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 2023-2024 onwards)

Semester-III				
Part	**Subject Status**	**Subject Title**	**Subject Code**	**Credit**
I	LANGUAGE	TAMIL/MALAYALAM/HINDI	E1TL31/ E1MY31/ E1HD31	3
II	ENGLISH	ENGLISH	E2EN31	3
III	CORE V	GENERAL CHEMISTRY-1II	EMCH31	4
III	CORE VI	QUALITATIVE INORGANIC ANALYSIS (MIXTURE)	EMCHP3	2
III	ELECTIVE 3	ALLIED PHYSICS	EEPH11	4
		ALLIED PHYSICS PRACTICAL	EEPHP1	2
IV	SEC 4	ENTREPRENEURIAL SKILLS IN CHEMISTRY	ESPH31	2
IV	EVS	ENVIRONMENTAL STUDIES	EEVS31	2
		NAAN MUTHALVAN (PESTICIDE CHEMISTRY)		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 TAMIL
தமிழக வரலாறும் பண்பாடும்

அலகு 1

தொழில் பழங்கால வரலாறும் சங்ககால வரலாறும்

1. தொழில் தமிழர்
2. பழைய கற்காலம்
3. புதிய கற்காலம்
4. உலோகக் காலம்
5. அகழ்வாராய்ச்சியில் தமிழும் தமிழரும் (கீழடி வரை)
6. திணை வாழ்வியல் (களவு வாழ்க்கை, கற்பு வாழ்க்கை, உணவு, அணிகலன்கள், வாணிகம், விளையாட்டுகள்)
7. கல்வியும் கலைகளும்
8. தமிழ் வளர்த்த சங்கம்
9. சங்க கால ஆட்சி முறை
10. அயல்நாட்டுத் தொடர்புகள்

அலகு 2

ஆட்சியர் வரலாறு

1. மூவேந்தர் வரலாறு
2. பல்லவர் வரலாறு
3. நாயக்கர் ஆட்சி
4. முகம்மதியர் ஆட்சி
5. மராட்டியர் ஆட்சி

அலகு 3

ஐரோப்பியர் கால வரலாறு

1. போர்த்துகீசியர்
2. டச்சுக்காரர்கள்
3. டேனிஸ்கரர்கள்
4. பிரெஞ்சுக்காரர்கள்
5. ஆங்கிலேயர்கள்
6. பாளையக்காரர்கள்
7. இந்தியா விடுதலை போராட்டத்தில் தமிழ்நாடு

அலகு 4

விடுதலைக்கிபின் தமிழ்நாட்டு வரலாறு

1. மொழிபோராட்டம்

2. சமூக மறுமலர்ச்சி
3. தொழில்நுட்ப வளர்ச்சி

அலகு 5

மொழிப்பயிற்சி

1. நிறுத்தக் குறிகள்
2. கலைச்சொற்கள்
3. மொழிபெயர்ப்பு

Text Books

- தமிழக வரலாறும் பண்பாடும் - கே. கே. பிள்ளை, உலகத் தமிழாராய்ச்சி நிறுவனம் , சென்னை
- தமிழர் நாகரீகம் பண்பாடும் - அ. தட்சிணாமூர்த்தி, யாழ் வெளியீடு, சென்னை
- தமிழக வரலாறும் பண்பாடும்-வே.தி.செல்லம், மணிவாசகர் பதிப்பகம், சென்னை

Reference Books

1. தமிழக சமூதாயா பண்பாட்டு கலை வரலாறு - கு சேதுராமன் , என்,சி,பி.எச், சென்னை
2. தமிழர் கலையும் பண்பாடும்-அ .கா.பெருமாள், என்,சி,பி.எச், சென்னை
3. ஒரு பண்பாட்டின் பயணம்: சிந்து முதல் வைகை வரை - ஆர். பாலகிருஷ்ணன், ரோஜா முத்தையா ஆராய்ச்சி நூலகம், சென்னை.

MALAYALAM - POETRY

UNIT I

This unit focus on significance of Malayalam Poetry and trends.

To familiarize the early stages of Malayalam poetry- Folklore heritage-Pattu-Bhakthi movement-Cherussery-Ezhutachan- Kunjan Nambiar-

Detailed study:

Jaritha Vilapam (Mahabharatam kilippattu) Ezhutachan

UNIT II

Romanticism –Asan- Ulloor – Vallathol

Detailed study :

1. Veena Poovu (First 7 slokas only)- Asan
2. Aa poomala- Changampuzha

UNIT III

Modernity in Malayalam poetry- First phase

Post Independent India and Modernization of Nation in Malayalam poetry

Detailed study

1. Yuga Parivarthanam- Vailoppilli Sreedhara Menon
2. Gandhiyum Godseyum- N .V.Krishna Warrier

UNIT IV

Modernity in Malayalam poetry- second phase

Detailed Study

1. Gajendra moksham _ Sugathakumari
2. Kozhi – Kadammanitta
3. Megharoopan – Aattoor Ravi Varma
4. Budhanum Attin kuttiyum – A. Ayyappan

UNIT V

This unit introduces the nature of samakalika kavitha It also evaluates s a m a k a l i k a kavitha,- the contemporary poetry originated after modern poetry- women, Dalit, environment and cyber issues.

Detailed study

1.Pattanbipuzhamanalil – P P Ramachandran
2.Malayalakavithakku oru Kathu- S. Joseph
3.Thoramazha – Rafeek Ahammad
4.Muttamadikkumbol – Anitha Thampi
5.Survey of India-B.M.Manoj

Recommended Text

Puthukavitha Ed by Dr.O.K.Santhosh.Madras University Publication (5 poems only)

(a) pattambipuzhamanalil,
(b) Malayala kavithakku oru kathu,
(c) Muttamadikkumbol,
(d) Thoramazha,
(e) Survey of India

Reading List (Print and Online)

1. Aadhunika Malayala Sahithya Charithram prasthanangaliloode – Dr. K.M.George (Ed.)
2. Kairaliyute Kadha – N.Krishnapillai
3. Kavitha Sahitya Charithram – M.Leelavathi
4. Adrushyathayute Akhyanangal- Rajesh Chirapadu
5. Adhunikananthara Malayala Kavitha –C.R.Prasad
6. Pen kavitha malayalathil-Sheeba Divakaran,kerala bhasha institute.Thiruvananthapuram
7. Samakalika Malayala kavitha-M.B.Manoj,Samayam Classics. Kannoor
8. Varnnaraji Dr.M.Leelavathi

HINDI - Patra Lekhan aur Paribhashik Shabdavali

Unit I

Niji Patra Lekhan

- Niji Patra – Arth aur Bhed
- Pitaji/Mataji ke naam patra
- Mitra, Bhai aadi ke naam patra
- Paribhashik Shabdawali – 20 words

Unit II

Samajik Patra Lekhan

- Samajik Patra – Arth aur Bhed
- Aavedan Patra – Noukri, Chutti aadi
- Dak Adhikari ke naam patra
- Paribhashik shabdawali – 20 words

Unit III

Vyavasayik Patra Lekhan

- Vyavasayik Patra – Arth aur Bhed
- Prakashak ke naam patra
- Shikayathi
- Paribhashik shabdavali – 20 words

Unit IV

- Samanya Parichay
- Sarkari Patra
- Ardh-Sarkari Patra
- Gyapan, Paripatra
- Anusmarak
- Paribhashik Shabdavali – 20 words

Unit V

- Precis Writing And Applied Grammar (Ling, Vachan and Karak)

Reference Books

1. Viyavaharik Hindi, Hindi Prachar press, T.Nagar, Madras-600 017
2. Alekhan aur Tippan – Prof. Viraj
3. Alekhan - Kichlu

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

1. https://youtu.be/-kUPGG0B4tU
2. https://www.youtube.com/watch?v=xk14MNb1r7k

GENERAL ENGLISH

Unit I ACTIVE LISTENING

Short Story

1.1 In a Grove – Akutagawa Ryunosuke Translated from Japanese by Takashi Kojima

1.2 The Gift of the Magi – O' Henry

Prose

1.3 Listening – Robin Sharma

1.4 Nobel Prize Acceptance Speech – WangariMaathai

Unit II INTERPERSONAL RELATIONSHIPS

Prose

2.1 Telephone Conversation – Wole Soyinka

2.2 Of Friendship – Francis Bacon Song on (Motivational/ Narrative)

2.3 Ulysses – Alfred Lord Tennyson

2.4 And Still I Rise – Maya Angelou

Unit III COPING WITH STRESS

Poem

3.1 Leisure – W.H. Davies

3.2 Anxiety Monster – RhonaMcFerran

Readers Theatre

3.3 The Forty Fortunes: A Tale of Iran

3.4 Where there is a Will – Mahesh Dattani

Unit IV Grammar

4.1 Phrasal Verbs & Idioms

4.2 Modals and Auxiliaries

4.3 Verb Phrases – Gerund, Participle, Infinitive

Unit V Composition/ Writing Skills

5.1 Official Correspondence – Leave Letter, Letter of Application, Permission Letter

5.2 Drafting Invitations

5.3 Brochures for Programmes and Events

Text Books (Latest Editions)

1. Wangari Maathai – Nobel Lecture. Nobel Prize Outreach AB 2023. Jul 2023.
2. Mahesh Dattani, Where there is a Will. Penguin, 2013.
3. Martin Hewings, Advanced English Grammar, Cambridge University Press, 2000
4. Essential English Grammar by Raymond Murphy

Web Resources

1. WangariMaathai – Nobel Lecture. Nobel Prize Outreach AB 2023. Mon. 17 Jul 2023. https://www.nobelprize.org/prizes/peace/2004/maathai/lecture/
2. Telephone Conversation - Wole Soyinka https://www.k-state.edu/english/westmank/spring_00/SOYINKA.html
3. Anxiety Monster-RhonaMcFerran www.poetrysoup.com

GENERAL CHEMISTRY-III

Objectives of the course

This course aims to provide a comprehensive knowledge on

- The physical properties of gases, liquids, solids and X-ray diffraction of solids.
- Fundamentals of nuclear chemistry and nuclear waste management.
- Applications of nuclear energy
- Basic chemistry of halo-organic compounds, phenol and other aromatic alcohols.
- Preparation and properties of phenols and alcohols.

UNIT-I

Gaseous state

Kinetic molecular model of a gas: postulates and derivation of the kinetic gas equation; The Maxwell –Boltzmann distribution of speed of molecules- average, root mean square and most probable velocity and average kinetic energy, law of equipartition of energy, degrees of freedom and molecular basis of heat capacities. Collision frequency; collision diameter; meanfree path and viscosity of gases.

Real gases: Deviations from ideal gas behaviour, (Andrew's and Amagat's plots); compressibility factor,Z, and its variation with pressure for different gases. Equations of states for real gases –Vander Waal's equation; Virial equation; Boyle temperature; Numerical problems based on equations of states for real gases, isotherms of real gases–critical phenomena–isotherms of CO2 -continuity of state –Vanderwaal's equation and the critical state; law of corresponding states- liquefaction of gases; numerical problems involving the core concepts.

Unit-II

Liquid and Solid State

Properties of Liquids-Surface tension, viscosity and their applications. Crystalline and amorphous– differences-geometry, isotropy and anisotropy, melting point; isomorphism, polymorphism.

Crystals–size and shape; laws of crystallography; symmetry elements –plane, Centre and axis; Miller indices, unit cells and space lattices; classification of crystal systems; Bravais lattices; X – ray diffraction – Bragg's equation

Packing in atomic solids – simple cubic, body centered cubic, face centered and hexagonal close packing; Co-ordination number in typical structures - NaCl, CsCl, ZnS, TiO2; comparison of structure and properties of diamond and graphite; Numerical problems involving core concepts

Defects in solids- stoichiometric and non-stoichiometric defects.

Liquid crystals–classification and applications.

UNIT-III

Nuclear Chemistry

Natural radioactivity -α, β and y rays; half-life period; Fajan–Soddy group displacement law; Geiger–Nattal rule; isotopes, isobars, isotones, mirror nuclei, isodiapheres; nuclear isomerism; radioactive decay series; magic numbers; units –

Curie, Rutherford, Roentgen; nuclear stability - neutron- proton ratio; binding energy; packing fraction; mass defect. Simple calculations involving mass defect and B.E., decay constant and t1/2and radioactive series.
Isotopes – uses – tracers – determination of age of rocks by radiocarbon dating. (Problems to be worked out)
Nuclear energy; nuclear fission and fusion–major nuclear reactors in India; radiation hazards, disposal of radioactive waste and safety measures.
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UNIT-IV

Halogen derivatives Aliphatic halogen derivatives

Nomenclature and classes of alkyl halides – isomerism, physical properties, Chemical reactions. Nucleophilic substitution reactions – SN1, SN2 and SNimechanisms with stereochemical aspects and effect of solvent.
Di, Tri &Tetra Halogen derivatives: Nomenclature, classification, preparation, properties and applications.

Aromatic halogen compounds

Nomenclature, preparation, properties and uses
Mechanism of nucleophilic aromatic substitution–benzyne intermediate.

Aryl alkyl halides

Nomenclature, benzyl chloride – preparation – properties and uses
Alcohols: Nomenclature, classification, preparation, properties, use; conversions–ascent and descent of series; test for hydroxyl groups.Oxidationof diols by per iodic acid and lead tetra acetate.

UNIT-V

Phenols

Nomenclature; classification, Preparation from diazonium salts, cumene, Dow's process, Raching process; properties – acidic character and effect of substitutiononacidity. Reactions–Fries, claisen rearrangement, Electrophilic substitution reactions, Reimer - Teimen, Kolbe, Schmidt, Gatermann synthesis, Libermann, nitro reaction, phthalein reaction.
Resorcinol, quinol, picric acid –preparation, properties and uses.

Aromaticalcohols

Nomenclature, benzyl alcohol – methods of preparation – hydrolysis, reduction of benzaldehyde, Cannizzaro reaction, Grignard synthesis, physical properties, reactions – reaction with sodium, phosphorus pentachloride, thionyl chloride, acetic anhydride, hydrogen iodide, oxidation–substitution on the benzene nucleus, uses.
Thiols: Nomenclature, structure, preparation and properties.

Recommended Text

1. B.R.Puri, L.R.Sharma, M.S.Pathania; PrinciplesofPhysicalChemistry, 46thedition, Vishal Publishing, 2020.
2. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, Milestone Publishers and Distributors, New Delhi, thirtieth edition, 2009.
3. P.L.Soni and Mohan Katyal, Textbook of Inorganic Chemistry, Sultan Chand & amp; Sons, twentieth edition, 2006.

4. M.K.Jain, S.C.Sharma, Modern Organic Chemistry, Vishal Publishing, fourth reprint,2003.
5. S.M. Mukherji, and S.P. Singh, Reaction Mechanism in Organic Chemistry, Macmillan India Ltd., third edition, 1994.

Reference Books

1. T.W. Graham Solomons, OrganicChemistry, JohnWiley&Sons, fifth edition, 1992.
2. A.Carey Francis,OrganicChemistry, TataMcGraw-Hill Education Pvt., Ltd.,New Delhi, seventh edition, 2009.
3. I.L. Finar,OrganicChemistry, Wesley Longman Ltd, England,sixth edition, 1996.
4. P. L. Soni, and H. M.Chawla - Text Book of Organic Chemistry, New Delhi,Sultan Chand & Sons, twenty ninth edition, 2007.
5. J.D.Lee, Concise Inorganic Chemistry, Blackwell Science, fifth edition, 2005.

Website and e-learning source

MOOC components

1. https://nptel.ac.in/courses/104104101 Solid state chemistry
2. https://nptel.ac.in/courses/103106071 Nuclear industries and safety
3. https://nptel.ac.in/courses/104106119s Introduction to organic chemistry

QUALITATIVE INORGANIC ANALYSIS

Objectives of the course

- To develop the skill on systematic analysis of mixture of inorganic salts. Study the principles/equation of the experiment.

Semi-Micro Qualitative Analysis

1. Analysis of simple acid radicals:Carbonate,sulphide,sulphate, chloride, bromide, iodide, nitrate
2. Analysis of interfering acid radicals: Fluoride, oxalate, borate, phosphate.
3. Elimination of interfering acid radicals and Identifying the group of basic radicals
4. Analysis of basic radicals (group wise): Lead, copper, bismuth, cadmium, iron, aluminium, arsenic, zinc, manganese, nickel, cobalt, calcium, strontium, barium, magnesium, ammonium.
5. Analysis of a mixture I to VIII containing two cations and two nions – of which one is interfering type.

Recommended Text

Reference Books:

1. V.Venkateswaran, R.Veera swamy and A.R.Kulandivelu, Basic Principles of Practical Chemistry, Sultan Chand & Sons, New Delhi, second edition, 1997.

Website and e-learning source

2. https://www.vlab.co.in/broad-area-chemical-sciences

ALLIED PHYSICS – I

COURSE OBJECTIVES

- To impart basic principles of Physics that which would be helpful for students who have taken programmes other than Physics.

UNIT-I

WAVES, OSCILLATIONS AND ULTRASONICS: simple harmonic motion (SHM) – composition of two SHMs at right angles (periods in the ratio 1:1) – Lissajous figures – uses – laws of transverse vibrations of strings – determination of AC frequency using sonometer (steel and brass wires) – ultrasound – production – piezoelectric method – application of ultrasonic inmedical field.

UNIT-II

PROPERTIES OF MATTER: Elasticity: elastic constants – bending of beam – theory of non- uniform bending – determination of Young‘s modulus by non-uniform bending – energy stored in a stretched wire – torsion of a wire – determination of rigidity modulus by torsional pendulum

Viscosity: streamline and turbulent motion – critical velocity – coefficient of viscosity – Poiseuille‘s formula

Surface tension: definition – molecular theory – droplets formation–shape, size and lifetime– drop weight method

UNIT-III

HEAT AND THERMODYNAMICS: Joule-Kelvin effect – Joule-Thomson porous plug experiment – theory – temperature of inversion –

thermodynamic system – thermodynamic equilibrium – laws of thermodynamics – heat engine – Carnot‘s cycle – efficiency – entropy – change of entropy in reversible

UNIT-IV

ELECTRICITY AND MAGNETISM: potentiometer – principle – measurement of thermo emf using potentiometer –magnetic field due to a current carrying conductor – Biot-Savart‘s law – field along the axis of the coil carrying current – peak, average and RMS values of ac current and voltage – power factor and current values in an AC circuit - fuses and circuit breakers in houses

UNIT-V

DIGITAL ELECTRONICS AND DIGITAL INDIA: logic gates, OR, AND, NOT, NAND, NOR , EXOR logic gates – universal building blocks – Boolean algebra – De Morgan‘s theorem – verification – overview of Government initiatives: semiconductor laboratories under Dept. of Space – an introduction to Digital India

TEXT BOOKS

1. R.Murugesan (2001), AlliedPhysics,S. ChandandCo,NewDelhi.
2. BrijlalandN.Subramanyam (1994), WavesandOscillations,VikasPublishing House,NewDelhi.
3. BrijlalandN.Subramaniam (1994), PropertiesofMatter,S.ChandandCo.,NewDelhi.

4. J.B.Rajam and C.L.Arora (1976). Heat and Thermodynamics (8th edition), S.ChandandCo.,New Delhi.
5. R.Murugesan(2005), OpticsandSpectroscopy,S.ChandandCo,NewDelhi.
6. A.Subramaniyam, AppliedElectronics2ndEdn.,NationalPublishingCo.,Chennai.

REFERENCE BOOKS

1. Resnick Halliday and Walker 2018). Fundamentals of Physics (11thedition), John Willey and Sons, Asia Pvt.Ltd., Singapore.
2. V.R.Khanna and R.S.Bedi (1998), Textbook of Sound 1st Edn. Kedharnaath Publishand Co, Meerut.
3. N.S.Khare and S.S.Srivastava (1983), Electricity and Magnetism 10th Edn., Atma Ram and Sons, New Delhi.
4. D.R.Khanna and H.R. Gulati(1979). Optics,S. Chand and Co. Ltd., New Delhi.
5. V.K.Metha(2004).Principles of electronics 6th Edn. S.Chand and company.

WEB RESOURCES

1. https://youtu.be/M_5KYncYNyc
2. https://youtu.be/ljJLJgIvaHY
3. https://youtu.be/7mGqd9HQ_AU
4. https://youtu.be/h5jOAw57OXM
5. https://learningtechnologyofficial.com/category/fluid-mechanics-lab/
6. http://hyperphysics.phy-astr.gsu.edu/hbase/permot2.htmlhttps://www.youtube.com/watch?v=gT8Nth9NWPMhttps://www.youtube.com/watch?v=9mXOMzUruMQandt=1shttps://www.youtube.com/watch?v=m4u-SuaSu1sandt=3shttps://www.biolinscientific.com/blog/what-are-surfactants-and-how-do-they-work

ALLIED PRACTICAL– I

COURSE OBJECTIVES

- Apply various physics concepts to understand Properties of Matter and waves, set up experimentation to verify theories, quantify and analyse, able to do error analysis and correlate results

Minimum of SIX Experiments from the list:

1. Young‘s modulus by non-uniform bending using pin and microscope
2. Young‘s modulus by uniform bending using optic lever,scale and telescope
3. Rigidity modulus by torsional oscillations without mass
4. Verification of Newton’s Law of Cooling
5. Co-efficient of viscosity - Stoke‘s method
6. Surface tension and interfacial Surface tension – drop weight method
7. index of prism using spectrometer
8. Verification of laws of transverse vibrations using sonometer
9. Calibration of low range voltmeter using potentiometer
10. Thermo emf using potentiometer
11. Thickness of a wire using air wedge
12. Construction of AND, OR, NOT gates using diodes and transistor

Note : Use of digital balance, digital screw gauge, digital calipers are permitted

ENTREPRENEURIAL SKILLS IN CHEMISTRY

Objectives of the course

The course aims at providing training to

- Develop entrepreneurial skills in students
- To provide hands on experience to prepare and develop products
- Stuy the principle /equation of the experiment.
- Develop start ups

UNIT-I

Food Chemistry

Food adulteration – contamination of food items with claystones, water and toxic chemicals -Common adulterants.

Food additives, Natural and synthetic anti-oxidants, glazing agents (hazardous effect), food colourants, Preservatives,leavening agents, Baking powder and baking soda, yeast, MSG, vinegar.

Dyes

Classification– Natural, synthetic dyes and their characteristics – basic methods and principles of dyeing.

UNIT-II

Hands on Experience (Students can choose any four)

Detection of adulterants in food items like coffee, tea, pepper, chilli powder, turmeric powder, butter, ghee, milk, honey etc., by simple techniques.

Preparation of Jam, squash and Jelly, Gulkand, cottage cheese.

Preparation of products like candles, soap, detergents, cleaning powder, shampoos, painbalm, toothpaste/ powder and disinfectants in small scale.

Extraction of oils from spices and flowers. Testing of water samples using testing kit.

Dyeing –cotton fabrics with natural and synthetic dyes

Printing–tie and dye, batik.

Recommended Text

1. George S & Muralidharan V, (2007) Fibre to Finished Fabric– A Simple Approach, Publication Division, University of Madras, Chennai.
2. Appaswamy G P, A Handbook on Printing and Dyeing of Textiles.

Reference Books

1. Shyam Jha, Rapid detection of food adulterant sand contaminants (Theory and Practice), Elsevier, eBookISBN9087128004289,1st Edition,2015

Web site and e-learning source

1. https://www.vlab.co.in/broad-area-chemical-sciences

PESTICIDE CHEMISTRY

Naan Mudhalvan (substitute)

Objectives of the course

This course aims to providing the students

- Knowledge about the various types of pesticides and their toxicity.
- To understand the accumulation of pesticides in the form of residues and its analysis.
- Knowledge on choice of alternate and eco-friendly pesticides.

Unit-I

Introduction: History of pesticides. Chemistry of Pesticides: Brief introduction to classes of pesticides (Chemical class, targets), structures, chemical names, physical and chemical properties.

Toxicity of pesticides: Acute and chronic toxicity in mammals, birds, aquatic species etc. Methods of analysis of pesticides.

Unit- II

Insecticides: Classification and study of following insecticides with respect to structure, chemical name, physical properties, chemical properties, synthesis, degradation, metabolism, formulations, Mode of action, uses, toxicity.Organophosphates and Phosphothionates: Acephate, Chlorpyriphos, Monocrotophos, and parathion-methyl. Organochlorine – Endosulfan, heptachlor;Carbamate:Cartaphydrochloride,Methomyl,Propoxur.

Unit-III

Pesticides residues: Introduction- application of agrochemicals, dissemination pathways of pesticides, causes of pesticide residues, remedies. Pesticides residues in atmosphere- entry into atmosphere, action of pesticides, effects on environments. Pesticides residues in water

- entry into water systems, action and effect in aquatic environment. Pesticides residues in soil. entry into soil, absorption, retention and transport in soil, effects on microorganism, soil condition and fertility, decomposition and degradation by climatic factors and microorganism.

Unit- IV

Pesticide Residues effect and analysis: Effects of pesticides residue on human life, birds and animals-routes for exposure to pesticides, action of pesticides on living system. Analysis of pesticides residues- sample preparation, extraction of pesticides residues (soil, water and vegetables/fruits) simple methods and schemes of analysis, multi-residue analysis.

Unit-V

Biopesticides: Pheromones, attractants, repellents–Introduction,types and application 8- Dodecen-1-ol, 10-cis-12-hexadecadienoic, Trimedlure, Cue-lure, methyl eugenol, N,N- Diethyl-m-toluamide, Dimethyl phthalate, Icaridin. Baits- Metaldehyde, Iron (II) phosphate, Indoxacarb, Zinc Phosphide, Bromadiolone.

Recommended Text

1. Handa .S.K,Principles of pesticide chemistry. Agrobios(India);2012.
2. Matolcsy. G, Nádasy. M, Andriska.V, Pesticide chemistry. Elsevier; 1989.
3. J. Miyamoto and P. C. Kearney, Pesticide Chemistry, Human Welfare and the Environment vol. IV Pesticide Residue and Formulation Chemistry, Pergamon press,1985.
4. R. Cremlyn: Pesticides, JohnWiley.

Reference Books

1. Roy N.K.,Chemistry of Pesticides. CBS Publisher & Distributors Pvt Ltd; 1st Ed. (2010).
2. Nollet. L.M., Rathore.H.S., Handbook of pesticides: methods of pesticide residues analysis. CRC press; 2016.
3. Ellerbrock. R.H., Pesticide Residues: Significance, Management and Analysis, 2005

ENVIRONMENTAL STUDIES

Course Objectives:

The main objectives of this course are:

- Enable the students to be aware of our natural resources, ecosystems and their linkages to society, livelihood, environment and conservation.

Unit I

Multidisciplinary Nature of Environmental Studies and Natural Resources:

Concept of Renewable and non-renewable resource, Natural resources and associated problems: Forest resources: Deforestation, Timber extraction, mining, dams and their effects. Water resources: Over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Land resources: Land degradation, man induced landslides, soil erosion and desertification.

UNIT II

Ecosystem: Concept of an Ecosystem, Structure and Functions of Ecosystem, Energy flow in the Ecosystem; Ecological Succession, Food Chains, Food webs and Ecological Pyramids, Characteristic Features of the following Ecosystem: Forest Ecosystem, Grassland Ecosystem and Desert Ecosystem, Aquatic Ecosystem (Ponds, Streams, Lakes, Rivers and Ocean Estuaries)

UNIT III

Biodiversity and its Conservation: Definition, levels and values of biodiversity; Threats to biodiversity- habitat loss, poaching of wildlife, man-wildlife conflicts, IUCN categories of threat; Terrestrial and marine hotspots of biodiversity in India; Conservation of Biodiversity - In-situ and Ex-situ conservation; Conservation schemes :Gir lion sanctuary project, Project tiger, Project elephant, Conservation of sea turtles in India. Ecotourism

UNIT IV

Environment Pollution: Types, causes, effects, and control - Air, Water, Soil and Noise pollution. Nuclear hazards and human health risks. Solid waste management: Control measure of urban and industrial waste. Climate change global warming, ozone layer depletion, acid rain, and impacts on human communities and agriculture

UNIT V

Social Issues and the Environment: Sustainable Development, Water Conservation, Resettlement and rehabilitation of people. Disaster Management: Floods, earthquake, cyclone and landslides. Consumerism and waste products; Environment Protection Act; Air and water (Prevention and control of Pollution) Act; Wild life protection Act; Forest conservation Act; Environmental movements (Chipko, Silent valley, Bishnois of Rajasthan). Environmental ethics. Environmental communication and public awareness.

Reading list

1. Erach Bharucha, 2021, Textbook of Environmental Studies for Undergraduate Courses, Third Edition, Orient blackswan Pvt. Ltd., Hyderabad.
2. V.K. Ahluwalia, Environmental Studies (Second Edition), Ane books India, T-Nagar, Chennai.
3. Y.K. Singh, 2006, Environmental science, New Age International (P) Ltd., Publishers, New Delhi.
4. S. P. Misra, 2023, Essential Environmental Studies, 4th Edn, Ane Books Pvt. Ltd., New Delhi.
5. G.S. Vijayalakshmi, A.G.Murugesan and N.Sukumaran, 2006, Basics of Environmental Science, Manonmaniam Sundaranar University Publications, Tirunelveli.

Recommended texts

1. N.Arumugam and V. Kumaresan, 2014, Environmental studies, 4th edition, Saras Publication, Nagercoil, TamilNadu.
2. M.Basu, and S. Xavier, 2016, Fundamentals of Environmental Studies, Cambridge University Press.
3. A.K. Mitra and R. Chakraborty, 2016, Introduction to Environmental Studies, Book Syndicate.
4. J.S. Singh, S.P.Singh, and S.R. Gupta, 2014, Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.