bharatdiscovery.org/india/%E0%A4%A4%E0%A4%BF%E0%A4%B0%E0%A5%81%E0%A4%B5%E0%A4%B2%E0%A5%8D%E0%A4%B2%E0%5%81%E0%A4%B5%E0%A4%B0#:~:text=%E0%A4%A4%E0%A4%BF%E0%A4%B%E0%A5%81%E0%A4%B5%E0%A4%B2%E0%A5%8D%E0%A4%B2%E0%A5%81E0%A4%B5%E0%A4%B0%20(%E0%A4%85%E0%A4%82%E0%A4%97%E0%5%8DE0%A4%B0%E0%A5%87%E0%A4%9C%E0%A4%BC%E0%A5%80%3A%20Thiruvaluvar)%20%E0%A4%A6%E0%A4%95%E0%A5%8D%E0%A4%B7%E0%A4%BF%E%A4%A3,%E0%A4%AA%E0%A4%BF%E0%A4%A4%E0%A4%BE%20E0%A4%AE%E0%A5%87%E0%A4%82%20%E0%A4%B5%E0%A4%BF%E0%A4%B6%E0%A5%8D%E0%A4%B5%E0%A4%BE%E0%A4%B8%20%E0%A4%B0%E0%A4%96%E0%A4%A4%E0%A5%87%20%E0%A4%A5%E0%A5%87%E0%A5%A4

2. bZ-os-jkelkeh

https://hi.wikipedia.org/wiki/%E0%A4%AA%E0%A5%87%E0%A4%B0%E0%A4%BF%E0%A4%AF%E0%A4%BE%E0%A4%B0#:~:text=%E0%A4%87%E0%A4%B0%E0%A5%8B%E0%A4%A1%20%E0%A4%B5%E0%A5%87%E0%A4%82%E0%A4%95%E0%A4%9F%20%E0%A4%A8%E0%A4%BE%E0%A4%AF%E0%A4%95%E0%A4%B0%20%E0%A4%B0%E0%A4%BE%E0%A4%AE%E0%A4%BE%E0%A4%B8%E0%A4%BE%E0%A4%AE%E0%A5%80%20(17,%E0%A4%B5%E0%A4%BE%E0%A4%B2%E0%A5%87%20%E0%A4%B9%E0%A4%BF%E0%A4%A8%E0%A5%8D%E0%A4%A6%E0%A5%81%E0%A4%A4%E0%A5%8D%E0%A4%B5%20%E0%A4%95%E0%A4%BE%20%E0%A4%B5%E0%A4%BF%E0%A4%B0%E0%A5%8B%E0%A4%A7%20%E0%A4%A5%E0%A4%BE%E0%A5%A4

3. ukjh l”kfDrdj.k%

https://www.hindikiduniya.com/essay/women-empowerment-essayinhindi/#:~:text=%E0%A4%AE%E0%A4%B9%E0%A4%BF%E0%A4%B2%E0%A4%BE%20%E0%A4%B8%E0%A4%B6%E0%A4%95%E0%A5%8D%E0%A4%A4%E0%A4%BF%E0%A4%95%E0%A4%B0%E0%A4%A3%20%E0%A4%95%E0%A5%8D%E0%A4%AF%E0%A4%BE%20%E0%A4%B9%E0%A5%88%20%3F&text=%E0%A4%AE%E0%A4%B9%E0%A4%BF%E0%A4%B2%E0%A4%BE%20%E0%A4%B8%E0%A4%B6%E0%A4%95%E0%A5%8D%E0%A4%A4%E0%A4%BF%E0%A4%95%E0%A4%B0%E0%A4%A3%20%E0%A4%95%E0%A5%8B%20%E0%A4%AC%E0%A5%87%E0%A4%B9%E0%A4%A6%20%E0%A4%86%E0%A4%B8%E0%A4%BE%E0%A4%A8,%E0%A4%B8%E0%A4%95%E0%A5%8D%E0%A4%B7%E0%A4%AE%20%E0%A4%AC%E0%A4%A8%E0%A4%BE%E0%A4%A8%E0%A4%BE%20%E0%A4%AE%E0%A4%B9%E0%A4%BF%E0%A4%B2%E0%A4%BE%20%E0%A4%B8%E0%A4%B6%E0%A4%95%E0%A5%8D%E0%A4%A4%E0%A4%BF%E0A95%E0%A4%B0%E0%A4%A3%20%E0%A4%B9%E0%A5%88%E0%A5%A4

4. i;kZoj.k laj{k.k%

a.https://hi.wikipedia.org/wiki/%E0%A4%AA%E0%A4%B0%E0%A5%8D%E0%A4%AF%E0%A4%BE%E0%A4%B5%E0%A4%B0%E0%A4%A3_%E0%A4%B8%E0%A4%88%E0%A4%B0%E0%A4%95%E0%A5%8D%E0%A4%B7%E0%A4%A3#:~:text=%E0%A4%AA%E0%A4%B0%E0%A5%8D%E0%A4%AF%E0%A4%BE%E0%A4%B5%E0%A4%B0%E0%A4%A3%20%E0%A4%B8%E0%A4%82%E0%A4%B0%E0%A4%95%E0%A5%8D%E0%A4%B7%E0%A4%A3%20%E0%A4%95%E0%A4%BE%20%E0%A4%B8%E0%A4%AE%E0%A4%B8%E0%A5%8D%E0%A4%A4%20%E0%A4%AA%E0%A5%8D%E0%A4%B0%E0%A4%BE%E0%A4%A3%E0%A4%BF%E0%A4%AF%E0%A5%8B%E0%A4%82,%E0%A4%AA%E0%A5%83%E0%A4%A5%E0%A5%8D%E0%A4%B5%E0%A5%80%20%E0%A4%B8%E0%A4%AE%E0%A5%8D%E0%A4%AE%E0%A5%87%E0%A4%B2%E0%A4%A8'%20%E0%A4%86%E0%A4%AF%E0%A5%8B%E0%A4%9C%E0%A4%BF%E0%A4%A4%20%E0%A4%95%E0%A4%BF%E0%A4%AF%E0%A4%BE%20%E0%A4%97%E0%A4%AF%E0%A4%BE%E0%A5%A4

b.http://gadyakosh.org/gk/%E0%A4%86%E0%A4%88%E0%A4%AF%E0%A5%87!_%E0%A4%AA%E0%A4%B0%E0%A5%8D%E0%A4%AF%E0%A4%BE%E0%A4%B5%E0%A4%B0%E0%A4%A3_%E0%A4%AC%E0%A4%9A%E0%A4%BE%E0%A4%8F%E0%A4%81_/_%E0%A4%85%E0%A4%A8%E0%A5%8D%E0%A4%A4%E0%A4%B0%E0%A4%BE_%E0%A4%95%E0%A4%B0%E0%A4%B5%E0%A4%A1%E0%A4%BC%E0%A5%87

PAPER II –GENERAL ENGLISH - I

Learning Objectives

- To enable learners to acquireself awareness and positive thinking required in various life situations.
- To help them acquire the attribute of empathy
- To assist them in acquiring creative and critical thinking abilities
- To enable them to learn the basic grammar
- To assist them in developing LSRW skills

Unit I

SELF-AWARENESS (WHO)&POSITIVE THINKING (UNICEF)

Life Story

1.1 Chapter 1 from MalalaYousafzai, I am Malala

1.2 An Autobiography or The Story of My Experiments with Truth (Chapters 1, 2 & 3) M.K.Gandhi

Poem

1.3 Where the Mind is Without Fear – Gitanjali 35 – Rabindranath Tagore

1.4 Love Cycle – Chinua Achebe

Unit II

EMPATHY

Poem

2.1 Nine Gold Medals – David Roth

2.2 Alice Fell or poverty – William Wordsworth

Short Story

2.3 The School for Sympathy – E.V. Lucas

2.4 Barn Burning – William Faulkner

Unit III

CRITICAL & CREATIVE THINKING

Poem

3.1 The Things That Haven't Been Done Before – Edgar Guest

3.2 Stopping by the Woods on a Snowy Evening – Robert Frost

Readers Theatre

3.3 The Magic Brocade – A Tale of China

3.4 Stories on Stage – Aaron Shepard (Three Sideway Stories from Wayside School" by Louis Sachar)

Unit IV

Part of Speech

4.1 Articles

4.2 Noun

4.3 Pronoun

4.4 Verb

4.5 Adverb

4.6 Adjective

4.7 Preposition

Unit V

Paragraph and Essay Writing

5.1 Descriptive
5.2 Expository
5.3 Persuasive
5.4 Narrative

Text books (Latest Editions)

1. MalalaYousafzai. I am Malala, Little, Brown and Company, 2013.
2. M.K. Gandhi. An Autobiography or The Story of My Experiments with Truth (Chapter – I), Rupa Publications, 2011.
3. Rabindranath Tagore. "Gitanjali 35" from Gitanjali (Song Offerings): A Collection of Prose Translations Made by the Author from the Original Bengali. MacMillan, 1913.
4. N.Krishnasamy. Modern English: A Book of Grammar, Usage and Composition Macmillan, 1975.
5. Aaron Shepard. Stories on Stage, ShepardPublications, 2017.
6. J.C. Nesfield. English Grammar Composition and Usage, Macmillan, 2019.

Web Resources

1. MalalaYousafzai. I am Malala (Chapter 1) https://archive.org/details/i-am-malala
2. M.K Gandhi. An Autobiography or The Story of My Experiments with Truth(Chapter-1)- Rupa Publication, 2011 https://www.indiastudychannel.com/resources/146521- Book-Review-An-Autobiography-or-The-story-of-my-experiments-with-Truth.aspx
3. Rabindranath Tagore. "Gitanjali 35" from Gitanjali (Song Offerings)https://www.poetryfoundation.org/poems/45668/gitanjali-35
4. Aaron Shepard.Stories on Stage, Shepard Publications, 2017 https://amzn.eu/d/9rVzlNv
5. JC Nesfield. Manual of English Grammar and Composition. https://archive.org/details/in.ernet.dli.2015.44179

GENERAL CHEMISTRY-I

Objectives of the course

The course aims at giving an overall view of the

- Various atomic models and atomic structure
- Wave particle duality of matter
- Periodictable, periodicity in properties and its application in explaining the chemical behaviour
- nature of chemical bonding, and
- fundamental concepts of organic chemistry

UNIT- I

Atomic structure and Periodic trends

History of atom (J.J.Thomson, Rutherford); Moseley's Experiment and Atomic number,AtomicSpectra;Black-BodyRadiationandPlanck'squantumtheory-Bohr's model of atom; The Franck-Hertz Experiment; Interpretation of H- spectrum; Photoelectriceffect,Comptoneffect;DualnatureofMatter-De-Brogliewavelength-Davisson and Germer experiment Heisenberg's Uncertainty Principle; Electronic Configuration of Atoms and ions-Hund'srule,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 wavefunctions, Formulation ofSchrodinger wave equation - Probabilityand electron density-visualizing the orbitals -Probability density and significance of Ψ and Ψ2.

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 ioniccompounds; BornHabercycle–latticeenergies, 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-dipolemoment, 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–CO2, NO2, CO32-, NO3- limitations of VBT;
MO theory - bonding, antibonding and nonbonding H2,C2,O2,O2+, O2-, O2-,N2,NO,HF,CO;CO2.
Magnetic characteristics, comparison of VB and MO theories.
Coordinate bond: Definition, Formation of BF3,NH3,NH4+,H3O+properties
Metallic bond-electron sea model,VBmodel;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.Repulsiveforces;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.Inductiveeffect –reactivity of alkylhalides,acidity of haloacids, basicity of amines; inductomeric and electromeric effects.
Resonance – resonance energy, conditions for resonance - acidity of phenols, basicity of aromatic amines, of carboniumions,carbanions and free radicals, reactivity of vinylchloride, dipole moment of vinylchloride 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,2nded.;S. Chand and Company: New Delhi, 2003.
2. Rao, C.N.R. University General Chemistry, Macmillan Publication: NewDelhi, 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. DashUN, Dharmarha OP, SoniP.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, 4 thed.; The Macmillan Company: Newyork,1972.
2. Lee, J.D.Concise Inorganic Chemistry,4 thed.; ELBS WilliamHeinemann: London,1991.
3. GurudeepRaj, Advanced Inorganic Chemistry,26thed.;GoelPublishing House: Meerut, 2001.
4. Atkins, P.W.&Paula,J.PhysicalChemistry,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 e-learning 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)

Objectives of the course

This course aims at providing knowledge on

- laboratory safety
- handling glass wares
- Study the principle /equation of the experiment.
- Quantitative estimation.

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, measuringcylinder, 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; primaryandsecondarystandards, preparation of standard solutions; theories of acid-base, redox, complex metric, iodimetric and iodometric titrations; indicators – types, theory Of acid–base, redox, metaion 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/Estimationof 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 iniron 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.;Anadvanced course in Practical Chemistry, 3rded.;New Central Book Agency: Kolkata,2007.

Website and e- learning source

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

ALLIED MATHEMATICS I
ALGEBRA AND DIFFERENTIAL EQUATIONS

Objectives of the Course

- To explain the simple concepts of the theory of equations and to find the roots of the equations by using techniques in various methods.

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 – Equationssolvableforp,x,y– Partialdifferentialequations–formations– solutions –Standard form $Pp+Qq=R$.

UNIT V

Laplace transformation–Inverse Laplacetransform.

Recommended Text

1. Dr.S.Arumugam and A. ThangapandiIsaac–AlliedMathematicsPaper-I,New Gamma Publishing House, 2012.

Reference Books

1. S.Narayanan.SandT.K.ManikavachagomPillay -Differential Equations and its applications, S.Viswanathan Printers Pvt.Ltd,2006.
2. T.Veerarajan-AlgebraandTrigonometry-YesDeePublishing Pvt.Ltd.,2009.

Website and e-LearningSource

1. https://nptel.ac.in

ALLIED ZOOLOGY - I
INVERTEBRATA

Course Objectives

- To acquire a basic knowledge of diversity and organization of Protozoa, Coelenterata, Helminthes and Annelida
- To acquire a basic knowledge of diversity and organization of Arthropoda, Mollusca and Echinodermata
- To comprehend the taxonomic position and diversity among Protochordata, Pisces and Amphibia
- To comprehend the taxonomic position and diversity among Reptilia, Aves and Mammalia
- To acquire detailed knowledge of select invertebrate and chordate forms

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

Learning Objectives

- To understand the structure and label the various parts of the dissected organisms and to sketch the required system using virtual dissections, charts and web resources.
- To compare and discuss the differences in the mouth parts of cockroach and mosquitos by mounting and drawing
- To identify and discuss the significance of pigeon feather. To identify and understand the different invertebrate and chordate forms and classify them using lab manuals
- To compare and criticise various types of invertebrate and chordate animals.
- Analyse the campus fauna enables them to understand, identify and classify the various fauna surrounding them. It also enables them to compile all the data and to discuss the importance of conservation of fauna

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

Objectives of the course

This course aims at giving an overall view of the

- Types of food
- Food adulteration and poisons
- Food additives and preservation

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 simpleanalytical 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

Foodadditives-artificialsweeteners–Saccharin-CyclomateandAspartateFoodflavours-esters, aldehydes and heterocyclic compounds – Food colours –Emulsifying agents–preservatives-leavening agents. Baking powder– yeast–tastemakers–MSG-vinegar.

UNIT-IV Beverages

Beverages-softdrinks-soda-fruitjuices-alcoholicbeverages-examples.Carbonation-addictiontoalcohol– diseases of liver and social problems

UNIT-V Edible Oils

Fats and oils - Sources of oils - production of refined vegetable oils - preservation. Saturated and unsaturatedfats-iodinevalue-roleofMUFAandPUFAinpreventingheart diseases-determinationof iodine value, RMvalue, saponification values and their significance.

Recommended Text

1. Foodchemistry, H.K.Chopra,P.S.Panesar,Narosa publishing house,2010.
2. JayashreeGhosh, Fundamental Concepts of Applied Chemistry, S.Chand & Co. Publishers, second edition, 2006.
3. Food Chemistry,Dr.L.RakeshSharma,Evince pub publishing,2022.
4. Food processing and preservation, G.Subbulakshmi, Shobha AUdipi, Pdmini S Ghugre, New age international publishers, second edition, 2021.

Reference Books

1. H.-D.Belitz,Werner Grosch, Food Chemistry Springer Science & BusinessMedia,4thEdition, 2009.

2. M.Swaminathan,Food Science and Experimental Foods, Ganesh and Company,1979.
3. Hasenhuettl, Gerard. L.; Hartel, Richard. W. Food Emulsifiers and their applications Springer New York 2nd ed. 2008.
4. Food Chemistry,H.-D.Belitz,W.Grosch,P.Schieberle,Springer,fourth revised and extended edition, 2009.
5. Principles of food chemistry, John M. deMan, 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 IN CHEMISTRY

Objectives of the course

This course aims at providing an overall view of the

- Atom structure and electronic configuration
- Types of chemical bonding characters
- Different states of mater and their general properties
- Nomenclature of and isomerism inorganic compounds
- Basic concepts of spectroscopy

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. Periodictable-periodic laws(MendeleevandMosley)-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-ordinatecovalentbond-Definition– Examples-Co-ordination 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: Chainisomerism, Functional isomerism,Positional isomerism and Meta isomerism.
Stereo isomerism: Geometrical and Optical isomerism-Chiral molecule-Enantiomers-Diastereomers-Mesocompounds-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 behavior-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-QuantizationofEnergylevel -Selection rule-IntensityoftheSpectrallines–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