B. Sc. CHEMISTRY

CHOICE BASED CREDIT SYSTEM (CBCS)

Curriculum and Syllabus
Regular (2015 – 2016)

Enable | Enlighten | Enrich
(Deemed to be University)
(Under Section 3 of UGC Act 1956)

DEPARTMENT OF CHEMISTRY
FACULTY OF ARTS, SCIENCE AND HUMANITIES

KARPAGAM ACADEMY OF HIGHER EDUCATION

(Established Under Section 3 of UGC Act, 1956)
Eachanari (Post), Coimbatore – 641 021,

DEPARTMENT OF CHEMISTRY
B. Sc. CHEMISTRY
SCHEME OF EXAMINATION (2015-2018 onwards)

Course code	Name of the course	Objectives & Outcomes		Instruction hours per week			Credits	Maximum Marks		
		PEO's	PO's	L	T	P		CIA	ESE	Total
SEMESTER I										
15LAU101	Language – I	4	7	05	0	0	05	40	60	100
15ENU101	English – I	4	7	04	0	0	04	40	60	100
15CHU101	General Chemistry-I	1	1,2,3	05	0	0	05	40	60	100
15CHU111	Chemistry Practical- I (Inorganic Qualitative Analysis)	1	1,2,3	0	0	05	03	40	60	100
15CHU102	Allied Physics I	1,2,3	2,3,4 ,10	04	0		04	40	60	100
15CHU112	Allied Physics Practical- I	2,5	2,3,4	0	0	03	02	40	60	100
15FCA101	Foundation course - A(Value Education)	1	1.2	02	0	0	01	100	-	100
15SSD101	Soft skill development - 1	4	8,11	02	0	0	-	-	-	-
	Semester total						24	**340**	**360**	**700**
	SEMESTER – II									
15LAU201	Language – II	4	7	05	0	0	05	40	60	100
15ENU201	English – II	4	7	04	0	0	04	40	60	100
15CHU201	General Chemistry-II	1,2	1,2,3 ,4	05	0	0	05	40	60	100
15CHU211	Chemistry Practical- II (Inorganic Preparations and Quantitative Analysis)	2,3	2,3,8	0	0	05	03	40	60	100
15CHU202	Allied Physics II	1,2,3	2,3,4 ,10	04	0	0	04	40	60	100
15CHU212	Allied Physics Practical- II	2,5	2,3,4	0	0	03	02	40	60	100
15FCB201	Foundation Course-B (Environmental Studies)	1	1,2	02	0	0	01	100	-	100
15SSD201	Soft skill Development– 1	4	8,11	02	0	0	01	100	-	100
	Semester total						**25**	**440**	**360**	**800**
	SEMESTER – III									
15ENU301	English – III	4	7	04	0	0	04	40	60	100
15CHU301	General Chemistry- III	1,2	1,4.10	05	0	0	05	40	60	100
15CHU302	Surface Chemistry	1,2	1,3,4	05	0	0	05	40	60	100

15CHU311	Chemistry Practical-III (Quantitative Analysis)	2,3	3.7,10	0	0	04	02	40	60	100
15CHU303A	Allied Mathematics-I	1,4	1,4,5,10	06	0	0	04	40	60	100
15CHU303B	Allied Statistics-I	2	5							
15CHU303C	Allied Pharmaceutical chemistry-I	1,2,3	2,3,6,10							
15FCC301	Computer Course	1,2	1,2,7,8	04	0	0	02	100	-	100
15SSD301	Soft skill Development– 2	4	8,11	02	0	0	-	-	-	-
	Semester total						**22**	**300**	**300**	**600**
	SEMESTER – IV									
15ENU401	English – IV	4	7	04	0	0	04	40	60	100
15CHU401	General Chemistry- IV	1,2	1,3,4	06	0	0	06	40	60	100
15CHU402	Physical Chemistry (Chemical kinetics)	1,2,3	2,3,4,10	06	0	0	06	40	60	100
15CHU411	Chemistry Practical- IV (Organic Qualitative Analysis)	3,4	2,7,9	0	0	06	03	40	60	100
15CHU403A	Allied Mathematics-II	2,3	2,3,4	06	0	0	04	40	60	100
15CHU403B	Allied Statistics-II	2	5							
15CHU403C	Allied Pharmaceutical chemistry-II	1,2,3	2,3,6,10							
15SSD401	Soft skill Development - 2	4	8,11	02	0	0	01	100	-	100
	Semester total						**24**	**300**	**300**	**600**
	SEMESTER – V									
15CHU501	Organic Chemistry	2,3	4,5,8	05	0	0	05	40	60	100
15CHU502	Inorganic Chemistry	2,3	4,7,8	05	0	0	05	40	60	100
15CHU503	Electrochemistry	2,3	1,4,8	05	0	0	05	40	60	100
15CHU504	Nano chemistry	2,3	2,4,8	05	0	0	05	40	60	100
15CHU505A	Green Chemistry	2,3	1,3,6	05	0	0	05	40	60	100
15CHU505B	Environmental Chemistry	2,3,4	2,4,5,10							
15CHU505C	Bioinorganic Chemistry	2,3,4	2,4,5,8,11							
15CHU511	Chemistry Practical- V (Gravimetric Analysis)	2,3,4	2,4,6,7,10	0	0	05	03	40	60	100
15OEU501	Open elective(Chemistry of consumer products)	1	1,3,6	-	-	-	03	-	100	100

	Semester total						**31**	**240**	**460**	**700**
	SEMESTER – VI									
15CHU601	Chemistry of Natural Products	1,2,3	4,5,8	05	0	0	05	40	60	100
15CHU602	Physical Methods and Chemical Structures	1,2,3	2,7,8 ,10	05	0	0	05	40	60	100
15CHU603 A	Radiation Chemistry	1,2,3	2,3,7 ,11	05	0	0	05	40	60	100
15CHU603 B	Dye Chemistry	1,2,3	2,3,7 ,11							
15CHU603 C	Chemistry of Materials	1,2,3	1,3,4 ,10							
15CHU611	Chemistry Practical- VI (Physical Chemistry)	1,2,3	2,3,4 ,5,6	0	0	05	03	40	60	100
15CHU691	Project	1,2,3 ,4	1,2,3 ,5,6, 8	10	0	0	05	80	120	200
15EAU601	NCC/NSS/Sports/Club activity etc			-			-	-	-	-
							23	**240**	**360**	**600**
	G. Total			**180**		**-**	**149**	**1860**	**2140**	**4000**

List of Allied Elective (Theory)			
Code	**Course**	**Code**	**Course**
15CHU303A	Allied Mathematics-I	15CHU403A	Allied Mathematics-II
15CHU303B	Allied Statistics-I	15CHU403B	Allied Statistics-II
15CHU303C	Allied Pharmaceutical chemistry-I	15CHU403C	Allied Pharmaceutical chemistry-II

List of Core Course Elective (Theory)			
Code	**Course**	**Code**	**Course**
15CHU505A	Green Chemistry	15CHU603A	Radiation Chemistry
15CHU505B	Environmental Chemistry	15CHU603B	Dye Chemistry
15CHU505C	Bioinorganic Chemistry	15CHU603C	Chemistry of Materials

Open Elective (Theory)

Code	Course
15OEU501	Chemistry of Consumer products

Computer Course	
Code	**Course**
15FCC301A	Introduction to Computers
15FCC301B	Introduction to Multimedia

Self study courses

Code	Course(s)	Hrs / week	Marks			Exam / Hrs	Credit
			CIA	ESE	Total		
15CHU506	Leather chemistry	-	-	100	100	3	04
15CHU604	Forensic chemistry	-	-	100	100	3	04

B. Sc. Honours

SEMESTER – V							
15CHU507	Spectroscopy	-	40	60	100	3	06
SEMESTER – VI							
15CHU605	Bio - Organic Chemistry	-	40	60	100	3	06
Total			**80**	**120**	**200**	**-**	**12**

Programme Outcome

1. Have firm foundations in the fundamentals and application of current chemical and scientific theories.
2. Are able to design, carry out, record and analyze the results of chemical experiments.
3. Knows the proper procedures and regulations for safe handling and use of chemicals and can follow the proper procedures and regulations for safe handling when using chemicals.
4. Students should have a working knowledge of the main areas of chemistry: organic, inorganic, analytical, and physical.
5. Students should possess critical thinking and problem solving abilities.
6. Students should be able to perform and understand chemical research.

7. Students should be able to describe, both in writing and orally, chemical processes and procedures
8. Students should be able to work in a chemical or related field.

Programme Specific Outcome

9. Are able to use modern instrumentation and classical techniques, to design experiments, and to properly record the results of their experiment.
10. Students should have a basic level understanding of the following areas of chemistry - Analytical, Inorganic, Organic, and Physical Chemistry.
11. Students should be able to work in a chemical or related field.

Programme Educational Objectives

PEO-1

Acquire the fundamental principles of science and demonstrate broad knowledge of descriptive chemistry and will be able to nurture the needs of industries/laboratories related to chemistry

PEO-2

To motivate critical thinking and analytical skills to solve chemical problems of practical relevance to society while complying with economical, environmental, ethical, and safety factors.

PEO-3

To synthesize, separate and characterize compounds using published reactions, protocols, standard laboratory equipment, and modern instrumentation.

PEO-4

Demonstrate professional excellence, ethics and will be able to communicate effectively the scientific information and research results in written and oral formats, to both professional scientists and to the public.

Mapping

PO's	1	2	3	4	5	6	7	8	9	10	11
PEO 1	X	X	X	X			X		X	X	
PEO 2					X		X		X		
PEO 3		X				X			X		X
PEO 4						X	X	X		X	X

Blue- Employability
Green- Entrepreneurship
Red – Skill development

பகுதி – I, தமிழ் | பருவம் I

15LAU101 : **தமிழ் முதல் தாள்** | 5-H,5-C

அலகு – I : இக்கால இலக்கியம்

தத்துவம் : மகாகவி பாரதியார் – பகைவனுக்கு அருள்வாய்.
கவிஞர் ந.பிச்சமூர்த்தி – கிளிக்கூண்டு

இயற்கை : பாவேந்தர் பாரதிதாசன் – அழகின் சிரிப்பு – ஞாயிறு.

சமுதாயம் : கவிக்கோ அப்துல் ரகுமான் – இன்றைய நிலை

அறிவியல் : கவிஞர் சிற்பி பாலசுப்பிரமணியன் – காலம்.

பெண்ணியம் : கவிஞர் சிவரமணி – வையகத்தை வெற்றிகொள்ள

சூழலியல் : அன்பாதவன் - மரணம்

காதல் : வைரமுத்து - காதல் உயில்

தன்னம்பிக்கை பா.விஜய் - தன்னம்பிக்கை

அலகு – II : அற இலக்கியம்

1. திருக்குறள் - தேர்ந்தெடுக்கப்பட்ட குறள்கள் 20
2. நான்மணிக்கடிகை - தேர்ந்தெடுக்கப்பட்ட ஐந்து பாடல்கள்
3. திரிகடுகம் - தேர்ந்தெடுக்கப்பட்ட ஐந்து பாடல்கள்

அலகு - III : சிற்றிலக்கியம்

1. நரிவிருத்தம் - அறன் வலியுறுத்தல்
2. தமிழ் விடு தூது - தமிழின் சிறப்புரைத்தல்
3. மதுரை மீனாட்சியம்மைப் பிள்ளைத்தமிழ் - தொடுக்கும் கடவுள் பழம்பாடல்

அலகு – IV : சிறுகதை

1. புதுமைப்பித்தன் - நிகும்பலை
2. தனுஷ்கோடி ராமசாமி - கந்தகக் கிடங்கிலே
3. கந்தர்வன் - துண்டு
4. வாஸந்தி - வடிகால்
5. சி.ஆர். ரவீந்திரன் - வழுக்குமரம்

அலகு- V : மொழிப்பயிற்சி

1. விண்ணப்பங்கள் எழுதுதல் மற்றும் கடிதப் பயிற்சி
2. மொழிபெயர்ப்புப் பயிற்சி

பாட நூல்: கற்பகச்சோலை – தமிழ் ஏடு. கற்பகம் பல்கலைக்கழகத் தமிழ்த் துறை வெளியீடு.

Part I TAMIL 2015. Karpagam University, Coimbatore – 21.

Semester: I

15ENU101 ENGLISH -I 4H- 4C

Instruction Hours/week: L:4, T:0, P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives

- To enable the learners to acquire English language skills at a faster pace.
- To train the learners to reflect on the literary works and communicate flexibly.
- Know about the Prose and Poetry
- To develop the Short Story:
- Learn about Vocabulary, Grammar and Composition:
- Know about Proverb Expansion

Course Outcomes

1. Enable the learners to acquire English language skills at a faster pace.
2. Trained the learners to reflect on the literary works and communicate flexibly.
3. Knowledge about the Prose and Poetry
4. Development of the Short Story:
5. Learnt about Vocabulary, Grammar and Composition:
6. Knowledge about Proverb Expansion

UNIT I:

Prose: Google Guys (Extract) – Richard L Brandt
Poetry: The Blind Pedlar – Osbert Sitwell
Short Story: A Garden So Rich – Christie Craig
Vocabulary: Prefixes, Antonyms, Sentence Completion
Grammar: Articles, Adverbs, Pronouns
Composition: Proverb Expansion

UNIT II:

Prose: Happiness 101 – Geeta Padmanabhan
Poetry: An Old Woman **–** Arun Kolatkar
Vocabulary: Suffixes, Analogies
Grammar: Nouns, Adjectives
Composition: Dialogue Writing

UNIT III:

Prose: Structured Procrastination – John Perry
Short Story: The Umbrella Man – Roald Dahl
One-Act Play: The Boy Who Stopped Smiling – Ramu Ramanathan
Vocabulary: Synonyms, Euphemisms, Word Definitions
Grammar: Verbs, Conjunctions and Interjection, Indirect/Reported Speech

UNIT IV:

Poetry: No Sentence – Anjum Hassan

One-Act Play: While the Auto Waits- O' Henry
Vocabulary: Words Often Confused, Anagrams
Grammar: Prepositions, Voice- Active and Passive
Composition: Letter Writing- Informal

UNIT V:

Short Story: The Bird **–** Amar Jalil
One-Act Play: The Cellphone Epidemic – Claudia I. Haas
Vocabulary: Portmanteau Words, One Word Substitute
Grammar: Questions, Pronunciation
Composition: Letter Writing- Formal

PRESCRIBED TEXTS:

Rao, G. Chandralekha and et al. Spring 2013. Emerald Publishers: Chennai.

REFERENCE BOOK:

Syamala, V. English for Communication. 2006. Emerald Publishers: Chennai

Semester: I

15CHU101 GENERAL CHEMISTRY -I 5H- 5C

Instruction Hours/week: L:5, T:0, P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives

Students should be able

- To understand the limitations of classical mechanics and its drawbacks.
- To understand the fundamentals of quantum mechanics and Schrödinger equation for simple atoms.
- To understand and write the electronic configuration of elements.
- To understand a versatile knowledge of different types of bonding like ionic and covalent bonding.
- To understand the basic reactions and properties of alkenes and dienes.
- To know the classification of reagents

Course Outcomes

The students

1. Understand the drawbacks of classical mechanics
2. Understand the fundamentals of quantum mechanics and Schrödinger equation for Hydrogen atom.
3. Know the various rules and principles to write the electronic configuration of elements
4. Have a versatile knowledge of different types of bonding like ionic and covalent bonding.
5. Have knowledge of reactions and properties of alkenes and dienes.
6. Gained knowledge about the classification of reagents.

Methodology

Blackboard teaching, Powerpoint presentation and group discussion.

UNIT-I

Periodic Properties - General group discussion restricted to Atomic radii, Ionic radii, Oxidation state, Ionization energy, Electron affinity and Electronegativity.

UNIT-II

Chemical bonding-Theories of bonding-Ionic bonding - Ionic crystals - NaCl and CsCl crystal structure - Lattice energy and its determination using Born-Haber cycle - Factors affecting crystal lattice energy - properties of ionic crystals - melting point, hardness, electrical conductivity in molten condition and in solution - Fajan's rules -Covalent bonding - sigma and pi bonding - partial ionic character of covalent bonds from electro negativity and dipole moment data - three centered bond - Geometry of molecules- Bonding weaker than covalent –Vanderwaal's forces– Hydrogen bonding - nature, energy and effect on structure and properties.

UNIT-III

Basic principles of qualitative analysis of cations and anions in the inorganic mixture. Polar effects - Inductive effect, Mesomeric effect, Electromeric effect, hyper conjugation. Classification of reagents - Electrophile, Nucleophile and Free radical.

Types of reaction - Polar reactions involving carbonium ions and carbanions with simple examples. Aliphatic hydrocarbons - Restricted rotation about single bond and preferred rotational conformations in ethane.

UNIT-IV

Alkenes: Preparation by Wittig reaction, mechanism of Beta elimination. E_1, E_2 and Syn elimination. Hofmann rule and Saytzeff rule.

Dienes: Stability of isolated and conjugated compounds. 1, 2 and 1, 4 additions - Diels Alder reaction. Free radical addition – Polymerization - Synthetic rubber.

Cyclo-Alkanes: Preparation by Dieckmann ring closure and by reduction of aromatic hydrocarbons - Ring opening reactions of cyclo propane with H_2, Br_2 and HI.

UNIT-V

Blackbody radiation, Planck's radiation law, photoelectric effect, Compton effect, de Broglie's hypothesis, Heisenberg's uncertainty principle. Quantum numbers - Postulates of quantum mechanics. Schrodinger wave equation and a particle in a box, energy levels, wave functions and probability densities. Schrodinger wave equation for H-atom. Separation of variables, Radial and angular functions, hydrogen like wave functions, quantum numbers and their importance.

TEXT BOOKS:

1. Bahl, B.S and Arun Bahl, 2006. A textbook of Organic Chemistry, 18th Edition. S.Chand & Co.
2. Puri, Sharma & Pathania, 2013. Elements of Physical Chemistry, Vishal Publishing Co., Jalandar.
3. Puri, B.R., L.R.Sharma and Kalia, 2011. Principles of Inorganic Chemistry, Shoban lal & Co., Jalandar.
4. Malik, W., R.D.Madan and G.D.Tuli, 2004. Selected topics in Inorganic Chemistry, S.Chand & Co., New Delhi.

REFERENCES

1. Bahl, B.S., Arun Bahl and G.D.Tuli, 2004. Essentials of Physical Chemistry. S.Chand & Co., New Delhi.
2. Madan, R.D., 2014. Modern Inorganic Chemistry, S.Chand & Co., New Delhi.
3. Soni, P.L., 2004. Inorganic Chemistry, S.Chand & Sons, New Delhi.
4. Soni, P.L. and S.M.Chawla, 2003. A textbook of Organic Chemistry, S.Chand & Co., New Delhi.
5. Anup Pathak, Anup Saha, 2012, Organic Chemistry, Vol-I, 2nd edn, Books and allied (P) Ltd.
6. Iran N. Levine, 2009, Physical chemistry, 5th edn, Mcraw Hill, New York.

Semester: I

CHEMISTRY PRACTICAL- I

15CHU111 (INORGANIC QUALITATIVE ANALYSIS) 5H-3C

Instruction Hours/week: L:0, T:0, P:5 Marks: Internal:40 External: 60 Total:100

Course Objective

- To understand and develop the skill to analyse qualitatively the anions
- To understand and develop the skill to analyse qualitatively the cations present in a mixture.
- To Learn about the qualitative analysis of cations
- To Learn about the qualitative analysis anions in a mixture by Semi micro methods.
- To analyse the cations like Lead, Copper, Bismuth, Calcium, Strontium, Magnesium and Ammonium.
- To analyse the anion like Carbonate, Sulphide, Sulphate, Nitrate, Chloride, Bromide, Fluoride, Borate, Oxalate and Phosphate.

Course outcomes:

1. Understood and develop the skill to analyse qualitatively the anions
2. Understood and develop the skill to analyse qualitatively the cations present in a mixture.
3. Learnt about the qualitative analysis of cations
4. Learnt about the qualitative analysis anions in a mixture by Semi micro methods.
5. Analysis the cations like Lead, Copper, Bismuth, Calcium, Strontium, Magnesium and Ammonium.
6. Analysis the anion like Carbonate, Sulphide, Sulphate, Nitrate, Chloride, Bromide, Fluoride, Borate, Oxalate and Phosphate.

Methodology

Demonstration of Experiments and Black board teaching.

Analysis of mixture containing two cations and two anions which contain one interfering ion. Semi micro methods using the conventional scheme with hydrogen sulphide may be adopted.

CATIONS TO BE STUDIED: Lead, Copper, Bismuth, Calcium, Strontium, Magnesium and Ammonium.

ANIONS TO BE STUDIED: Carbonate, Sulphide, Sulphate, Nitrate, Chloride, Bromide, Fluoride, Borate, Oxalate and Phosphate.

TEXT BOOKS:

1. Venkateswaran,V., R.Veeraswamy and A.R.Kulandaivelu, 2004. Basic Principles of Practical Chemistry, 2nd Edition, S.Chand Publications, New Delhi .
2. Thomas, A.O., 2003. Practical Chemistry, Scientific Book Center, Cannanore.

REFERENCES

1. Ramanujam, V.V., 2004. Inorganic Semi-micro Qualitative Analysis, 3rd Edition, The National Publishing Company, Chennai.
2. Bajpai, D.N. and S.Giri, 2001. Practical Chemistry, 8th Edition, S.Chand Publications, New Delhi .
3. Furniss, B.S., A.J.Hannaford, P.W.G.Smith and A.R.Tatchell, 2004.Vogel's Textbook of Practical Organic Chemistry, 5th Edition, Pearson Education Ltd., Singapore.
4. Mendham, J., R.C.Denney, J.D.Barnes and M.Thomas, 2002. Vogel's textbook of quantitative Chemical Analysis, 6th Edition, Pearson Education Ltd., Singapore .

Semester –I

15CHU102 ALLIED PHYSICS–I 4H-4C

Instruction Hours/week: L:4, T:0, P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives:

- To understand basic theories and experiments in Physics.
- To understand the fundamentals of physics.
- To educate and motivate the students in the field of science
- To know about Debroglie's concept of matter waves
- To learn about Amplifiers
- To Learn about Digital Electronics And Optics

Course Outcomes:

1. Students will demonstrate proficiency in mathematics and the mathematical concepts to understand physics.
2. Students will design and conduct an experiment (or series of experiments) demonstrating their understanding of the scientific method and processes.
3. Students will demonstrate an understanding of the analytical methods required to interpret and analyze results and draw conclusions as supported by their data.
4. Knowledge about Debroglie's concept of matter waves
5. Learnt about Amplifiers
6. Learnt about Digital Electronics And Optics

UNIT – I

MODERN PHYSICS

Debroglie's concept of matter waves- Debroglie's wavelength –Characteristics of Debroglie's matter waves- calculation of Debroglie's wavelength of material particles like electrons –experimental study of matter waves-Thomson's experiment

UNIT – II

ANALOG ELECTRONICS

Construction, characteristics and applications of Zener diode, Photo diode, Light emitting diode (LED); working, efficiency, ripple factor and advantages of a full wave rectifier-Qualitative analysis of a common emitter amplifier;Phase reversal of the output voltage;advantage of common emitter amplification circuit.

UNIT - III

AMPLIFIERS

Circuit symbol polarity conventions and virtual ground or summing point of an operational amplifier; characteristics of an ideal operational amplifier; amplifier as an adder, subtractor, differentiator and integrator.

UNIT – IV

DIGITAL ELECTRONICS

Number systems-Binary Octal-Hexa decimal-ASCII and EBCDIC-Redundant coding for error detection and correction. Basic logic design using digital integrated circuits. Truth tables, Boolean algebra, Simple arithmetic circuits-exclusive half adder-full adder-half subtractor, full subtractor. NAND AND NOR As Universal Building Block-De Morgan's theorem and its proof.

UNIT –V

OPTICS

Reflection – Refraction – Snell's law – Total internal reflection – Interference – Diffraction – Polarisation – Coherence

TEXT BOOKS:

1. Murugesan. R., Modern Physics, S.Chand & CO, New Delhi
2. Aruldhas G. and P.Rajagopal, 'Modern Physics', Printice Hall of India, New Delhi, 2009

REFERENCES:

1. Rajam. J.B., Atomic Physics, S.Chand & Co, New Delhi.
2. Gupta and Kumar, 2000, Solid State Physics - Pragati Prakashan, Meerut.
3. Kittel. C., 1996, Introduction to Solid State Physics, 7TH Edition, John Willey & sons, New Delhi.
4. Dekkar. A.J. , 1900, Solid State Physics - Macmillan India Ltd., New Delhi.

Semester – I

15CHU112 ALLIED PHYSICS PRACTICAL - I 3H-2C

Instruction Hours/week: L:0, T:0, P:3 Marks: Internal:40 External: 60 Total:100

Course Objective

- To acquire basic understanding of laboratory technique and
- To educate and motivate the students in the field of Physics
- To allow the students to have a deep knowledge of fundamentals of optics.
- To work efficient in the Young modulus, rigidity modulus
- Refractive Index of a liquid prism-Spectrometer
- Thickness of a thin wire-Air wedge method

Course outcome

Students can able to

1. Perform basic experiments in mechanics and electricity and analyze the data.
2. Acquire engineering skills and Practical knowledge, which help the student in their everyday life.
3. Knowledge about the physical Principles and applications of Electronics.
4. Work efficiently in the Young modulus, rigidity modulus
5. Refractive Index of a liquid prism-Spectrometer
6. Thickness of a thin wire-Air wedge method

Any 8 Experiments

1. Young's Modulus-Non Uniform bending-Optic lever
2. Young's Modulus-Static cantilever
3. Rigidity modulus- Dynamic method
4. Acceleration due to gravity-Compound pendulum
5. Refractive Index of a liquid prism-Spectrometer
6. Refractive Index of a solid prism (I-d) curve-Spectrometer
7. Co-efficient of thermal conductivity-Lee's disc method
8. Wavelength of spectral lines -Grating-minimum deviation method-Spectrometer.
9. Characteristics of a Junction diode
10. μ of a lens-Newton's ring method
11. Thickness of a thin wire-Air wedge method
12. Frequency of tuning fork and density of solid and liquid – Melde's String

REFERENCES:

1. Ouseph C.C., U.J. Rao and V. Vijayendran 2007, Practical Physics and Electronics, S.Viswanathan (Printers & Publishers) Pvt. Ltd., Chennai

2. Singh S.P., 2003, Advanced Practical Physics – 1, 13th Edition, Pragathi Prakashan, Meerut

3. Singh S.P., 2000, Advanced Practical Physics – 2, 12th Edition, Pragathi Prakashan, Meerut

Semester – I

15FCA101 **FOUNDATION COURSE A (VALUE EDUCATION)** **2H – 1C**

Instruction Hours/week: L: 2 T: 0 P: 0 Marks: Internal: 100 External: Nil Total: 100

Course Objectives:

- To improve the integral development of human begins
- To train the students towards sustainable lifestyle
- To create awareness about the values and their significance and role
- To imbibe the concept of discipline and freedom
- To know about goal setting
- To know about responsibility

Course outcomes:

1. **I**mproved the integral development of human begins
2. Trained the students towards sustainable lifestyle
3. Created awareness about the values and their significance and role
4. Imbibed the concept of discipline and freedom
5. Knowledge about goal setting
6. Knowledge about responsibility

UNIT – I

Concept of Self, self-esteem and self-confidence. Concept of personality, determinants and disorgiansation of it. Personality development – meaning.

UNIT – II

Goal setting – meaning and importance; steps in goal setting Manners and Etiquette – meaning need and importance; means to improve. Positive thinking.

UNIT – III

Discipline – meaning. Concept of Roles and Responsibility Time Management – Meaning and steps for effective time management.

UNIT – IV

Interpersonal relationship – meaning and importance; means to improve it. Healthy friendship.

UNIT – V

Family Relationship importance of it; Means to improve. Spirituality – meaning. Its relationship with Altruism, sacrifice, self control, tolerance and truthfulness.

TEXT BOOKS

1. Karpagam Academy of Higher Education, Study Material, 2015.

Semester – I & II

15SSD101 SOFT SKILL DEVELOPMENT – I 2H – 1C

Instruction Hours / week: L: 2 T: 0 P: 0 Marks: Internal: 100 External: Nil Total: 100

Course Objective

- To achieve the analytical skills
- To know about reasoning competencies
- To improve their communication and presentation skills
- Gain the knowledge on both Aptitude and Soft skills to the students
- Reinforcing competencies in soft skills which are crucial in a social setting
- Learn critically evaluate and demonstrate various principles involved in solving mathematical problems and to adopt new and faster methods of calculations

Course Outcomes

1. achieve the analytical skills
2. To know about reasoning competencies
3. To improve their communication and presentation skills
4. Gained the knowledge on both Aptitude and Soft skills to the students
5. Learnt critically evaluate and demonstrate various principles involved in solving mathematical problems and to adopt new and faster methods of calculations.
6. Reinforcing competencies in soft skills which are crucial in a social setting

UNIT - I

Introduction to Quantitative Aptitude, Speed Maths, Problems on Numbers, Averages, Ratios and Proportions, Problems on Ages

UNIT - II

Number Series, Blood Relation, Image Analysis, Direction Sense, Syllogism, Coding and Decoding

UNIT – III

Percentages, Data Interpretation, Profit and Loss, Simple Interest and Compound Interest

UNIT – IV

Parts of Speech, Tense, Subject Verb Agreement, Active and Passive Voice, Articles, Prepositions

UNIT - V

Conditional Clause, Degrees of Comparison, Goal Setting, Interpersonal Skills

பகுதி – I, தமிழ் | பருவம் II

15LAU201 : **தமிழ் இரண்டாம் தாள்** | 5-H,5-C

அலகு - I : பக்தி இலக்கியம்

1. சைவம் - மூவர் தேவாரத்திலிருந்து தேர்ந்தெடுக்கப்பெற்ற15 பாடல்கள்
2. வைணவம் – ஆண்டாள் நாச்சியாரின் திருப்பாவையிலிருந்து 11 பாடல்கள்

அலகு – II : சங்கஇலக்கியம்

அ). எட்டுத்தொகை

நற்றிணை: 1. இலை இல பிடவம், **திணை** – முல்லை,
ஆசிரியர் – விழிக்கட் பேதைப் பெருங்கண்ணனார்.
2. மடல் மா ஊர்ந்து, **திணை** – குறிஞ்சி, **ஆசிரியர்** – மடல் பாடிய மாதங்கீரனார்.

குறுந்தொகை : 1. உள்ளார் கொல்லோ, **திணை** – பாலை, **ஆசிரியர்** – பெருங்கடுங்கோ.
2. யாரினும் இனியன், **திணை** – மருதம், **ஆசிரியர்** – வடமவண்ணக்கன் தாமோதரனார்.

ஐங்குறுநூறு : 1. நுண்ணேர் புருவத்த, **திணை** – குறிஞ்சி, **ஆசிரியர்** – கபிலர்.
2. அவறொறுந் தேரை, **திணை** – முல்லை, **ஆசிரியர்** - பேயனார்.

பதிற்றுப்பத்து – **தைந்த காஞ்சி, ஆசிரியர்** - பாலைக் கௌதமனார்.

பரிபாடல் - **வையை - திரை இரும் பனிப் பௌவம், ஆசிரியர்** - மையோடக் கோவனார்.

கலித்தொகை – **கடும் புனல் கால் பட்டு, திணை** – பாலை, **ஆசிரியர்** - பெருங்கடுங்கோ.

அகநானூறு - 1. **ஆடு அமைக் குயின்ற, திணை** – குறிஞ்சி, **ஆசிரியர்** – கபிலர்.
2.**யான் எவன் செய்கோ தோழி, திணை** – பாலை, **ஆசிரியர்** – நோய்பாடியார்.

புறநானூறு - 1. **சிறப்பில் சிதடு முறுப்பில், திணை –** பொதுவியல்,
ஆசிரியர் – உறையூர் முதுகண்ணன் சாத்தனார்.
2.இளையரு முதியரும் வேறுபுலம் படா – **ஆசிரியர் –** கயமனார்.

ஆ). பத்துப்பாட்டு - **சிறுபாண் ஆற்றுப்படை –** கடையெழு வள்ளல்களின் சிறப்பு,
நல்லியக்கோடனின் சிறப்பு, ஈகைத் திறம்.

அலகு - III : காப்பியங்கள்

1.**மணிமேகலை** –பாத்திரம் பெற்ற காதை – **தீவதிலகை, மணிமேகலைக்குச்** சொல்லியது,
சிறைக்கோட்டம் அறக்கோட்டமாக்கிய காதை – **மணிமேகலை வேண்ட,**
மாவண்கிள்ளி, சிறைக்கோட்டத்தை அறக்கோட்டமாக்கியது.

2. **கம்பராமாயணம்** - இலக்கியநயம் மிக்க, தேர்ந்தெடுக்கப்பெற்ற 41 பாடல்கள்.

அலகு - IV : கட்டுரைகள்

1.திருக்குறளில் மனிதவள மேலாண்மைக் கருத்துக்கள் - திருமிகு ஹரி விஜயலட்சுமி.

2. தமிழர் வளர்த்த நுண்கலைகள்: சிற்பமும் ஓவியமும் – தொ.மு. பாஸ்கரத் தொண்டைமான்.

3. சமயமும் தமிழும் – பேராசிரியர் அ.ச.ஞானசம்பந்தன்.

4.தமிழில் அறிவியல் – ஒரு பார்வை - பேராசிரியர் சிவகுமார்.

5. இன்றைய நெருக்கடிப் பிரச்சனைகள் - நீர்வளம் - முனைவர் ச. முத்துக்குமரன்.

அலகு - V : **இலக்கணமும் மொழிப்பயிற்சியும்**

1.எழுத்து, சொல், பொருள் இலக்கண எழுத்துப்பயிற்சிகள்

2.பொதுக் கட்டுரைகள்

பாட நூல்: **கற்பகச்சோலை – தமிழ் ஏடு.** கற்பகம் பல்கலைக்கழகத் தமிழ்த் துறை வெளியீடு.

Part I TAMIL 2015. Karpagam University, Coimbatore - 21, India

Semester-II

15ENU201 ENGLISH-II 4H- 4C

Instruction Hours/week:L: 4 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives

- To enable the learners to acquire English language skills at a faster pace.
- To train the learners to reflect on the literary works and communicate flexibly.
- Know about the Prose and Poetry
- To develop the Short Story:
- Learn about Vocabulary, Grammar and Composition:
- Know about Proverb Expansion

Course Outcomes

1. Enable the learners to acquire English language skills at a faster pace.
2. Trained the learners to reflect on the literary works and communicate flexibly.
3. Knowledge about the Prose and Poetry
4. Development of the Short Story:
5. Learnt about Vocabulary, Grammar and Composition:
6. Knowledge about Proverb Expansion

UNIT I:

Prose: The Unexpected- Robert Lynd
Poetry: The Village Schoolmaster – Oliver Goldsmith
Short Story: The Lion's Share – Arnold Bennett
Vocabulary: Homonyms
Grammar: Irregular Verbs

UNIT II:

Prose: Travel by Train – J. B. Priestly
Poetry: The Gift of India **–** Sarojini Naidu
Grammar: Sentence patterns
Composition: Reading Comprehension

UNIT III:

Prose: Women's Education is Almost More Important than the Education of Boys and Men – Indira Gandhi
Short Story: The Necklace – Guy De Maupassant
One-Act Play: The Referee – W.H. Andrews and Geoffrey Dearmer
Vocabulary: Similes
Grammar: Discourse Markers
Composition: Report Writing

UNIT IV:

Poetry: Ozymandias – P.B. Shelley
One-Act Play: The Pot of Broth- W.B. Yeats

Vocabulary: Collective Nouns
Grammar: Correction of Sentences
Composition: Picture Reading

UNIT V:

Short Story: The Silver Butterfly**–** Pearl S. Buck
One-Act Play: The Bear – Anton Chekov
Vocabulary: Acronyms
Grammar: Question Tags
Composition: Drafting Advertisement

PRESCRIBED TEXT:

Wings of Communication **2014.** Board of Directors. Emerald Publishers: Chennai

REFERENCE:

Syamala, V. English for Communication. 2006. Emerald Publishers: Chennai.

Semester-II

15CHU201 GENERAL CHEMISTRY–II 5H-5C

Instruction Hours/week:L: 5, T:0, P:0 Marks: Internal:40 External: 60 Total:100

Course objectives:

- The course allows one to get a fundamental idea about the subject concerned.
- The course helps the students in improving their diverse skills in various areas such as
- Laboratory skills,
- Numerical and computing skills, ability to approach to the problems both analytically and logically, etc.
- The principles in this course are used in almost every field such as medicines, food products, and electronics and even in construction industry.
- The principles of coordination Chemistry

Course Outcomes:

On successful completion of the course the students should understood

1. The principles of coordination Chemistry
2. Different types of reactions of aromatic and aliphatic compounds
3. Principles of Thermodynamics.
4. The course helps the students in improving their diverse skills in various areas such as Laboratory skills,
5. Numerical and computing skills, ability to approach to the problems both analytically and logically, etc.
6. The principles in this course are used in almost every field such as medicines, food products, and electronics and even in construction industry.

Methodology

Black board Teaching and Group discussion.

UNIT - I

Nomenclature of coordination compounds - conductivity and precipitation studies-Werner's coordination theory-Electronic interpretation of coordinate bond by Sidge-wick. Isomerism: Examples of Geometrical and optical isomerism in square planar and octahedral coordination compounds. Examples of linear and tetrahedral coordination compounds - magnetic properties of co ordination compounds and their interpretation by Pauling's valence bond theory and crystal field theory.

UNIT - II

Ozone and hydrogen peroxide-preparation, properties, structure and uses - comparison between the two.

Aromaticity - Huckel's rule - benzenoid and non benzenoid aromatic compounds. Benzene resonance and resonance energy, structure -. Polar effects in electrophilic substitution in benzene-Mechanism of nitration, sulphonation, halogenation, Friedel-Crafts alkylation and acylation - diazo coupling.

UNIT – III

Grignard reagents - preparation and synthetic applications- Aliphatic Nucleophilic substitution mechanism-S_N1, S_N2, S_Ni mechanism -Effect of solvent - nucleophile, structure of substrate and neighbouring group participation, elimination versus substitution. Aromatic nuleophilic substitution-Benzyne mechanism, Intermediate complex mechanism.

Alkynes: Acidity of alkynes - formation of acetylides, addition of water with $HgSO_4$ catalyst - Hydroboration.

UNIT - IV

The laws of thermodynamics, generalities and the Zeroth law - kinds of energy - scope of the first and second laws of thermodynamics, thermodynamic terms – Definitions - heat-work of expansion - work of compression - Maximum and minimum quantities of work-Reversible and irreversible transformations - Energy and the first law of thermodynamics - properties of energy changes in relation to changes in properties of the system - Isothermal and adiabatic changes. Meaning of the thermodynamic state function versus path function - properties of exact and inexact differentials - Joule Thomson experiment. Relation between E and H, Cp and Cv.

UNIT - V

Applications of the first law of thermodynamics to chemical reactions. The heat of reaction – Conventional values of H - The determination of heat of formation – Sequences of reactions - Hess's Law, Heats of combustion - Determination by Bomb calorimeter - Bond energies - Resonance energy - Heat of solution - integral and differential dilution. Heats of reaction at constant volume -Dependence of the heat of reaction on temperature and Kirchoff's equation.

TEXT BOOKS:

1. Bahl, B.S and Arun Bahl, 2006. A textbook of Organic Chemistry, 18th Edition. S.Chand & Co.
2. Puri, Sharma & Pathania, 2013. Elements of Physical Chemistry, Vishal Publishing Co., Jalandar.
3. Puri, B.R., L.R.Sharma and Kalia, 2011. Principles of Inorganic Chemistry, Shoban lal & Co., Jalandar.
4. Wahid Malik, W., R.D.Madan and G.D.Tuli, 2004. Selected topics in Inorganic Chemistry, S.Chand & Co., New Delhi.

REFERENCES:

1. De,A.K.,Wiley, 1998. A text book of Inorganic Chemistry, New age international publishers, New Delhi.
2. Gurtu and Gurtu, 2000. Thermodynamics, Pragati pragasan publications, Chennai.
3. Madan, R.D., 2005. Modern Inorganic Chemistry, S.Chand & Co., New Delhi.
4. Morrison and Boyd, 2003. Organic Chemistry, 6th Edition, Pearson Education, Singapore.

5. Puri,B.R. and L.R.Sharma, 2002. Principles of Inorganic Chemistry, Shoban lal & Co.,
6. Skoog, D.A. and D.M.West, 2004. Fundamentals of Analytical Chemistry, 8th Edition Thomson Book store, Singapore.
7. Soni,P.L., 2004. Inorganic Chemistry, Sultan Chand & Sons,
8. Soni,P.L., 2004. A textbook of Organic Chemistry, S.Chand & Co., New Delhi.
9. Peter Atkins, Tina Overton, Jonathan Rourke, mark Weller and Fraser Armstrong, 2010, Inorganic Chemistry, 5th edn, Oxford University Press, New Delhi.

Semester-II

15CHU211 CHEMISTRY PRACTICAL-II 5H-3C

(INORGANIC PREPARATIONS & QUANTITATIVE ANALYSIS)

Instruction Hours/week: L: 0 T:0 P:5 Marks: Internal:40 External: 60 Total:100

Course Objective:

- To understand the basic principles of volumetric estimations and inorganic preparations.
- It enables the students to learn about the basic principles of quantitative analysis in Chemistry.
- To estimate the complexometric titrations
- To prepare inorganic complexes
- To estimate the hardness of water
- Analyse the prepared complexes.

Course Outcomes:

1. Understood and develop the skill to perform complexometric titrations
2. Learned about the development of a skill in the preparation of inorganic complexes and characterise them.
3. Estimation of the complexometric titrations
4. Preparation of inorganic complexes
5. Estimation the hardness of water
6. Analysis the prepared complexes.

Methodology

Demonstration of Experiments and Black board teaching

A. Complexometric titrations

1. Estimation of hardness of water
2. Estimation of calcium using EDTA
3. Estimation of magnesium ions using EDTA

B. Preparation of inorganic complexes

1. Preparation of Tetrammine Copper II Sulphate
2. Preparation of Ammonium Sulphate
3. Preparation of Chrome Alum
4. Preparation of Ferrous Ammonium Sulphate
5. Preparation of Potassium trioxalatochromate
6. Preparation of copper I chloride

TEXT BOOKS:

1. Venkateswaran,V., R.Veeraswamy and A.R.Kulandaivelu, 2004. Basic Principles of Practical Chemistry, 2nd Edition, S.Chand Publications, New Delhi .
2. Thomas, A.O., 2003. Practical Chemistry, Scientific Book Center, Cannanore.

REFERENCES :

1. Lepse Paul, A. and Lyle B.Peter, 1986. Lab Manual for Lingren's Essentials of Chemistry, Prentice Hall, New Delhi.
2. Mendham, J. R.C.Denney, J.D.Barnes and M.Thomas, 2002. Vogel's textbook of quantitative Chemical Analysis, 6th Edition, Pearson Education Ltd., Singapore.
3. Siddhiqui Zeba, N., 2002. Practical industrial Chemistry, 1st Edition, Anmol Publications Pvt. Ltd., New Delhi.

Semester –II

15CHU202 ALLIED PHYSICS–II 4H-4C

Instruction Hours/week: L:4, T:0, P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives:

- Many basic natural processes in nature can be explained by physics. So it is essential to know basic physics any science student. This paper is aimed at giving some insight into the basic physics, theory as well as experiment.
- To gain a knowledge of elasticity of solids.
- To understand the basics of surface tension
- To learn Eienstein's photoelectric effect.
- To knowledge about laser physics
- To gain a knowledge about solar physics.

Course Outcomes

The students have gained knowledge about

1. Basic natural processes of Physics
2. Gained about elasticity of solids.
3. Learned about Eienstein's photoelectric effect.
4. Understood the basics of surface tension.
5. Laser physics
6. Gained knowledge about solar physics

UNIT-I

ELASTICITY OF SOLIDS

Elastic constants of an isotropic solid - Relations connecting them - Poisson's ratio - Bending of beams - Uniform and non-uniform bending - Bending moment of a bent beam - cantilever - Static and dynamic methods - Torsion in a wire - Rigidity modulus determination by Static and dynamic methods.

UNIT-II

SURFACE TENSION

Surface tension and Surface energy- Pressure difference across a spherical surface- Pressure difference across a curved surface - Angle of contact - Angle of contact for water in a glass - Vapour pressure over a flat and curved surface - Variation of Surface tension with temperature - Jaegar's method - Quinke's method.

UNIT-III

MODERN PHYSICS: Photo electric effect – Einstein's photo electric equation – verification of Einstein's photo electric equation by Millican's experiment – photo electric cells – applications

Nuclear physics : characteristics of nuclear forces – nuclear structure by liquid drop model – Binding energy – mass defect – particle accelerators – cyclotron and betatron nuclear Fission and nuclear Fusion

UNIT-IV

LASER PHYSICS: Purity of spectral lines – Coherence length and time – spontaneous and induced emissions – population inversion – meta stable state – conditions for laser actions – Ruby laser – Helium – neon laser – applications of lasers – Raman effect – Raman shift – stokes and anti stokes lines – Laser Raman Spectrometer.

UNIT-V

SOLAR PHYSICS: solar constant – measurement of solar radiations by Pyroheliometer and Pyranometer – general applications of solar energy – flat–plate collector - box type cooker - solar water heaters – solar photo – votaic cells – general applications of solar cells.

TEXT BOOKS:

1. Murugesan. R., Modern Physics, S.Chand & CO, New Delhi
2. Aruldhas and P.Rajagopal, Modern Physics, Prentice Hall of India, New Delhi.

REFERENCES:

1. Mathur. D.S., 2003, Elements of properties of matter - Shyamlal Charitable Trust, New Delhi.
2. Brijlal and N. Subramanyam, 2004, Properties of matter, S. Chand & Company, New Delhi.
3. Rai. G.D, Solar energy and its utilization, S.Chand & Co., New Delhi.
4. Rajam. J.B., Atomic Physics, S.Chand & Co, New Delhi.

Semester –II

15CHU212 ALLIED PHYSICS PRACTICAL-II 3H-2C

Instruction Hours/week: L:0, T:0, P:3 Marks: Internal:40 External: 60 Total:100

Course objectives

The students are able to

- Determine Field Intensity-Circular coil- Vibration magnetometer
- Co-efficient of thermal conductivity-Lee's disc method
- Refractive Index of a prism (I-I') curve-Spectrometer
- Moment of a magnet-Circular coil-Deflection Magnetometer
- Analyse the Temperature coefficient of resistance of a thermistor-Post office box
- Comparison of viscosities of two liquids
- To Study of logic gates using IC's
- To Study of NOR gate as Universal building block.
- To Study of NAND gate as Universal building block.
- Determine the Verification of Basic logic gates using discreate components.
- Determine the Cauchy's constant – Spectrometer
- AC frequency – Sonometer

Course Outcomes

1. Field Intensity-Circular coil- Vibration magnetometer
2. Co-efficient of thermal conductivity-Lee's disc method
3. Refractive Index of a prism (I-I') curve-Spectrometer
4. Moment of a magnet-Circular coil-Deflection Magnetometer
5. Temperature coefficient of resistance of a thermistor-Post office box
6. Comparison of viscosities of two liquids
7. Study of logic gates using IC's
8. Study of NOR gate as Universal building block.
9. Study of NAND gate as Universal building block.
10. Verification of Basic logic gates using discreate components.
11. Determination of Cauchy's constant – Spectrometer
12. AC frequency – Sonometer

ANY TEN EXPERIMENTS

1. Field Intensity-Circular coil- Vibration magnetometer
2. Co-efficient of thermal conductivity-Lee's disc method
3. Refractive Index of a prism (I-I') curve-Spectrometer
4. Moment of a magnet-Circular coil-Deflection Magnetometer
5. Temperature coefficient of resistance of a thermistor-Post office box
6. Comparison of viscosities of two liquids

7. Study of logic gates using IC's
8. Study of NOR gate as Universal building block.
9. Study of NAND gate as Universal building block.
10. Verification of Basic logic gates using discreate components.
11. Determination of Cauchy's constant – Spectrometer
1. AC frequency – Sonometer

REFERENCES:

1. Ouseph C.C., U.J. Rao and V. Vijayendran 2007, Practical Physics and Electronics, S.Viswanathan (Printers & Publishers) Pvt. Ltd., Chennai
2. Singh S.P., 2003, Advanced Practical Physics – 1, 13th Edition, Pragathi Prakashan, Meerut
3. Singh S.P., 2000, Advanced Practical Physics – 2, 12th Edition, Pragathi Prakashan, Meerut

SEMESTER II

15FCB201 FOUNDATION COURSE - B
(ENVIRONMENTAL STUDIES) 2H - 1C
Total hours/week: L:2 T:0 P:0 Marks: Internal: 100 External: - Total:100

Course Objective:

- The study creates awareness among the people
- To know about various renewable and nonrenewable resources of the region,
- Enables environmentally literate citizens (by knowing the environmental acts, rights, rules, legislation, etc.)
- To make appropriate judgments and decisions for the protection and
- Improve of the earth life
- Know about eco system and environment.

Couse Outcomes

1. Creating the awareness about environmental problems among people.
2. Developed an attitude of concern for the environment.
3. Students have a Motivation to public to participate in environment protection and improvement.
4. Makes appropriate judgments and decisions for the protection and
5. Improvement of the earth life
6. Knowledge about eco system and environment.

UNIT - I: Eco system and natural resources: Environment – Definition – components - Ecosystem -Definition, Concept, Scope, importance, structure and functions of ecosystem. Energy flow, Ecological succession. Food chains and food webs. Classification of ecosystem. Natural resources: Forest resources; water resources

UNIT - II: Environmental pollution: Cause, effects and control measures of Air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution and nuclear hazards pollution. Solid waste management.

UNIT - III: Biodiversity and its conservation: Introduction- Definition, genetic, species and ecosystem diversity, biogeographical classification of India- Value of biodiversity: Consumptive, productive uses; social, ethical, aesthetic and option values. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.

UNIT - IV: Social issues and the environment: Urban problems related to energy-water conservation and management -Rain water harvesting- water shed management. Resettlement and Rehabitilisaion. Natural resources and associated problems and sustainable utilization. Environmental Education.

UNIT - V: Environment ethics: Environmental Ethics - Gender equity, ethical basis of environment education and awareness, conservation ethic and traditional value systems

of India. Valuing nature, cultures, social justice, Human heritage, equitable use of resources, preserving resources for future generation, common property resources, Ecology and its uses and its degradation, Introduction to Environmental Protection Act (EPA).

TEXT BOOKS

1. Agarwal, K.M., P.K. Sikdar and S.C. Deb, 2002. A Text Book of Environment, Mac Millan India Ltd, Kolkatta, India.
2. Kotwal, P.C. and S. Banerjee, 2002. Biodiversity Conservation – In Managed forest and protected areas, Agrobios, India.

REFERENCES

1. Singh, M.P., B.S. Singh and Soma S. Dey, 2004. Conservation of Biodiversity and Natural Resources. Daya Publishing House, Delhi.
2. Uberoi, N.K., 2005. Environmental Studies, Excel Books Publications, New Delhi, India.
3. Shaw, R and Krishnamurthy, R.R. 2009. Disaster management: global challenges and local solutions Universities Press (India) Private Ltd, Hyderabad.
4. Sorokin Pitirim. A, 1942. Man and Society In Calamity. New York: Dutton, 1942
5. Patrick L.Abbott, 2008. Natural Disasters, Mc Graw Hill, New York. Page: 1-7.

Semester – I & II

15SSD101 SOFT SKILL DEVELOPMENT – I 2H – 1C

Instruction Hours / week: L: 2 T: 0 P: 0 Marks: Internal: 100 External: Nil Total: 100

Course Objective

- To achieve the analytical skills
- To know about reasoning competencies
- To improve their communication and presentation skills
- Gain the knowledge on both Aptitude and Soft skills to the students
- Reinforcing competencies in soft skills which are crucial in a social setting
- Learn critically evaluate and demonstrate various principles involved in solving mathematical problems and to adopt new and faster methods of calculations

Course Outcomes

1. achieve the analytical skills
2. To know about reasoning competencies
3. To improve their communication and presentation skills
4. Gained the knowledge on both Aptitude and Soft skills to the students
5. Learnt critically evaluate and demonstrate various principles involved in solving mathematical problems and to adopt new and faster methods of calculations.
6. Reinforcing competencies in soft skills which are crucial in a social setting

UNIT - I

Introduction to Quantitative Aptitude, Speed Maths, Problems on Numbers, Averages, Ratios and Proportions, Problems on Ages

UNIT - II

Number Series, Blood Relation, Image Analysis, Direction Sense, Syllogism, Coding and Decoding

UNIT – III

Percentages, Data Interpretation, Profit and Loss, Simple Interest and Compound Interest

UNIT – IV

Parts of Speech, Tense, Subject Verb Agreement, Active and Passive Voice, Articles, Prepositions

UNIT – V

Conditional Clause, Degrees of Comparison, Goal Setting, Interpersonal Skills

Semester-III

15ENU301 ENGLISH-III 4H- 4C

Instruction Hours/week:L: 4 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course Objective

- To develop confidence to respond in English during situations where the use of English is imperative.
- To develop fluency in actual conversation in the English language.
- To develop speech skills necessary for confident and intelligent participations in Group Discussions and develop skills related to teamwork in work places.
- To write the paragraph practice & letter writing
- To learn about vocabulary
- To learn about functional grammar

Course Outcomes:

1. The students have confidence to respond in English during situations where the use of English is imperative.
2. They develop fluency in actual conversation in the English language.
3. They develop speech skills necessary for confident and intelligent participations in Group Discussions and develop skills related to teamwork in work places.
4. write the paragraph practice & letter writing
5. Learnt about vocabulary
6. Learnt about functional grammar

UNIT I

Listening: Listening comprehension – Listening for Specific Information –Note Taking – Interpreting Charts and Diagrams.

UNIT II

Speaking: Essentials of effective communication – Greeting and Introducing – Making requests – Asking for permission – Giving and Denying Permission – Offering and Accepting Help – Asking for and Declining Help – Giving Instructions and Orders - Talking about likes and dislikes.

Telephone Skills – Understanding telephone conversation – handling calls – leaving messages –making requests - giving instructions and orders

Discussion Skills – Giving your opinion – agreeing and disagreeing – Making suggestions – Interrupting – questioning – reporting – Dealing with questions.

(Completing dialogues)

UNIT III

Reading: Reading – Reading with a purpose –Skimming and Scanning – locating main points – reading critically – Sequencing of sentences – Reading comprehension.

UNIT IV

Writing: Paragraph Writing – Descriptive and Narrative. Safety Instructions/ Suggestions. Expansion of Abbreviations – Spellings- Report writing.

Translation- Translating short sentences and passages from English to Tamil and from Tamil to English.

UNIT V

Vocabulary: Improve English vocabulary: Synonyms – Antonyms – Prefixes – Suffixes – Idioms – Collocations – Different types of English – British and American (Choose the best answer type from a database of 50 words each for each topic)

Functional Grammar: Forming questions, getting answers – Articles – Parts of Speech – Punctuation – Common mistakes in English (Homophones)(Exercise based)

REFERENCE BOOKS:

1. Language in Use: Kenneth Anderson, Cambridge University Press.
2. Study Speaking: A course in Spoken English for Academic Purpose: Kenneth Anderson, Joan MacLean and Tony Lynch, Cambridge University Press, 2008.
3. Spoken English Part I & II (for Tamil speakers), Orient Longman Pvt. Ltd.
4. Dr. J. John Love Joy, Dr.Francis M.Peter S.J. "Lets Communicate – Basic English for Everyone", Vaigarai Publications, 1st edition, Dindigul 2007.

Semester - III

15CHU301 GENERAL CHEMISTRY-III 5H-5C

Instruction Hours/week:L: 5, T:0, P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives

- To learn the different concepts in metallurgy
- To understand the extraction process of ores
- To understand the reactions of aldehydes, ketones and carboxylic acids.
- Learn about tautomerism of esters
- To understand the principles of second law of Thermodynamics,
- Concept of free energy and third law of thermodynamics.

Course Outcomes:

1. Students learnt the different concepts in metallurgy
2. Understood the extraction process of ores
3. Learnt about tautomerism of esters
4. They understood the reactions of aldehydes, ketones and carboxylic acids.
5. They understood the principles of second law of Thermodynamics,
6. Concept of free energy and third law of thermodynamics.

Methodology:

Black board teaching and Group discussion

UNIT-I

General methods of extraction of metals: Concentration: Gravity separations, Froth flotation, Magnetic separation, Extraction, Chemical and Electrolytic methods. Refining-zone refining, Van Arkel Refining and Electrolytic refining; Comparative study- Physical properties of alkali metals: Electric structure, density, atomic volume, atomic radius, ionic radius, ionization energy and electro negativity.

UNIT-II

Occurrence, Extraction properties , thermodynamic aspects of extraction of ores – Elligham diagram and uses of Gallium, Thallium, Germanium, Titanium, Zirconium, Vanadium, Molybdenum, Tungsten and their important compounds such as $GeCl_4$, GeO_2, TiO_2, $ZrOCl_2$, V_2O_5, Ammonium Molybdate and WO_2.

UNIT-III

Reactions of aldehydes and ketones: Nucleophilic addition of Grignard reagents - Aldol condensation, Perkin, Knoevenagal, Claisen, Dieckmann, Reformatsky reactions, Cannizzaro reaction. Reduction using $LiAlH_4$ and $NaBH_4$- Wolf-Kishner and M.P.V. reduction.

Malonic ester and acetoacetic ester their synthetic applications-Tautomerism of acetoacetic ester.

UNIT-IV

Halogen derivatives of carboxylic acids: mono, di and tri chloro acetic acids, their reactivity. Ester hydrolysis. Hydroxy acids: citric acids.

Introduction to II law of thermodynamics: Entropy - Definition - Entropy changes in isothermal transformations-Troutons rule. Entropy as a function of T, P and V- change of entropy with T- Entropy changes in ideal gas-Entropy of mixing of ideal gases.

UNIT-V

Partial molar properties-Chemical potential-General conditions of equilibrium and spontaneity under constraints- Definitions of A and G - Physical significance of Δ_A and Δ_G-Temperature and pressure dependence of Δ_G – Gibbs-Helmholtz equation.Gibbs-Duhem equation. Chemical equilibrium in a mixture of ideal gases - Third law of Thermodynamics - statement and applications - Exceptions to 3rd law.

TEXT BOOKS:

1. Bahl, B.S and Arun Bahl, 2006. A textbook of Organic Chemistry, 18th Edition. S.Chand & Co.
2. Puri, Sharma & Pathania, 2013. Elements of Physical Chemistry, Vishal Publishing Co., Jalandar.
3. Puri, B.R., L.R.Sharma and Kalia, 2011. Principles of Inorganic Chemistry, Shoban lal & Co., Jalandar.
4. Wahid Malik, W., R.D.Madan and G.D.Tuli, 2004. Selected topics in Inorganic Chemistry, S.Chand & Co., New Delhi.

REFERENCES:

1. Gurtu and Gurtu, 2000. Thermodynamics, Pragati pragasan publications, Chennai.
2. Madan, R.D., 2005. Modern Inorganic Chemistry, S.Chand & Co., New Delhi.
3. Morrison, R.T. and Boyd, 2003. Organic Chemistry, 6th Edition, Pearson Education, Singapore.
4. Puri, B.R. and L.R.Sharma, 2002. Principles of Inorganic Chemistry, Shoban lal & Co.,.
5. Skoog, D.A. and D.M.West, 2004. Fundamentals of Analytical Chemistry, 8th Edition Thomson Book store, Singapore.
6. Soni, P.L., 2004. Inorganic Chemistry, Sultan Chand Sons.
7. Soni, P.L., 2004. A textbook of Organic Chemistry, S.Chand & Co., New Delhi.
8. Wiley and A.K.De, 1998. A text book of Inorganic Chemistry, New age international publishers, New Delhi.

Semester - III

15CHU302 SURFACE CHEMISTRY 5H-5C

Instruction Hours/week:L: 5 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course Objective

To learn the basic principles of Surface Chemistry.

- It enables the students to learn about the basic principles of Chemistry involved in surface phenomena.
- The course helps the students in improving their diverse skills in various areas such as laboratory skills,
- numerical and computing skills, ability to approach to the problems both analytically and logically, time management skills, etc.
- The principles in this course are used in almost every field such as medicines, food products, and electronics and even in construction industry.
- Learn about emulsion
- Understand Liquid gas and liquid interfaces

Course Outcomes:

1. Students learnt the Adsorption and surface phenomenon
2. The course helps the students in improving their diverse skills in various areas such as laboratory skills,
3. numerical and computing skills, ability to approach to the problems both analytically and logically, time management skills, etc.
4. The principles in this course are used in almost every field such as medicines, food products, and electronics and even in construction industry.
5. Learnt about emulsion
6. Understood Liquid gas and liquid interfaces

Methodology:

Black board teaching and Group discussion.

UNIT- I

Adsorption and surface phenomenon

Physisorption and chemisorption , adsorption isotherms, Langmuir and B. E. T. equation and significance in surface area determination, surface films, states of insoluble films, L. B. films and their application, adsorption from solution, adsorption types, surface excess concentration , Gibb's adsorption equation : derivation , significance and experimental verification , catalytic activity of surfaces.

UNIT –II

Micelle

Surface activity, surface active agents and their classification, micellisation, critical micelle concentration (cmc) thermodynamics of micellisation , factors affecting cmc,

methods of determination of cmc , reverse micelle , solubisation of water insoluble organic substances , use of surfactants in oil recovery.

UNIT-III
Emulsion

Types of emulsion, theories of emulsion and emulsion stability, identification of emulsion types, inversion emulsion, microemulsion : theory and application.

UNIT –IV
Liquid gas and liquid interfaces

Surface tension, capillary action, methods of determination of surface tension, surface tension across curved surfaces, vapor pressure of droplet (Kelvin equation) , surface spreading , spreading coefficient, cohesion and adhesion energy, contact angle, constant angle hystereis, wetting and detergency.

UNIT-V
Solid - Solid interfaces

Surface energy of solids, adhesion and adsorption, sintering and sintering mechanism, Tammann temperature and its importance, surface structure and surface composition.

TEXT BOOKS:

1. W. Adamson, 1990. V Edition, Physical chemistry of surfaces, John Wiley & Sons, New York.

REFERENCES:

1. Alfred Clark, 1970. Theory of adsorption and catalysis, Academic Press, United Kingdom.
2. B. M. W. Trapnell and D.O. Hayward, 1964. Chemisorption, Butterworths, London.
3. D. J. Shaw, 1991. Introduction to colloid and surface chemistry, Butterworth-Heinemann Limited, United Kingdom.
4. J. K. Laidler, 2005. Theories of chemical reaction rates, McGrew Hill, New York.
5. J. J. Bikermann, 1958. Surface chemistry, Academic Press Inc., New York.

Semester-III

15CHU311 CHEMISTRY PRACTICAL-III (QUANTITATIVE ANALYSIS) 4H- 2C

Instruction Hours/week:L: 0 T:0 P:4 Marks: Internal:40 External: 60 Total:100

Course Objective:

- To understand the basic principles of volumetric analysis.
- It enables the students to learn about the fundamental aspects of different types of titrations in volumetric analysis in Chemistry
- Estimate of Acidimetry and alkalimetry
- Estimate permanganometry
- Estimate Dichrometry
- Estimate iodimetry and argentometry

Course Outcomes:

1. Understood the basic principles of volumetric analysis.
2. It enables the students to learn about the fundamental aspects of different types of titrations in volumetric analysis in Chemistry
3. Understand and develop the skill to perform Acidimetry and alkalimetry Titrations.
4. Understood and develop the skill to perform permanganometry
5. Understood and develop the skill to perform dichrometry
6. Learnt the skill for performing iodimetry and argentometry

Methodology

Demonstrations of experiments and Black board teaching.

A. Acidimetry & Alkalimetry

1. Estimation of Na_2CO_3
2. Estimation of HCl

B. Permanganometry

1. Estimation of Ferrous sulphate
2. Estimation of Oxalic acid
3. Determination of Iron in Ferric Alum
4. Estimation of Calcium-Direct method.

C. Dichrometry

Estimation of Ferrous ion-Internal indicator method.

D. Iodimetry

1. Estimation of $K_2Cr_2O_7$.
2. Estimation of Copper

E. Argentometry- Demonstration experiments
Estimation of chloride-Fajan's and Volhards method.

TEXT BOOKS:

1. Venkateswaran, V., R.Veeraswamy and A.R.Kulandaivelu, 2004. Basic Principles of Practical Chemistry, 2nd Edition, S.Chand Publications, New Delhi
2. Pandey, O.P., D.N.Bajpai and S.Giri, 2001. Practical Chemistry, 8th Edition, S.Chand Publications, New Delhi .

REFERENCES :

1. Arun Sethi, 2003. Laboratory experiments in Organic Chemistry, New Age Publishers, New Delhi.
2. Furniss, B.S., A.J.Hannaford, P.W.G.Smith and A.R.Tatchell, 2004. Vogel's Textbook of Practical Organic Chemistry, 5th Edition, Pearson Education Ltd., Singapore .
3. Mendham, J., R.C.Denney, J.D.Barnes and M.Thomas, 2002. Vogel's textbook of quantitative Chemical Analysis, 6th Edition, Pearson Education Ltd., Singapore.
4. Raj K.Bansal, 2001. Laboratory Manual of Organic Chemistry, 4th Edition, New Age Publishers, New Delhi.
5. Thomas, A.O., 2003. Practical Chemistry, Scientific Book Center, Cannanore .

Semester - III

15CHU303A **ALLIED ELECTIVE-I** **6H-4C**

ALLIED MATHEMATICS - I

Instruction Hours/week:L:4 T:2 P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives

This course enables the students to learn

- The concepts of Matrices and their properties.
- Techniques of differentiation and integration.
- Solve simultaneous equations with the help of matrices.
- Mastery in the concepts of vector and scalar fields.
- Knowledge the properties of definite integrals.
- Learn about integral calculus

Course Outcomes (COs)

On successful completion of this course, the students will be able to

1. Solve simultaneous equations with the help of matrices.
2. Mastery in the concepts of vector and scalar fields.
3. Gain the intellectual knowledge of complex functions and their applications.
4. Acquire fundamental knowledge in the techniques of differentiation.
5. Know the properties of definite integrals.
6. Learnt about integral calculus

UNIT I

Matrices: Different types of matrices – Inverse of a matrix – Solution of simultaneous equations by matrix method- Cayley-Hamilton theorem(Statement only)-Verification.

UNIT II

Vector calculus: Concepts of vector and scalar fields- Derivative of a vector - The Del operator, Gradient – Divergence of a vector – Curl of a vector- Directional derivative – Formula involving ∇ operator. Laplacian Operator.

UNIT III

Complex variables: Analytical function –Cauchy –Reimann equations – The necessary and sufficient condition for f(z) to be analytic – Polar form of C-R equation-Properties of analytic function – Construction of analytic functions – Milne Thomson method.

UNIT IV

Differential Calculus: Differentiation- Curvature and radius of Curvature in Cartesian and Polar form – Evolutes – Involute .

UNIT V

Integral Calculus: Definite and Indefinite integrals – Methods of Integration – Integration by substitution – Integration by parts.

TEXT BOOKS

1. Venkataraman. M. K.,1998. Engineering Mathematics, The National Publications & Co., Chennai. (Unit I , II)
2. Manickavasagam Pillai.T.K , and S. Narayanan, 2002. “Calculus”, Volume I, and Volume II S.V Printers & Publishers, Chennai. (Unit IV , V)
3. Sastry .S.S,2009, Engineering mathematics, PHI learning Pvt. Ltd, New Delhi(Unit III)

REFERENCES

1. Singaravelu.A.,2011, Engineering Mathematics Vol 1&Vol 2 Meenakshi Publications, Arpakkam.
2. Venkataraman.M.K., 2001. Engineering Mathematics Vol 2, National Publishing Company, Chennai.

Semester - III

15CHU303B **ALLIED ELECTIVE-I** **6H-4C**

ALLIED STATISTICS- I

Instruction Hours/week:L:4 T:2 P:0 Marks: Internal:40 External: 60 Total:100

Course Objective

Students get an idea about

- Collection, interpretation and presentation of statistical data and also learn how to analyze and interpret the data for decision making.
- Measures of Central tendency
- Understand the Meaning and definition of statistics.
- Understand the Measures of Central tendency - Arithmetic Mean, Median
- Understand the Measures of Dispersion – Range, Inter Quartile range, Quartile deviation, Mean Deviation, Standard deviation and Coefficient of variation
- Learn about correlation and regression

Course Outcomes:

1. Collection, interpretation and presentation of statistical data and also learn how to analyze and interpret the data for decision making.
2. Measures of Central tendency
3. Understood the Meaning and definition of statistics.
4. Understood the Measures of Central tendency - Arithmetic Mean, Median
5. Understood the Measures of Dispersion – Range, Inter Quartile range, Quartile deviation, Mean Deviation, Standard deviation and Coefficient of variation
6. Learnt about correlation and regression

UNIT I

Meaning and definition of statistics – sources of data – collection of data – primary and secondary data - methods of primary data collection –sources of secondary data – Classification of data . Diagrammatic representation– Bar diagram and Pie diagram – Graphic representation – Histogram , Frequency distribution , Ogives.

UNIT II

Measures of Central tendency - Arithmetic Mean, Median, Mode - problems on individual, discrete and continuous series, Harmonic Mean and Geometric Mean.

UNIT III

Measures of Dispersion – Range, Inter Quartile range, Quartile deviation, Mean Deviation, Standard deviation and Coefficient of variation – problems on individual, discrete and continuous series.

UNIT IV

Correlation – meaning and definition – types of Correlation – degrees of Correlation – Methods of finding Correlation coefficient – scatter diagram – Karl Pearson's correlation coefficient –Rank correlation coefficient - Computation and interpretation.

UNIT V

Regression - meaning and definition - Regression equation Regression in two variables – two regression lines - X on Y and Y on X – properties of regression equation – problems using normal equations and regression coefficients.

TEXT BOOK:

1. Pillai R.S.N., and Bagavathi V., 2002. Statistics , S. Chand & Company Ltd, New Delhi.

REFERENCE BOOKS:

1. Dr.P.N.Arora, 1997, A foundation course statistics, S.Chand & Company Ltd, New Delhi.
2. Navnitham P.A , 2004, Business Mathematics And Statistics, Jai Publications, Trichy,
3. Gupta S.C., and Kapoor V.K., 1999. Fundamentals of Mathematical statistics, Sultan Chand & Sons, Educational Publishers, New Delhi.
4. Gupta S.P., 2001, Statistical methods, Sultan Chand & Sons, New Delhi.

ALLIED ELECTIVE-I **Semester - III**

15CHU303C PHARMACEUTICAL CHEMISTRY-I 6H-4C

Instruction Hours/week: L:4, T:2, P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives

- Identify various functional groups in compounds, especially drugs and other pharmaceuticals where possible.
- Make correct predictions of the general reactivity, chemical reactions, and possible synthesis of compounds.
- Discuss the use of the compounds in pharmacy and in medicine.
- Discuss physico-chemical concepts as the basis of drug analysis, drug stability, and reaction spontaneity, maximum yields in synthesis, solubility's and drug actions.
- Classify drugs according to their physiological and biochemical actions.
- Explain the principles on which analytical instruments have been based.

Course Outcomes

The students understood the

1. Knowledge about drug discovery
2. Procedures to prepare analgesic, antipyretic, anti-inflammatory agents
3. Synthesis of Central Nervous System and cardiovascular drugs.
4. Fermentation process and preparation of antibiotics.
5. Classify drugs according to their physiological and biochemical actions.
6. Explain the principles on which analytical instruments have been based.

Methodology

Black Board Teaching

UNIT I

Drug Design

Concept of isosterism and bioiososterism and their applications in drug design Antimetabolite approach to drug design, Analog drug design, Prodrugs and drug latentiation, Carrier-linked prodrugs– Bioprecursors– Role of functional groups in prodrug design–

UNIT II

Drug Discovery

Drug Discovery Historical perspective, Drug Discovery Strategies in Direct Drug Design (Structure based) and Indirect drug design, Target selection and lead identification, Natural product sources,

Specific and non-specific drug action Drug receptors, Basic concept and classification of receptors, Forces involved in drug receptors- interactions, Receptor agonism and antagonism,

UNIT III

Drugs & Pharmaceuticals

Drug discovery, design and development; Basic Retrosynthetic approach. Synthesis of the representative drugs of the following classes: analgesics agents, antipyretic agents, anti-inflammatory agents (Aspirin, paracetamol, lbuprofen);

UNIT IV

Fermentation

Aerobic and anaerobic fermentation. Production of (i) Ethyl alcohol and citric acid, (ii) Antibiotics; Penicillin, Cephalosporin, Chloromycetin and Streptomycin, (iii) Lysine, Glutamic acid, Vitamin B2, Vitamin B12 and Vitamin C.

UNIT V

Pharmaceutical Compounds: Structure and Importance

Classification, structure and therapeutic uses of antipyretics: Paracetamol (with synthesis), Analgesics: Ibuprofen (with synthesis), Antimalarials: Chloroquine (with synthesis). An elementary treatment of Antibiotics and detailed study of chloramphenicol, Medicinal values of curcumin (haldi), azadirachtin (neem), vitamin C and antacid (ranitidine).

TEXT BOOKS:

1. Jayashree Ghosh, 2003. A Text Book of Pharmaceutical Chemistry, S. Chand & Company Ltd. Ram Nagar, New Delhi.

REFERENCES :

1. G.L. Patrick., 2013. Introduction to Medicinal Chemistry, Oxford University Press, UK.
2. Hakishan, V.K. Kapoor, 1012. Medicinal and Pharmaceutical Chemistry, Vallabh Prakashan, Pitampura, New Delhi.
3. William O. Foye, Thomas L., Lemke , David A. William, 2008. Principles of Medicinal Chemistry, B.I. Waverly Pvt. Ltd. New Delhi.

Semester-III

		L	T	P	C
15FCC301A	**INTRODUCTION TO COMPUTERS**	**4**	**0**	**0**	**2**

COURSE OBJECTIVES

- Know the basic concept of computers.
- Understand the concept of Ms-word,
- Understand the concept of Ms-Excel.
- Be able to work in Ms-PowerPoint.
- Knowledge about internet and the usage of E-Mail services.
- Data sheet printing

Course Outcomes

The student understood

1. Knowledge about the basic concept of computers.
2. the concept of Ms-word,
3. the concept of Ms-Excel.
4. Able to work in Ms-PowerPoint.
5. Knowledge about internet and the usage of E-Mail services.
6. Data sheet printing

Unit-I

Introduction- Characteristics of computers- development of computers- generations of computers- classification of computers-the computer system- types of Input/ Output and memory devices-computer software-categories of software.

Unit-II

Starting with MS Office Word – Working with Text – working with tables-Checking spelling and grammar- adding graphics to document- Mail merge- printing a document – Advanced features of MS Office Word- Keyboard shortcuts.

Unit III

Starting with MS Office Excel- Working with Excel workbook-working with worksheet-formulas and functions-inserting charts-sorting-importing data-printing in excel-Advanced features of MS Office Excel.

Unit IV

Starting with MS Office PowerPoint – Working with PowerPoint- Working with different views-Designing Presentations- Slide Show.- Printing in PowerPoint.

Unit-V

The Internet-Evolution of Internet-Owner of Internet- Anatomy of Internet – Internet Terminology- Getting Connected to Internet- Web Brower- Electronic Mail- Search engines- Uses of internet to society.

Text Book

1. Fundamentals of Computers: For Undergraduate Courses in Commerce and Management, ITL Education Solutions.2011. Pearson, New Delhi.

References

1. Pradeep K.Sinha ,Priti Sinha. Computer Fundamentals, 2007, 6th Edition BPB Publications, New Delhi.
2. V. Rajaraman. Fundamentals of Computers, Prentice-Hall Of India Pvt. Limited, 2003.
3. Wallace Wang. Microsoft Office 2007 For Dummies,1st Edition Wiley Publishing Inc.

Semester III

L	T	P	C
4	0	0	2

15FCC301B INTRODUCTION TO MULTIMEDIA

Course Objectives

- This course in curriculum is an introduction to the multimedia and Applications of multimedia.
- This course enables students to understand how the web pages are designed interactively.
- How to critically evaluate website quality,
- Learn how to create and maintain quality web pages learn to create and manipulate images.
- To gain the skills and project-based experience needed for entry into web design and development careers.
- Introducing Photoshop elements

Course Outcomes

1. Learnt the introduction to the multimedia and its applications.
2. Students have understood how the web pages are designed interactively.
3. Critically evaluate website quality,
4. Learnt how to create and maintain quality web pages learn to create and manipulate images.
5. Gained the skills and project-based experience needed for entry into web design and development careers
6. Introducing Photoshop elements

UNIT - I

Multimedia – An overview: Introduction – Multimedia presentation and production – Characteristics of Multimedia presentation – Hardware and Software Requirements – Uses of Multimedia. Text: Types of text - Font - Text File formats. Image: Image data representation – Image file formats – Image processing software. Graphics: Advantages of graphics – Uses – Components of a graphics system.

UNIT - II

Audio: Sound waves – Types and properties of sound – Components of audio system – Digital audio - Musical Instrument Digital Interface (MIDI) – Audio file formats – Audio processing software. Video: Motion video – Television systems – Video file formats – Video processing software. Animation: Uses of animation – Computer based animation – Animation file formats – Animation software.

UNIT - III

Introducing Photoshop elements: About elements – Welcome screen – Create mode – Menu bar – Toolbox – Options bar – Panels. Organizing images: Obtaining images –

Tagging images - Searching for images - Opening and saving images. Selecting Areas – Layers – Text and Drawing Tools.

UNIT - IV

Understanding Flash: Understanding Flash basic elements – Creating a simple animation. Learning Flash Toolbox: Learning the toolbox – Using tools. Learning Flash Panels: Understanding the panels. Using timeline and layers: Understanding how timeline works – Understanding layers. Drawing objects: Drawing lines and fills – Using colors – Rotating, skewing and scaling – Grouping objects.

UNIT - V

Creating animation – How animation works – Creating motion tweens – Creating shape tweens. Understanding masks – Creating masks. Creating symbols and using the library: Learning about symbols – Creating symbols – Using libraries. Learning Basic ActionScript concepts: ActionScript basics – Data type basics.

TEXT BOOKS

1. Ranjan Parekh, 2013, Principles of Multimedia, 2nd Edition, Tata McGraw hill . (Unit I, Unit II)
2. Nick Vandome, 2011, Photoshop Elements 9, Tata McGraw hill. (Unit III)
3. Brian Underdahl, 2002, Macromedia Flash MX – A Beginners Guide, Dreamtech Press. (Unit IV, Unit V)

REFERENCES

1. Tay Vaughan, 2002, Fundamentals of Multimedia, 5th Edition, Tata McGraw-Hill.
2. Bill Sanders. 2001. Flash5 Action Script, 1st Edition, Dream Tech Press, New Delhi

Semester – III & IV

15SSD301 SOFT SKILL DEVELOPMENT – II 2H – 1C

Instruction Hours / week: L: 2 T: 0 P: 0 Marks: Internal: 100 External: Nil Total: 100

Course Objective

- To achieve the analytical skills
- To know about reasoning competencies
- To improve their communication and presentation skills
- Gain the knowledge on both Aptitude and Soft skills to the students
- Reinforcing competencies in soft skills which are crucial in a social setting
- Learn critically evaluate and demonstrate various principles involved in solving mathematical problems and to adopt new and faster methods of calculations

Course Outcomes

1. achieve the analytical skills
2. To know about reasoning competencies
3. To improve their communication and presentation skills
4. Gained the knowledge on both Aptitude and Soft skills to the students
5. Learnt critically evaluate and demonstrate various principles involved in solving mathematical problems and to adopt new and faster methods of calculations.
6. Reinforcing competencies in soft skills which are crucial in a social setting

UNIT - I

Time, Speed and Distance, Time and Work, Pipes and Cisterns, Geometry, Data Arrangement

UNIT – II

Analogy, Logic based Venn diagram, Probability, Permutation and Combination, Logarithms

UNIT – III

Data Sufficiency, Clocks, Calendar, Reading Comprehension, Sentence Correction, Sentence Completion, Spotting the Errors, Jumbled Sentences

UNIT – IV

Synonyms, Antonyms, Verbal Analogy, Statements and Assumptions, Group Discussion

UNIT - V

Resume Writing, Introduction to HR rounds, Time Management, Attitude and Behaviour

Semester-IV

15ENU401 ENGLISH-IV 4H-4C

Instruction Hours/week: L:4, T:0, P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives:

- To train the students in understanding the concepts of communication.
- To train the students in developing their written communication and presentation skills.
- To Learn Listening Comprehension
- To write Dicto Composition
- To present Effective Presentation
- To understand Group Discussion

Course Outcomes:

1. Students understanding the concepts of communication.
2. Trained the students in developing their written communication and presentation skills.
3. Learn Listening Comprehension
4. Learn Dicto Composition
5. Understood Effective Presentation
6. Understood Group Discussion

UNIT I – Concept of Communication – Barrier to Communication –Body language – Personality Development – Etiquette and Manners- Soft Skills – Emotional Intelligence

UNIT II – Listening Comprehension – Reading Comprehension – Paragraph writing – Precis Writing – Writing Resume and Covering Letter -Speaking – Welcome Address, Vote of Thanks, Compering, Debates, Role Play, Dialogues – Vocal Communication Techniques. Voice, Quality, Volume, Pitch

UNIT III – Dicto Composition – Letter Writing (Informal, Letters to the Editor etc) – Term paper – Book reviews

UNIT IV – Business Correspondence – Layout of Business Letter – Formal Styles of Business Letters – Letters of Acceptance, Appointment, Resignation, Complaint, Sending E-mails.

UNIT V – Effective Presentation – Planning – Audience Analysis –Logical Sequencing – Timing of the Presentation – Conclusion – Answering Queries – Group Discussion – Interview.

PRESCRIBED TEXT:

1. Juneja. P. Om and Aarati Mujumdar, *"Business Communication - Techniques and Methods"*, Orient Blackswan Pvt. Ltd., Hyderabad: 2010.

REFERENCES:

1. Badi, R.V and K. Aruna. Business Communication, 2008, Vrinda Publications: New Delhi.
2. Balasubramanian M and G Anbalagan. Performance in English. 2007.Anuradha Publications: Kumbakonam
3. Mohan, Krishna and Meenakshi Raman.2008, Effective English Communication, Tata McGraw Hill: New Delhi.
4. Selley, John. Oxford Guide to Effective Writing and Speaking. 2005. OUP: New Delhi.

Semester -IV

15CHU401 GENERAL CHEMISTRY - IV 6H-6C

Instruction Hours/week: L: 6 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course Objective

- To learn metallurgy of iron, cobalt, nickel
- To learn metallurgy of platinum
- To understand the reactions of phenols and
- To understand the reactions of amines.
- To understand the principles of Phase rule and
- To understand the principles of solutions.

Course Outcomes:

1. Learn metallurgy of iron, cobalt, nickel
2. Learn metallurgy of platinum
3. Understood the reactions of phenols and
4. Understood the reactions of amines.
5. Understood the principles of Phase rule and
6. Understood the principles of solutions.

Methodology

Blackboard teaching and group discussion

UNIT I

Metals: Iron, Cobalt, Nickel - metallurgy-industrial importance-platinum group metals – isolation, properties and uses, their important alloys. Platinum black, spongy platinum, platinized asbestos**.**

UNIT II

Phenols: Preparation, physical and chemical properties of monohydric phenols - Reactions of monohydric phenols with mechanism - alkylation, esterification, nitration, sulphonation, halogenation, coupling with diazonium salts - Kolbe, Riemer - Tiemann, Schotten - Baumann, Hoesch and Houben reactions, Gattermann reaction. Preparation,

properties of alpha and beta Naphthols, Dihydric and trihydric Phenols- catechol, resorcinol, quinol, pyrogallol, phloroglucinol and hydroxy quinol.

UNIT III

Amines: Aliphatic amines - Primary, secondary and tertiary amines-separation and comparison of their basicity. Aromatic amines- Preparation and reactions of aromatic amines. Ring substitution, Diazotisation and coupling reaction.

Diazomethane and diazoaceticester - preparation, structure and their synthetic applications.

UNIT IV

Phase rule and phase equilibria – Conditions for equilibrium between the Phases. Derivation of Gibbs phase rule. Phase equilibria in one component system. Phase diagram for sulphur, water, carbondioxide system. Phase diagram for two component system. Construction of the phase diagram - Thermal analysis method – B- Cd; Zn - Mg; Na - K system. Pressure dependence of U and T curves - Clapeyron and Clapeyron-Clausius equations.

UNIT V

Solutions: Ideal and non ideal solutions- Raoult's law – Henry's law. Nernst distribution law and its applications. Colligative properties - relative lowering of vapour pressure, elevation of boiling point, depression of freezing point and osmotic pressure.

TEXT BOOKS:

1. Bahl, B.S and Arun Bahl, 2006. A textbook of Organic Chemistry, 18th Edition. S.Chand & Co.
2. Puri, Sharma & Pathania, 2013. Elements of Physical Chemistry, Vishal Publishing Co., Jalandar.
3. Puri, B.R., L.R.Sharma and Kalia, 2011. Principles of Inorganic Chemistry, Shoban lal & Co., Jalandar.
4. Wahid Malik, W., R.D.Madan and G.D.Tuli, 2004. Selected topics in Inorganic Chemistry, S.Chand & Co., New Delhi.

REFERENCES:

1. De,A.K., Wiley, 1998. A text book of Inorganic Chemistry, New age international publishers, New Delhi.
2. Madan,R.D., 2005. Modern Inorganic Chemistry, S.Chand & Co., New Delhi.
3. Morrison,R.T. and Boyd, 2003. Organic Chemistry, 6th Edition, Pearson Education, Singapore.
4. Puri,B.R. and L.R.Sharma, 2002. Principles of Inorganic Chemistry, Shoban lal & Co., New Delhi.
5. Soni,P.L., 2004. Inorganic Chemistry, Sultan Chand & Sons.
6. Soni,P.L., 2004. A textbook of Organic Chemistry, S.Chand & Co., New Delhi.
7. Robert Thornton Morrison, Robert Neilson and Saibal Kanthi Bhattacharjee, 2012, Organic chemistry, 2nd edn, New York.

Semester - IV

15CHU402 PHYSICAL CHEMISTRY (CHEMICAL KINETICS) 6H-6C

Instruction Hours/week:L: 6 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives

- To study about the order and rate of reactions.
- To derive the expression for rate constant of first and pseudo-first order reactions.
- To know the experimental methods of determination of order of reaction. Graphical method of determination of order and rate constant of a reaction is also to be studied.
- To learn about the effect of temperature on the rates and rate constants of reaction.
- To know about Arrhenius equation and Arrhenius parameters.
- To differentiate between simple and complex reactions.
- To learn about consecutive, opposing and parallel reactions.

Course Outcomes:

1. Study about the order and rate of reactions.
2. Derive the expression for rate constant of first and pseudo-first order reactions.
3. Know the experimental methods of determination of order of reaction.
4. Graphical method of determination of order and rate constant of a reaction is also to be studied.
5. Learnt about the effect of temperature on the rates and rate constants of reaction. To know about Arrhenius equation and Arrhenius parameters.
6. Differentiate between simple and complex reactions.
7. Learnt about consecutive, opposing and parallel reactions.

Methodology

Black Board Teaching, power point presentation and Group discussion

UNIT - I

Chemical kinetics - Empirical laws and experimental aspects. Rate laws. Stoichiometry, order and molecularity of reactions, setting up and solving simple differential equation for first order, second order, third order and zero order reactions, pseudo order reactions with examples.

UNIT - II

Expression for half-life periods of first order, second order, zero order and third order reactions. Determination of order of reactions. Experimental techniques involved in the following kinetics of reaction.

Volumetry, manometry, dialtometry, polarimetry and colorimetry. Typical examples for each of the techniques.

UNIT - III

Theoretical aspects: effects of temperature on the rate constant. The activation energy. The collision theory of reaction rates and its limitation. The theory of absolute reaction rates. Comparison of the collision theory with the absolute reaction rate theory. Significance of free energy of activation and entropy of activation.

UNIT - IV

Error analysis – terms and definitions – absolute and relative errors – precision and accuracy – classification of errors – sources and minimization of errors – significant figures and computation – mean and standard deviation – method of least squares – student T test and Q test.

UNIT - V

Thermal chain reaction. H_2/Br_2 reactions. Chain reactions – characteristics- steady state approximation, complex reaction. Kinetics of photochemical reactions. Adsorption of light and photochemical processes. The Stark - Einstein law of photochemical equivalence. Photochemical chain reaction H_2/Br_2 reaction. Quantum yield of photochemical reactions. Comparison of thermal and photochemical kinetics of H_2/Br_2, H_2/Cl_2 reaction. Photosensitized reactions.

TEXT BOOKS:

1. Bahl, B.S, Arun Bahl and Tuli, G.D, 2005. Essentials of Physical Chemistry, S. Chand & Company, 7361, Ram Nagar, New Delhi-110 055.
2. Puri, B.R, Sharma, L.R, Madan S. Pathania, 2013. Elements of Physical Chemistry, Vishal Publishing, Jalandhar, New Delhi-110 002.
3. B.K.Sharma, Instrumental methods of chemical analysis, 5th edition, Goel publication,1996, Meerut.
4. S. Usharani, Analytical Chemistry, 1st edition, Macmillan publications, 2008.

REFERENCES:

1. Atkins, P.W, 2002. Physical Chemistry, 9th Edition, Oxford Publishers, Oxford.
2. Keith J. Laidler, 2004, Chemical Kinetics, Pearson Education Publishing, Indian branch, 482 F.I.E. Patparganj, New Delhi 110 092, India.
3. Skoog, D.A. and D.M. West, 2004. Fundamentals of Analytical Chemistry, 8th Edition, Thomson Book store, Singapore.
4. Soni, P.L, 2004. Inorganic Chemistry, S. Chand & Company, 7361, Ram Nagar, New Delhi-110 055.
5. Iran N. Levine, 2009, Physical chemistry, 5th edn, Mcgraw Hill, New York.

Semester -IV

15CHU411 CHEMISTRY PRACTICAL- IV 6H- 3C
(ORGANIC QUALITATIVE ANALYSIS)

Instruction Hours/week:L: 0 T:0 P:6 Marks: Internal:40 External: 60 Total:100

Course Objective

To understand and develop the skill to perform organic qualitative analysis.

- Preliminary tests
- Detection of elements present
- Aromatic or Aliphatic
- Saturated or Unsaturated
- Nature of the functional group (Aldehydes, Ketones, Amines, Diamide, Carbohydrates, Phenols, Acids, Esters & Nitro compounds)
- Confirmatory tests
- Preparation of derivatives.

Course Outcomes

Understood and develop the skill to perform organic qualitative analysis.

1. Preliminary tests
2. Detection of elements present
3. Aromatic or Aliphatic
4. Saturated or Unsaturated
5. Nature of the functional group (Aldehydes, Ketones, Amines, Diamide, Carbohydrates, Phenols, Acids, Esters & Nitro compounds)
6. Confirmatory tests
7. Preparation of derivatives.

Methodology

Black board teaching and Demonstration.

Systematic analysis of an organic compound

- ✓ Preliminary tests
- ✓ Detection of elements present
- ✓ Aromatic or Aliphatic
- ✓ Saturated or Unsaturated
- ✓ Nature of the functional group (Aldehydes, Ketones, Amines, Diamide, Carbohydrates, Phenols, Acids, Esters & Nitro compounds)
- ✓ Confirmatory tests
- ✓ Preparation of derivatives.

TEXT BOOKS:

1. Venkateswaran, V., R.Veeraswamy and A.R.Kulandaivelu, 2004. Basic Principles of Practical Chemistry, 2nd Edition, S.Chand Publications, New Delhi
2. Bansal Raj, K., 2001. Laboratory Manual of Organic Chemistry, 4th Edition, New Age Publishers, New Delhi.

REFERENCES :

1. Arun Sethi, 2003. Laboratory experiments in Organic Chemistry, New Age Publishers, New Delhi.
2. Furniss, B.S., A.J.Hannaford, P.W.G.Smith and A.R.Tatchell, 2004. Vogel's Textbook of Practical Organic Chemistry, 5th Edition, Pearson Education Ltd., Singapore.
3. Lepse Paul, A., Lyle B Peter, 1986. Lab Manual for Lingren's Essentials of Chemistry, Prentice Hall, New Delhi
4. Mendham, J., R.C.Denney, J.D.Barnes and M.Thomas, 2002. Vogel's textbook of quantitative Chemical Analysis, 6th Edition, Pearson Education Ltd., Singapore.

Semester - IV

15CHU403A **ALLIED ELECTIVE-II** **6H-4C**

ALLIED MATHEMATICS - II

Instruction Hours/week:L:4 T:2 P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives:

This course enables the students to learn

- The Concept of Fourier analysis and
- Solving boundary value problems.
- Techniques of Fourier transform
- Laplace transform
- To solve differential equations.
- Numerical techniques of differentiation and integration.

Course Outcomes (COs)

On successful completion of this course, the students will be able to

1. Appreciate the physical significance of Fourier series
2. Understood the mathematical principles on transforms.
3. Apply mathematical foundation to formulate and solve problems arising in physics
4. Synthesize numerical techniques for practical problems
5. Techniques of Fourier transform
6. Laplace transform

UNIT I

Fourier series: Definition – Finding Fourier coefficients for a given periodic function with period 2π – Odd and Even functions – Half Range Series

UNIT II

Fourier Transforms: Definition of Fourier Transform-Properties of Fourier Transform-Inverse Fourier transform-Convolution theorem-Finite Fourier Sine &Cosine Transform –Parseval's theorem.

UNIT III

Laplace Transforms: Definition of Laplace Transform - Properties of Laplace Transform, Inverse Laplace Transform. Application of Laplace Transform.

UNIT IV

Differential Equations: Types of Linear differential equations with constant coefficients – Simultaneous differential equations with constant coefficient.

UNIT V

Numerical methods: Solving simultaneous equations–Gauss Elimination method, Gauss Jordan method, Gauss – Seidel method. Numerical Integration – Trapezoidal Rule, Simpson's Rule.

TEXT BOOKS

1. Sastry .S.S,2009. Engineering Mathematics, PHI learning Pvt. Ltd, New Delhi. (For Unit I , II , III & IV)

2. Kandasamy. P., K.Thilagavathy., and K.Gunavathy., 2003. Numerical methods, S. Chand & company Ltd , New Delhi. (For Unit V)

REFERENCES

1.Singaravelu.A.,2011,Engineering Mathematics Vol I & Vol II Meenakshi Publications, Arpakkam.

2.Venkataraman.M.K., 2001. Engineering Mathematics Vol II, National Publishing Company, Chennai.

3. Manicavachagom Pillay.T.K ,S.Narayanan,2000, "Calculus Vol II", S. Viswanathan (Printers and Publishers), PVT., LTD.

4. Sundaram.V, R. Balasubramaniam, And K.A.Lakshminarayanan, 2001, Engineering Mathematics – Vol III, Vikas Publishing House PVT., LTD, New Delhi.

Semester -IV

15CHU403B ALLIED ELECTIVE-II 6H-4C

ALLIED STATISTICS - II

Instruction Hours/week:L:4 T:2 P:0 Marks: Internal:40 External: 60 Total:100

Course Objective

- To enable the students to learn the Statistical methods and their applications.
- On successful completion of this course the students shall enrich to solve the Statistical problems in commerce and business.
- Learn about Probability distribution
- Know about test of significance
- Understand index numbers
- To learn about time series

Learn about time series

Course Outcomes:

1. The students learnt the Statistical methods and their applications.
2. On successful completion of this course the students shall enrich to solve the Statistical problems in commerce and business.
3. Learnt about Probability distribution
4. Knowledge about test of significance
5. Understood index numbers
6. Learnt about time series

UNIT I

Probability – definitions – addition and multiplication rules (only statements), permutation and combination, diagrammatic representation of probability (Venn diagram) – simple problems.

UNIT II

Probability distribution - Binomial distribution – Poisson Distribution – properties, mean and variance, Normal distribution–characteristics of normal curve (No derivations) simple problems only.

UNIT III

Test of Significance: Basic concepts – Z-test for two means – Small sample tests- t- test for single mean, two means – Chi Square Test.

UNIT IV

Index numbers – meaning and definition – uses – methods of construction – Unweighted and weighted index number – Laspeyre's, Paasche's and Fischer's method – Tests for an ideal index number – Wholesale and Cost of living index .

UNIT V

Time Series: Meaning – Components – Models – Business forecasting – methods of estimating trend – graphic, semi average, moving average and least square method – Seasonal variation – Methods of Simple Average.

TEXT BOOK:

1. Pillai R.S.N., and Bagavathi V., 2002.,Statistics , S. Chand & Company Ltd, New Delhi.

REFERENCES:

1. Gupta S.C., and Kapoor V.K., 1999. Fundamentals of Mathematical statistics, Sultan Chand & Sons, Educational Publishers, New Delhi.
2. Dr.P.N.Arora, 1997, A foundation course statistics, S. Chand & Company Ltd, New Delhi.
3. Navnitham P.A , 2004, Business Mathematics And Statistics, Jai Publications, Trichy,
4. Gupta S.P., 2001, Statistical methods, Sultan Chand & Sons, New Delhi.
5. Richard. I. Levin., & David. S. Rubin., 1998. Statistics for management**,** Seventh edition, Prentice hall of India, New Delhi.

ALLIED ELECTIVE-II **Semester - IV**

15CHU403C PHARMACEUTICAL CHEMISTRY-II 6H-4C

Instruction Hours/week: L:6, T:0, P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives

- To identify various functional groups in compounds, especially drugs and other pharmaceuticals where possible.
- To make correct predictions of the general reactivity, chemical reactions, and possible synthesis of compounds.
- To discuss the use of the compounds in pharmacy and in medicine.
- To discuss physico-chemical concepts as the basis of drug analysis, drug stability, and reaction spontaneity, maximum yields in synthesis, solubility's and drug actions.
- To classify drugs according to their physiological and biochemical actions.
- Explain the principles on which analytical instruments have been based.

Course Outcomes:

1. Identify various functional groups in compounds, especially drugs and other pharmaceuticals where possible.
2. Make correct predictions of the general reactivity, chemical reactions, and possible synthesis of compounds.
3. Discuss the use of the compounds in pharmacy and in medicine.
4. Discuss physico-chemical concepts as the basis of drug analysis, drug stability, and reaction spontaneity, maximum yields in synthesis, solubility's and drug actions.
5. Classify drugs according to their physiological and biochemical actions.
6. Explain the principles on which analytical instruments have been based.

Methodology

Black Board Teaching

UNIT-I

Molecular basis of drug action: Receptor: Drug Receptor Interaction: Basic ligand concept, agonist, antagonist, partial agonist, inverse agonist, receptor Theories - Occupancy, Rate & Activation Theories.

UNIT -II

Analgesics - Definition - Different types of pain superficial, deep non visceral, visceral, referred and pshycogeneic, Classification - Morphine and its derivatives. Antipyretic analgesics – Salicylic acid derivatives – Paracetamol, phenacetin – Propanoic acid derivative – Ibuprofen. Antibiotics: Definition - Microbial synthesis, structure,

assay and uses of chloramphenicol and pencillin - Structure and uses of streptomycin and tetracyclines.

UNIT - III

Antiseptics and disinfectants : Definition and distinction - Examples - Phenolic compounds and chloro compounds. Transquilizers – Definition and examples. Vitamins –Definition – Classification, sources and deficiency, diseases of Vitamins A, B, C, D, E and K. Importance of vitamin A in vision.

UNIT-IV

Synthon approach: Definition of terms - disconnection, synthon, functional group interconversion (FGI), Basic rules in Disconnection.
Combinatorial Chemistry Introduction, combinatorial approaches, chemical Peptide and small molecule libraries.

UNIT-V

Enzyme Inhibition – Enzyme structure: primary, secondary, tertiary and quaternary, enzyme Kinetics, enzyme Inhibitors - reversible, irreversible. Drug binding to nucleic acid -- Antimalarial, anti-cancer, antiviral.

TEXT BOOKS:

2. Jayashree Ghosh, 2003. A Text Book of Pharmaceutical Chemistry, S. Chand & Company Ltd. Ram Nagar, New Delhi.
3. Mukhopadhyay R, Datta S and Das, R.K. 2013. Text Book of Pharmaceutical Chemistry and Medicinal Chemistry, Books and Allied (P) ltd. 83/1, Belighata Main Road, Kolkatta.
4. Lakshmi S 1998. Pharmaceutical Chemistry, 2nd Edition, S. Chand & Company Ltd. Ram Nagar, New Delhi.
5. Sanjay K. Jain and Vandana Soni Raubins, 2012. Bentley's Text book of pharmaceutics, 1st Ed., Elsevier.

REFERENCES:

1. Wolff ME., 1995. Burger's Medicinal Chemistry and Drug Discovery, Principle and Practice. John Wiley and Sons, New York. 5th Edition.
2. W. O. Foye, Principles of Medicinal Chemistry, 3rd Edn., Lea & Febige/Varghese Company, Bombay, India (1989).
3. Ledinicer: 2007. Organic Drug synthesis Vol. 1,2,3,4 (John Wiley &. Sons N.Y.)
4. Ariens E.J., 1980. Medicinal Chemistry Series, Academic Press Inc.,U.S.
5. Ellis and West, 1991. Progress in Medicinal Chemistry Series. Elsevier Science Ltd.
6. Stuart Warren: 2008. Organic Synthesis – The Disconnection Approach (John Wiley & Sons). 2nd Edition.

Semester – III & IV

15SSD301 SOFT SKILL DEVELOPMENT – II 2H – 1C

Instruction Hours / week: L: 2 T: 0 P: 0 Marks: Internal: 100 External: Nil Total: 100

Course Objective

- To achieve the analytical skills
- To know about reasoning competencies
- To improve their communication and presentation skills
- Gain the knowledge on both Aptitude and Soft skills to the students
- Reinforcing competencies in soft skills which are crucial in a social setting
- Learn critically evaluate and demonstrate various principles involved in solving mathematical problems and to adopt new and faster methods of calculations

Course Outcomes

1. achieve the analytical skills
2. To know about reasoning competencies
3. To improve their communication and presentation skills
4. Gained the knowledge on both Aptitude and Soft skills to the students
5. Learnt critically evaluate and demonstrate various principles involved in solving mathematical problems and to adopt new and faster methods of calculations.
6. Reinforcing competencies in soft skills which are crucial in a social setting

UNIT - I

Time, Speed and Distance, Time and Work, Pipes and Cisterns, Geometry, Data Arrangement

UNIT – II

Analogy, Logic based Venn diagram, Probability, Permutation and Combination, Logarithms

UNIT – III

Data Sufficiency, Clocks, Calendar, Reading Comprehension, Sentence Correction, Sentence Completion, Spotting the Errors, Jumbled Sentences

UNIT – IV

Synonyms, Antonyms, Verbal Analogy, Statements and Assumptions, Group Discussion

UNIT - V

Resume Writing, Introduction to HR rounds, Time Management, Attitude and Behaviour

Semester - V

15CHU501 ORGANIC CHEMISTRY 5H-5C

Instruction Hours/week:L: 5 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course Objective

- To learn and understand the fundamental aspects of stereochemistry.
- Learn about R and S notations
- To understand different types of rearrangement reactions.
- To learn about carbohydrates.
- To understand the amino acids and proteins
- To learn about heterocyclic compounds

Course Outcomes:

1. Learnt and understand the fundamental aspects of stereochemistry.
2. Learnt about R and S notations
3. Understand different types of rearrangement reactions.
4. Learnt about carbohydrates.
5. Understand the amino acids and proteins
6. Learnt about heterocyclic compounds

Methodology:

Black board teaching and Group Discussion.

UNIT-I

Optical activity: compounds with asymmetric carbon- racemisation-Resolution-Asymmetric synthesis-Configuration –DL and RS nomenclature for compounds containing one asymmetric carbon. Walden inversion. Optical activity of Biphenyls, Allenes. Geometrical isomerism for olefin compounds. E-Z nomenclature.

UNIT-II

Mechanism of molecular rearrangement reaction: Pinacol-Pinacolone, Wagner-Meerwein, Beckmann, Hofmann, Curtius, Benzilic acid and Claisen rearrangements, Fries rearrangement and Cope rearrangement.

UNIT-III

Carbohydrates: Chemistry of monosaccharide- Glucose and Fructose. Chemistry of disaccharide- Sucrose and Maltose. Chemistry of polysaccharide - Starch and Cellulose - an elementary account (Elucidation of structure not necessary).

Inter conversion of Sugars – Muta rotation – Epimerization.

UNIT-IV

Amino acids– Classification,Preparation and properties –Peptides and synthesis of Polypeptides. Proteins- classification based on physical properties and biological functions, colour reactions – Primary, Secondary and tertiary structure.

UNIT-V

Heterocyclic compounds: Preparation, properties and use of Furan, Pyrrole, Thiophene, Pyridine, Quinoline, α and β-Flavones.

TEXT BOOKS:

1. Finar, I.L., 2003. "Organic Chemistry",Vol. I, Pearson Education, Singapore .
2. Finar, I.L., 2001. "Organic Chemistry", Vol. II, Pearson Education, Singapore.
3. Agarwal, O.P., 2004. "Natural Product Chemistry", Vol . I, Goel publishing House, Meerut.
4. Agarwal, O.P., 2004. "Natural Product Chemistry", Vol . II, Goel publishing House, Meerut.

REFERENCES :

1. Bahl, B.S. & Arun bahl, 2005. Advanced Organic Chemistry, S.Chand & Co., New Delhi.
2. Morrison, R.T. and Boyd, 2003. Organic Chemistry, 6th Edition ,Pearson Education, Singapore.
3. Soni, P.L., 2004. A textbook of Organic Chemistry, S.Chand & Co., New Delhi.
4. Jerry March, 1992. ''Advanced Organic Chemistry'', 4th Edition, Wiley, New York.
5. Pillai, C.N. 2009, Text book of Organic Chemistry, University press, New Delhi.
6. Michael B. Smith and Jerry March, 2013, Advanced Organic Chemistry, 6th edn, John Wiley & sons, New York.

Semester - V

15CHU502 INORGANIC CHEMISTRY 5H-5C

Instruction Hours/week:L: 5 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives

- Understand the structure of metals and alloys
- To learn the principles of radioactivity.
- To learn about isotopes and isobars
- To understand the fundamentals of acids and bases.
- To understand about the structure of metals and alloys.
- To learn about different aspects of solvents

Course Outcomes:

1. Understood the structure of metals and alloys
2. Learnt the principles of radioactivity.
3. Learnt about isotopes and isobars
4. Understood the fundamentals of acids and bases.
5. Understood about the structure of metals and alloys.
6. Learnt about different aspects of solvents

Methodology

Black board teaching and Group discussion.

UNIT- I

Structure of metals and alloys - substitutional and interstitial solid solutions - Hume – Rothery ratios - metallic bonding –theories-VBT, MOT and free electron theory-electrical, optical and mechanical properties of metals -semi conductors, intrinsic and extrinsic – uses, Crystal defects.

UNIT - II

Radio activity – General proprerties of Radio activity radiations, detection and measurement of radio activity. Natural radio activity & artificial radioactivity: Artificial transmutation of new elements, synthesis of radio isotopes of elements. Nuclear fission and fusion. Nuclear reactors - principles of working - production of electrical energy. Atomic energy projects in Industries - Safety measures, pollution, disposal of reactor wastes.

UNIT - III

Nature of isotopes and isobars - Detection and isolation of isotopes- various methods-importance of discovery of isotopes - uses of isotopes in various fields. Nuclear stability n/p ratio,magic numbers, C-12 and C-14 and nuclear binding energies. Nuclear reactions,mechanism and different types. Stellar energy. Radioactive disintegration series.

UNIT - IV

Acids and Bases - Arrehenius concept, proton transfer theory – concept of Lowry and Bronsted –Luxflood concept – the solvent system concept – Lewis concept – relative strength of acids and bases – effect of solvent – leveling effect – effect of polarity and dielectric constant – effect of substituents – factors influencing relative strengths of acids and bases. Applications and Limitations of HSAB concept.

UNIT - V

The solvent - solubility's of compounds - effect of temperature on solubility - Chemical structure and solubility of solvents. Classification of solvents - general behavior - properties of ionizing solvents. Types of reaction in solvents. Aqueous and non aqueous solvents –Protonic solvents- Ammonia. Non-protonic solvents - SO_2.

TEXT BOOKS:

1. C.V.Shekar , 2005. A text book of nuclear chemistry. First Edition, Dominant publishers and Distributros, New Delhi.
2. Puri, B.R. and L.R.Sharma, 2002. Principles of Inorganic Chemistry, Shoban lal & Co.,
3. Wahid Malik, R.D.Madan and G.D.Tuli, 2004. Selected topics in Inorganic Chemistry, S,Chand & Co., New Delhi.

REFERENCES :

1. Arnikar H.J, 2003. Essentials of Nuclear Chemistry. IV Edition, New Age International Publishers Pvt. Ltd., New Delhi.
2. James E Huheey, Elien A Keiter and Richard L Keiter, 2003. Inorganic Chemistry – Principles of Structure and Reactivity, 4^{th} Edition, Pearson Education Ltd., Delhi.
3. Madan, R.D., 2005. Modern Inorganic Chemistry, S.Chand & Co., New Delhi.
4. Puri, B.R. and L.R.Sharma, 2002. Principles of Inorganic Chemistry, Shoban lal & Co.,
5. Skoog, D.A. and D.M.West, 2004. Fundamentals of Analytical Chemistry, 8^{th} Edition Thomson Book store, Singapore.
6. Soni, P.L., 2004. Inorganic Chemistry, Sultan Chand & Sons.
7. Wiley and A.K.De, 1998. A text book of Inorganic Chemistry, New age international publishers, New Delhi.

Semester -V

15CHU503 ELECTROCHEMISTRY 5H-5C

Instruction Hours/week:L: 5 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course Objective

- To learn and understand the electrical condition in solutions.
- To understand about the ionic equilibrium,
- Learn about electrochemical cells and
- Learn about fuel cells.
- Learn about redox reactions
- Know about application of EMF measurements

Course Outcomes

1. Learnt and understand the electrical condition in solutions.
2. Understood about the ionic equilibrium,
3. Learnt about electrochemical cells and
4. Learnt about fuel cells.
5. Learnt about redox reactions
6. Knowledge about application of EMF measurements

Methodology

Black board teaching and Group Discussion.

UNIT-I

Electrical conduction: Conduction in metals and in electrolytic solutions. Measurement of conductivity in electrolytic solution. Migration of ions-Kohlrausch's law. Arrhenius theory of electrolytic dissociation – Ostwald's dilution law. Theory of strong electrolytes-Debye-Huckel-Onsagar theory Elementary account only verification – Debye – Falkenhagen effect- Wien effect. Transport numbers –Determination. Conductometric titrations.

UNIT-II

Ionic Equilibria- Solubility and solubility product- Determination of solubility product - Application of solubility product principle-Dissociation of weak acids and bases-Dissociation constants – pH scale - common ion effect – buffer solutions –Determination of pH values of buffer mixtures - Henderson's equation –Hydrolysis of salts –Degree of hydrolysis**.**

UNIT-III

Electrochemical cells: Electrode potentials-The standard hydrogen electrode- kinds of electrodes and their potentials- Nernst equation. EMF –computation and measurement of

cell emf- Single electrode potential –Determination and significance of electrode potentials- Electrochemical series –Temperature dependence of the cell EMF. Thermodynamic quantities of cell reactions.

UNIT-IV

Reference electrodes-calomel electrode-hydrogen electrode-glass electrode- Electrodes for measurement of pH –Concentration cells with and without transport- Liquid junction potential –Application of EMF measurements. Redox potentials –Redox indicators – Uses. Potentiometric titrations.

UNIT-V

Fuel cells: Hydrogen – Oxygen cell and hydrocarbon oxygen cell. Storage cells. Lead storage cell and Nickel Cadmium cell. Decomposition voltage – Over voltage-Deposition and discharge potential.

TEXT BOOK:

1. Puri Sharma and Pathania, 2003. Physical Chemistry, Vishal Publishing Co., Jalandar.

REFERENCES:

1. Atkins, P.W., 1983. Physical Chemistry, ELBS & Oxford university press, Oxford.
2. Glasstone, S., 2002. An Introduction to Electrochemistry, Affiliated East West press, New Delhi.
3. Whittakar, A.G., 2001. Physical Chemistry, Mount & Heal Viva Books Pvt. Ltd.,
4. Peter Atkin's and Julio De Paula, 2010, Physical Chemistry, 9th edn, Oxford University Press, New York.

Semester -V

15CHU504 NANOCHEMISTRY 5H-5C

Instruction Hours/week:L: 5 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course Objective

- To learn and understand the fundamentals of Nanochemistry.
- To understand the use of nano particles in molecular electronics,
- To learn about super Conductors
- To learn about the synthesis and stabilization of nano particles
- To characterize them by experimental techniques.
- Know about nano rods nano tubes

Course Outcome

1. Learnt and understood the fundamentals of Nanochemistry.
2. Understand the use of nano particles in molecular electronics,
3. Learnt about Super Conductors
4. Learnt about the synthesis and stabilization of nano particles
5. Characterization of them by experimental techniques
6. Know about nano rods nano tubes

Methodology:

Black board teaching, Discussion and Powerpoint Presentation.

UNIT-I

Basics of Nanochemistry: Introduction – definition – length scales – importance of nanoscale and its technology – self assembly of materials – self assembly of molecules – porous solids, nanowires, nanomachines and quantum dots.

UNIT-II

Nano Particles: Introduction – types of nanoparticles – preparation, properties and uses of gold, silicon, silver, zinc oxide, iron oxide, alumina and titania nanoparticles.

UNIT-III

Synthetic Techniques: Techniques to synthesize nanoparticles – top down and bottom up approaches – common growth methods – characterization of nanoparticles – applications and toxic effects of nanomaterials.

UNIT-IV

Nano Materials: Preparation, properties and applications of carbon nanotubes, nanorods, nano fibre and nanoclay.

UNIT-V

Instrumental Techniques: Electron microscopes – scanning electron microscopes (SEM) – transmission electron microscopes (TEM) – scanning probe microscopy – atomic force

microscopy (AFM) – scanning tunneling electron microscope (STEM) – basic principles only.

TEXT BOOKS:

1. Shanmugam.S, 2010, Nanotechnology, MJP Publishers, Chennai.
2. Patrick Salomon, A Handbook on Nanochemistry, Dominant Publishers and Distributers, New Delhi.
3. S. Balaji, 2010, Nanobiotechnology, MJP Publishers, Chennai.

REFERENCES:

1. CNR Rao, 2006, The Chemistry of Nanomaterial: Synthesis, Properties and Applications, Vol. I and II, Springer.
2. Mick Wilson, Kamali Kannangara, Geoff Smith, Michelle Simmons, Burkhard Raguse, 2005, Nanotechnology: Basic Science and Emerging Technologies, Overseas Press.
3. Segreev, G. B., 2006, Nanochemistry, Elsevier, New York.
4. T.Pradeep, 2013, Nano- The Essentials, Mcraw Hill Edn, New York.

	MAJOR ELECTIVE-I	Semester -V
15CHU505A	**GREEN CHEMISTRY**	**5H-5C**

Instruction Hours/week:L: 5 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course objectives

This course enables the student to

- Apply the principles and the practical aspects of green chemistry
- Prepare biodiesel from vegetable oil.
- Prepare phthalocyaninecomplex of Cu (II).
- Characterise the biodiesel.
- Mechano chemical solvent free synthesis of azomethine.
- Solvent free, microwave assisted one pot synthesis of phthalocyanine complex of copper(II)

Course outcome

The students have to use

1. The basic principles and practical aspects like preparations and characterization in green approach.
2. Preparation and characterization of biodiesel from vegetable oil.
3. Characterization of biodiesel from vegetable oil.
4. Preparation of phthalocyaninecomplex of Cu(II).
5. Mechano chemical solvent free synthesis of azomethine.
6. Solvent free, microwave assisted one pot synthesis of phthalocyanine complex of copper(II).

Methodology:

Black board teaching, Group discussion and Powerpoint Presentation.

UNIT-I

Introduction to green chemistry

Green chemistry-relevance and goals, Anastas' twelve principles of green chemistry - Tools of green chemistry: alternative starting materials, reagents, catalysts, solvents and processes with suitable examples.

UNIT-II

Microwave mediated organic synthesis (MAOS)

Microwave activation – advantage of microwave exposure – specific effects of microwave – Neat reactions – solid supports reactions _ Functional group transformations – condensations reactions – oxidations – reductions reactions – multi-component reactions.

UNIT III

Ionic liquids and PTC :

Introduction – synthesis of ionic liquids – physical properties – applications in alkylation – hydroformylations – expoxidations – synthesis of ethers – Friedel-craft reactions – Diels-Alder reactions – Knoevengal condensations – Wittig reactions – Phase transfer catalyst - Synthesis – applications.

UNIT IV

Supported catalysts and bio-catalysts for Green chemistry

Introduction – the concept of atom ecomomy – supported metal catalysts – mesoporous silicas – the use of Biocatalysts for green chemistry - modified bio catalysts – fermentations and biotransformations – fine chemicals by microbial fermentations – vitamins and amino acids — Baker's yeast –mediated transformations– Bio-catalyst mediated Baeyer-Villiger reactions–- Microbial polyester synthesis.

UNIT V

Alternative synthesis, reagents and reaction conditions

A photochemical alternative to Friedel-crafts reactions - Dimethyl carbonate as a methylating agent – the design and applications of green oxidants – super critical carbon dioxide for synthetic chemistry.

TEXT BOOK:

1. Ahluwalia V. K, 2012. Green Chemistry – Environmentally benign reactions. II Edition, Ane Books Pvt. Ltd., Chennai.

REFERENCES :

1. Paul T. Anastas & Tracy C. Williamson, 1996. Green Chemistry – Designing Chemistry for the Environment. II Edition, American Chemical Society, Wahington, D. C.
2. Paul T. Anastas & Tracy C. Williamson, 1998. Green Chemistry – Frontiers in benign chemical synthesis and processes. Oxford University Press, United Kingdom.
3. Rshmi Sanghi & M. M. Srivastava, 2003. Green Chemistry – Environment friendly alternatives. Narora Publishing House, Chennai.

MAJOR ELECTIVE-I **Semester -V**

15CHU505B ENVIRONMENTAL CHEMISTRY 5H- 5C

Instruction Hours/week:L: 5 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives

- To learn about atmospheric pollution
- To understand the chemistry of pollution in land
- To learn about the biosphere
- To understand the lithosphere and biosphere interactions
- To learn the control of pollution
- To learn about agricultural pollution

Course Outcomes

1. Learnt about atmospheric pollution
2. Understand the chemistry of pollution in land
3. Learnt about the biosphere
4. Understand the lithosphere and biosphere interactions
5. Learnt the control of pollution
6. Learn about agricultural pollution

Methodology

Black board teaching and Group discussion.

UNIT-I

Atmospheric Chemistry

The structure of the earth's atmosphere- chemistry of the lower and upper atmosphere. The chemistry of air pollution- oxides of nitrogen- hydrogen sulphide and oxides of sulphur- Aerosols – ozone depletion and consequences- dioxins burning plastics- other atmospheric chemicals- smog- radio activity and fallout- air pollution abatement. Green house effect- Global warming, oxides of carbon.

UNIT-II

The earth

The lithosphere- the chemical composition of earth- the structure and composition of inner earth- the mantle, and the crust. The exploitation of mineral resources and the abuse of earth – earth resources – changing the face of the land- the earth as a dump- recycle- earth resource conservation steps.

The hydrosphere : The fresh water chemistry – the structure and properties of liquid water – lakes, rivers, ponds and stream –The role of water in our total environment- the hydrologic cycle- snow and ice – nucleation and precipitation – the chemical composition of rain water- phase changes and isotopic fractionation.

UNIT- III

The biosphere

The structure of the biosphere, Man's perturbation of the biosphere – Man as a chemical factory – material use and waste – energy use and thermal pollution – ecological

disruption – chemical sensation, hormonal imbalance and mutagens- internal pollution. Hydrosphere - lithosphere interaction: The structure of water at an interface – chemical composition of mineral water- weathering and the changing face of the land- the origin of the oceans- sedimentation and the deposition of materials from the hydrosphere – chemical exchange between sediments and the water column.

UNIT- IV

Interactions

Lithosphere- biosphere interaction: soil chemistry – the prospects of agriculture- agricultural pollution – pesticides and other persistent pollutants – the deposition of coal and petroleum – theories of origin of petroleum. Atmosphere – biosphere interaction and atmosphere– hydrosphere interaction: history of earth's atmosphere – the nitrogen cycle – the carbon cycle – air – sea interactions.

UNIT-V

Pollution control

Pollution control in the following: Fertilizer, petroleum, pulp and paper, tanning, sugar, alcohol, electroplating and nuclear reactors.

Analysis of pollutants: Sum, specific and group parameters BOD, COD, specific oxygen demand, DOC, DOCl, DOS, Fe, Cr, Cu, Pb, and Ni-So2, NOx, H_2S, O_3 and CO.

TEXT BOOK:

1. A.K.De , 2001 Environmental chemistry, Rohan Ahmed Publishers.

REFERENCES :

1. Von R. A. Horne, 1978. Chemistry of our environment, John Wiley & Sons Ltd., New York.
2. Iain L, Marr and Malcom S. Cresser, 1983. Environmental chemical analysis, International Textbook Co, Pennsylvania.
3. Mahajan S.P, 1985. Pollution control in process industries. Mc.Graw Hill Publishing, New York.

MAJOR ELECTIVE-I **Semester -V**

15CHU505C BIOINORGANIC CHEMISTRY 5H-5C

Instruction Hours/week:L: 5 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course Objective

- To acquaint the students with the applications of Bioinorganic Chemistry to the medicinal chemisty.
- To Identify key structural molecules for metal bonding in biological molecules.
- To learn about the metals in life process
- To understand oxygen carrier systems.
- To understand about the metals used in plant life and about metal poisoning.
- To learn about nitrogen fixation

Course Outcomes

1. Students know the applications of Bioinorganic Chemistry to the medicinal chemisty.
2. Identify key structural molecules for metal bonding in biological molecules.
3. Learnt about the metals in life process.
4. Understand about the metals used in plant life and about metal poisoning.
5. Understood about Oxygen carrier systems
6. Learn about nitrogen fixation

Methodology

Black board teaching and Group discussion.

UNIT-I

Metals in Life Processes

Na-K-charge carriers & osmotic pressure, relation to sensitivity of nerves and control on muscles, Mg-Ca complexes with nucleic acid, nerve impulse transmission, trigger reaction, Mn, Fe, Co, Cu, Mo, ferridoxins, Zn-super acid catalysis.

UNIT-II

Oxygen Carrier Systems

Structure and mechanism of hemoglobin, vitamin B12, B12 co-enzyme myoglobin, synthesis of oxygen carriers.

Photosynthesis : Porphyrins ring complexes and redox mechanism.

UNIT-III

Nitrogen Fixation

Nitrogen in biosphere, nitrogen cycle, nitrification role of microorganisms, nitrogen fixation in soils

UNIT-IV

Metal poisoning and drug action of Inorganic complexes compounds

Metal poisoning, treatment by using chelating agent, mercury, lead & cadmium poisoning & treatment. Platinum complexes in treatment of cancer, metal deficiency and use of metal chelates.

UNIT-V

Trace Metals in Plant Life

Micronutrients in soil, role of micronutrients in plant life

Biogeochemistry : Biodegradation of minerals bacteria leaching and its applications.

TEXT BOOK:

1. A.K.De , 2001 Environmental chemistry, Rohan Ahmed Publishers.

REFERENCES :

1. Ochiai E-I 1977. Bioinorganic Chemistry**.** Allyn and Bacon, Inc., Massachusetts, Boston.
2. Williams, 1983. An Introduction to Bioinorganic Chemistry, C.C. Thomos Spring III.
3. Wallace, 1962. Decade on synthetic chelating agent in Inorganic plant nutrition.
4. E. Crabb and E.Moore, 1995. Metals in Life , Royal Chemical Society, Washington.
5. Zagic J.E., 1969. Microbial Biogeochemistry, Academic press, New York.
6. Ahuja S and E.M. Cohen, 1973. Chemical Analysis of the Environment and other modern techniques, Plenum press, New York.

Semester - V

15CHU511 CHEMISTRY PRACTICAL- V (GRAVIMETRIC ANALYSIS) 5H- 3C

Instruction Hours/week:L: 0 T:0 P:5 Marks: Internal:40 External: 60 Total:100

Course Objective

- To understand and develop the skill to perform organic qualitative analysis.
- To understand the factors which affect the crystallinity/size of precipitate.
- To understand the steps to be taken to ensure that the precipitates formed are large and easily filtered and avoid peptization.
- Estimate the Barium as Barium chromate
- Estimate of Lead as Lead Chromate.
- Estimate of Lead as Lead Sulphate.

Course Outcomes

1. Understand and develop the skill to perform organic qualitative analysis.
2. Understand the factors which affect the crystallinity/size of precipitate.
3. Understand the steps to be taken to ensure that the precipitates formed are large and easily filtered and avoid peptization.
4. Estimation the Barium as Barium chromate
5. Estimation of Lead as Lead Chromate.
6. Estimation of Lead as Lead Sulphate

Methodology

Black board teaching and Demonstration.

LIST OF PRACTICALS

1. Estimation of Barium as Barium chromate.
2. Estimation of Barium as Barium Sulphate.
3. Estimation of Lead as Lead Chromate.
4. Estimation of Lead as Lead Sulphate.
5. Estimation of Calcium as Calcium Oxalate
6. Estimation of Nickel as Nickel Dimethylglyoxime complex.
7. Estimation of Mg as Oxinate.

TEXT BOOKS:

1. Thomas, A.O., 2003. Practical Chemistry, Scientific Book Center, Cannanore.
2. Venkateswaran, V., R.Veeraswamy and A.R.Kulandaivelu, 2004. Basic Principles of Practical Chemistry, 2nd Edition, S.Chand Publications, New Delhi.

REFERENCES :

1. Furniss, B.S., A.J.Hannaford, P.W.G.Smith and A.R.Tatchell, 2004. Vogel's Textbook of Practical Organic Chemistry, 5th Edition, Pearson Education Ltd., Singapore .
2. Mendham, J., R.C.Denney, J.D.Barnes and M.Thomas 2002. Vogel's textbook of quantitative Chemical Analysis, 6th Edition, Pearson Education Ltd., Singapore.
3. Pandey, O.P., D.N.Bajpai and S.Giri, 2001. Practical Chemistry, 8th Edition, S.Chand Publications, New Delhi.
4. Santi Rajan palit and Sadhan Kumar, 1971. Practical Physical Chemistry, Ist Edition, Joy Publishers, Calcutta.

OPEN ELECTIVE Semester-V
15OEU501 (CHEMISTRY OF CONSUMER PRODUCTS) 3C

Instruction Hours/week:L:0 T:0 P:0 Marks: External: 100 Total:100

Course Objectives:
This skill enhancement course helps the student to

- Develop the preparation of hair dyes, hair spray and shampoos
- Develop the preparation of Hair spray
- Describe the preparation and uses of lotions,
- Describe the preparation and uses lipsticks
- Describe the preparation and uses talcum powder and Creams.
- Demonstrate the chemistry of essential oils

Course outcome

The students have formulate the knowledge about

1. The preparation of hair dyes, hair spray and shampoos
2. The preparation and uses of lotions,
3. The preparation and uses of lipsticks and
4. The preparation and uses of talcum powder
5. The preparation and uses of creams
6. The chemistry of essential oils

Methodology
Self study

UNIT I
Soaps
Saponification of oils and fats. Manufacture of soaps. Formulation of toilet soaps-different ingredients used. Their functions. Medicated soaps. Herbal soaps. Mechanism of action of soap. Soft soaps. Shaving soaps and creams. ISI specifications. Testing procedures/limits.

UNIT II
Detergents
Anionic detergents: Manufacture of LAB (linear alkyl benzene). Sulphonation of LAB – preparation of acid slurry. Different ingredients in the formulation of detergent powders and soaps. Liquid detergents. Foam boosters. AOS (alpha olefin sulphonates. cationic detergents: examples. Manufacture and applications.

Non-ionic detergents: examples. Manufacture of ethylene oxide condensater.

Mechanism of action of detergents. Comparison of soaps and detergents. Biodegradation – environmental effects. ISI specifications / limits.

UNIT III

Shampoos

Manufacture of SLS and SLES. Ingredients. Functions. Different kinds of shampoos – anti-dandruff, anti-lice, herbal and baby shampoos. Hair dye. Manufacture of conditioners. Coco betaines or coco diethanolamides – ISI specifications. Testing procedures and limits.

UNIT IV

Skin preparations

Face and skin powders. Ingredients, functions. Different types. Snows and face creams. Chemical ingredients used. Anti perspirants. Sun screen preparations. UV absorbers. Skin bleaching agents. Depilatories. Turmeric and Neem preparations. Vitamin oil.

Nail polishes: nail polish preparation, nail polish removers. Article removers. Lipsticks, roughes, eyebrow pencils. Ingredients and functions – hazards. ISI specifications.

UNIT V

Oils, fats and Waxes

Classification of oils fats and waxes: distinction between oil, fats and waxes Hydrogenation of oils-principle and manufacturing details. Definition and determination of saponification value, acid value, iodine value, RM value and their signification. Elaidin test for oils. Some common waxes like spermaceti, Bees wax, baybeery wax and their uses.

TEXT BOOKS:

1. Mohan Malhotra, Latest Cottage Industries, 20th Edition Edn, Vishal publishers, 1980, Meerut.
2. Gobala Rao.S , Outlines of chemical technology, Affiliated East West press,1998

REFERENCES:

1. Kafaro, Wasteless chemical processing, Mir publishers, 1995.
2. Sawyer.W, Experimental cosmetics, Dover publishers, New York, 2000.

Semester -VI

15CHU601 CHEMISTRY OF NATURAL PRODUCTS 5H-5C

Instruction Hours/week:L: 5 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives

- To understand the field of natural products chemistry;
- To identify natural products and their probable synthetic pathways.
- To enhance their understanding of biological and biochemical sciences.
- To learn about the Natural products including terpenoids
- To learn about the alkaloids,
- To learn about the vitamins, hormones and chemotherapeutic agents

Course Outcomes

1. Understand the field of natural products chemistry;
2. Identify natural products and their probable synthetic pathways.
3. Enhance their understanding of biological and biochemical sciences.
4. Learnt about the Natural products including terpenoids
5. Learnt about the alkaloids,
6. Learnt about the vitamins, hormones and chemotherapeutic agents

Methodology:
Black board teaching, Discussion and Power Point Presentations

UNIT-I
Terpenoids : Introduction – Classification – General methods of isolation – Isoprene rule- Structural elucidation and synthesis of geraniol, terpinol, dipentene and alpha-pinene.

UNIT-II
Alkaloids – Introduction –Classification – General characteristics – General methods of determining structures – Hofmann's exhaustive methylation, structural elucidation and synthesis of Nicotine, Conine, Piperine and Papaverine.

UNIT-III
Vitamin's – Introduction – Importance of vitamins – structural elucidation and synthesis of Retinol, Thiamine, Riboflavin, Ascorbic acids.

UNIT-IV
Hormones: Introduction – Structural elucidation and synthesis of adrenaline and thyroxin. Steroids: Introduction -Chemistry and structure of cholesterol. Synthesis (not necessary), Enzymes.

UNIT-V

Chemotherapy: Introduction – Classification of drugs – lethal dose –chemistry and application of sulpha drugs, Antimalarials, and Amoebicidal drugs, Antiseptics, Antipyretics, Analgesics and Antibiotics, Penicillin, Streptomycin, Chloromycetin, Tetracycline- Structure and uses only.

TEXT BOOK:

1. Agarwal,.O.P, 2003. Natural Product Chemistry, Goel Publishing House, Meerut.

REFERENCES:

1. Arun Bahl and B.S.Bahl, 2005. Advanced Organic Chemistry, S.Chand And Company, New Delhi
2. Finar, I.L., 2003. Organic Chemistry, Vol. I & Vol. II, Pearson Education, Singapore.
3. Gurdeep R.Chatwal, 2001. Organic Chemistry Of Natural Products, Vol. I, Himalaya Publishing House, New Delhi.
4. Gurdeep R.Chatwal, 2004. Organic Chemistry Of Natural Products, Vol. II, Himalaya Publishing House, New Delhi.
5. Madan.R.L, 2005. Organic Chemistry Q & A, S.Chand And Company, New Delhi.

Semester - VI

15CHU602 PHYSICAL METHODS & CHEMICAL STRUCTURES 5H- 5C

Instruction Hours/week:L: 5 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives

- To enable and impart the knowledge of crystal classes,
- To learn about polarization,
- To understand magnetic properties and spectroscopy.
- To understand how to characterize a compound.
- Identify functional groups
- Interpret a spectrum.

Course Outcomes

1. The students have knowledge of crystal classes
2. Learnt about polarization,
3. Understood magnetic properties and spectroscopy.
4. Understood how to characterize a compound.
5. Identify functional groups
6. Interpret a spectrum.

Methodology

Black board teaching and Group discussion.

UNIT-I

Electrical properties of molecules: Molar polarization,Orientation polarization and distortion polarization – polar and non polar molecules. Determination of dipole moment of polar gases, liquids and solids – Applications of dipole moment in the study of simple molecules.

UNIT-II

Magnetic properties of molecules: Meaning of the terms magnetic susceptibility, magnetic moment, diamagnetism, paramagnetism and ferromagnetism. Determination of magnetic susceptibility by Gouy's method.Application of magnetic measurements.

UNIT-III

Spectroscopy: Absorption spectra- Fundamental concepts of electromagnetic spectrum-The various regions of the spectrum and the relative energies of the radiation in each region-Type of changes induced by the interaction of the radiation with matter. Theory of rotation spectra – Diatomic molecule as rigid rotor and non rigid rotor - Intensities of spectral lines.

Theories of IR spectra – simple harmonic oscillator, model anharmonic oscillator, model of diatomic molecules information on molecular constitution from IR spectra; Application of IR spectra.

UNIT-IV

Theory of Raman spectra – Comparison of IR and Raman spectra - Theory of UV and visible spectra–Franck-Condon principle-Application of UV spectra to simple molecules.

NMR spectra – Basic principles – Chemical shift – Application of NMR spectra to simple molecules. High resolution Raman spectra (details not expected). Examples-Ethanol and o, m & p-xylenes.

UNIT-V

Chromatography – classification- Principles of Column, Paper and Thin Layer chromatography.

TEXT BOOKS:

1. Puri Sharma and Pathania, 2003. Physical Chemistry, Vishal Publishing Co., Jalandar.
2. Y.R.Sharma , 2004.Elementary Organic Spectroscopy,1st Edition,S.Chand& Company Ltd, New Delhi.

REFERENCES :

1. Gopalan,V., P.S.Subramanan and K.Rangarajan, 2003. Elements of Analytical Chemistry, S.Chand and Sons, New Delhi .
2. GurdeepR.Chatwal,ShamK.Anand 2004.Instrumental methods of chemical analysis,1st Edition Mrs.Meenapandey for Himalaya publishing House, Mumbai.
3. B.K.Sharma, 1999**.** Instrumental methods of chemical analysis,15th Revised and Enlarged Edition Global Publishing House,Meerut.
4. Skoog, .D.A., and D.M.West, 2004. Fundamentals of Analytical Chemistry, 8th Edition, Thomson book store, Singapore.
5. Galen W.Ewing., 1988. Instrumental Methods of Chemical Analysis. III Edition, McGraw Hill International Editions, Singapore .
6. Skoog, D.A., 2004. Instrumental Methods of Analysis, Thomson book store, Singapore.
7. Robbert M. Siverstein and Francis X. Webster, 2013, Spectroscopic identification of organic compounds, 6th edn, Wiley India, New Delhi.

MAJOR ELECTIVE-II **Semester -VI**

15CHU603A RADIATION CHEMISTRY 5H-5C

Instruction Hours/week: L: 5 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives

- To learn about the effect of radiation on plants and animals
- To understand about the radiochemical separation
- To learn about the principles of tracer chemistry,
- To Learn about detection of radiation
- To learn about the use of lasers in chemistry.
- To learn about isotopes.

Course Outcomes

1. Know about the effect of radiation on plants and animals
2. Understand about the radiochemical separation
3. Learn about the principles of tracer chemistry,
4. Learnt about detection of radiation
5. To learn about the use of lasers in chemistry
6. Learnt about isotopes.

Methodology:

Black board teaching and Group discussion

UNIT-I

Isotopes

Isotope separation, thermodynamic and kinetic isotope effects, isotope exchange reaction kinetics, determination of exchange rate constant, production of radio isotopes.

Biological effects of Radiation:

Introduction, genetic and somatic effect on human being, effect of radiation on plants and aquatic Environment .

UNIT-II

Radiochemical Separation

The need of radiochemical separation techniques, carrier techniques, isotope and nonisotopic carriers, co precipitation and adsorption, ion exchange, solvent extract, electrolytes behavior of carrier free tracer radionuclide.

UNIT-III

Principle of tracer chemistry

Application of tracers in physiochemical studies, diffusion studies, isotopic and exchange reactions, tracer in the study of the mechanism of the inorganic chemical reaction, atom transfer & electron transfer mechanisms. Heterogeneous catalysis and surface area measurements, radio carbon dating, tracer studies with tritium, application in metallurgy and preservation of food, geochemical application and hot atom chemistry.

UNIT-IV

Radiation detection and measurements

Ionization current measurements, multiplicative ion collector, methods not based on ion collection, auxillary Instrumentation and health physical instruments and counting staticsits.

UNIT-V

Lasers and Lasers in Chemistry

Introduction, characteristics of laser, uses of lasers in chemical process, laser induced chemical reactions, organic photochemistry, lasers as a photochemical tool, laser induced selective bond chemistry , overview , bond selective chemistry of light atom molecules.

TEXT BOOK:

1. Hari J.Arnikar, 1982. Essentials of Nuclear Chemistry, John Wiley, New York.

REFERENCES :

1. Friendlander, Kennedy & Miller, 1981. Nuclear and radio Chemistry, John Wiley and Sons, New York.
2. B.G. Harvey, 1965. Nuclear Chemistry, Pentice-Hall of India (Private) ltd., New Delhi.
3. Hassinsky Translated by D. G. Tuck, 2006. Nuclear Chemistry and its application, Addison Wiley, New York.
4. N. Nesmeyanov, An. N. Nesmeyanov, 1974. Radiochemistry, Mir, Russian.
5. Alan M. Jacobs, Donald E. Kline and Forrest J. Remick, 1960. Basic Principles of nuclear science and reactors, Princeton, N.J., Van Nostrand.
6. Jay, K. E. B, 1961. Nuclear power, today tomorrow, Methuen, London.
7. Gerald R. Van Hecke & Kerry K. Karukstis, 1998. A Guide To lasers in chemistry, Boston.

	MAJOR ELECTIVE-II	**Semester -VI**
15CHU603B	**DYE CHEMISTRY**	**5H- 5C**

Instruction Hours/week:L: 5 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives

- To know about colour and chemical constituents.
- To introduce the application of colourants (dyes) on various substrate- fibres, food, plastics, etc.
- To provide students with opportunities to appreciate and know the basic skills in dyeing.
- To learn about different types of dyes like Direct, Acid & basic dyes, Mordant, Azo and Vat Dyes ,
- Disperse dyes and about optical brightening agents.
- Know about mechanism of fading

Course Outcomes

1. Knowledge about colour and chemical constituents.
2. Introduce the application of colourants (dyes) on various substrate- fibres, food, plastics, etc.
3. Students have opportunities to appreciate and know the basic skills in dyeing.
4. Learnt about different types of dyes like Direct, Acid & basic dyes, Mordant, Azo and Vat Dyes ,
5. Disperse dyes and about optical brightening agents.
6. Knowledge about mechanism of fading

Methodology

Black board teaching and Group discussion

UNIT I

Colour and chemical constitution

Colour and chemical constitution - chromophore, auxochrome and resonance, various theories; History of natural and synthetic dyes; Names of commercial dyes; Study of raw materials and dyestuff intermediates; Unit operations - nitration, sulphonation, halogenation, amination, diazotisation and alkali fusion; Classification of dyes based on chemical constitution.

UNIT II

Direct, Acid and Basic Dyes

Direct cotton dyes (substantive dyes) – Classification, properties, structure and mechanism of dyeing, post treatment of dyeing.

Acid dyes and Basic dyes – Classification, Characteristics, Mechanism of dyeing, Nature of affinity on cellulose and protein fibres.

UNIT III

Mordant, Azo and Vat Dyes

Mordant dyes – classification, methods of application; Metal complex dyes – types of bond formation between dye and various fibres.

Azo dyes – Azoic coupling components, protective colloids, electrolytes, stabilisation of diazonium salts, principles and application.

Vat dyes and solubilised vat dyes – classification, methods of application, principles and application, Stripping agents and correction of faulty dyeing.

UNIT IV

Disperse dyes

Chemistry involved in the production of Aniline black; Prussian black and phthalocyanines.

Disperse dyes - classification based on chemical structure, properties and principles of application; Solvent soluble dyes - Nigrosines and Indulines; Cyanine dyes.

UNIT V

Colour and Brightening Agents

Fluorescent brightening agents (FBA) - Theory and applications; Identification and estimation of dyes on fibres; The action of light on dyes and dyed fibres; Mechanism of fading.

TEXT BOOKS:

1. K. Venkataraman, The chemistry of synthetic dyes Part I & II, Academic Press, New York, 1952.
2. V. A. Shenai, Introduction to Chemistry of Dyesuffs, Sevak Prakashan Pub., Mumbai, 1991.

REFERENCES :

1. V. A. Shenai, Chemistry of Dyes and Principles of Dyeing Vol.-II, Sevak Prakashan, Mumbai, 1987.
2. V. A. Shenai, Ecology and Textiles, Sevak Publications, Mumbai, 1997.
3. D. M. Nunn, The Dyeing of Synthetic Polymer and Acetate Fibres, Dyers Company, Publication Trust, 1979.
4. V. A. Shenai, Toxicity of Dyes and Intermediates, Sevak Publications, Mumbai, 1998.
5. Directory of safe dyes conforming to German Consumer Goods Ordinances, The Dyestuff Manufacturers Association of India, 1996.

MAJOR ELECTIVE-II **Semester -VI**

15CHU603C CHEMISTRY OF MATERIALS 5H- 5C

Instruction Hours/week:L: 5 T:0 P:0 Marks: Internal:40 External: 60 Total:100

Course Objectives

- To review the chemistry in the context of materials science & engineering.
- To learn the introduction to metals, ceramics, polymers, and electronic materials in the context of a molecular level understanding of bonding.
- To learn about composite and nano material
- To understand the relation between processing, structure, and physical properties.
- To know about High Tc materials
- To know about Thin films and Langmuir- Blodgett Films

Course Outcomes

1. Understand the chemistry in the context of materials science & engineering.
2. Learnt the introduction to metals, ceramics, polymers
3. Knowledge about electronic materials in the context of a molecular level understanding of bonding.
4. Understood the relation between processing, structure, and physical properties.
5. Learn about composite and nano material
6. Knowledge about thin flims

Methodology:

Black board teaching and Group discussion

UNIT-I

Glasses and Ceramics

Glassy state, glass formers and glass modifiers, applications, Ceramic structures, mechanical properties, clay products. Reformatories, characterizations, properties and applications.

UNIT – II

Composite and Nanomaterials

Microscopic composites; dispersion - strengthened and particle - reinforced, fibre - reinforced composites, macroscopic composites. Nanocrystline phase, preparation procedures, special properties, and applications.

UNIT-III

High Tc Materials

Defect perovskites, high Tc superconductivity in cuprates, anisotropy; temperature dependence of electrical resistance; optical photon modes, superconducting state; heat capacity; coherence length, elastic constants, position lifetimes, microwave absorption - pairing and multigap structure in high Tc materials , applications of high Tc materials.

UNIT- IV

Polymeric Materials

Molecular shape , structure and configuration, crystallinity, stress- strain behavior, thermal behavior , polymer types and their applications, conducting and ferro - electric polymers.

UNIT- V

Thin films and Langmuir- Blodgett Films

Preparation techniques; evaporation / sputtering, chemical processes, MOCVD, sol - gel etc. Langmuir- Blodgett (LB) film, growth techniques, photolithography, properties and application of thin and LB films.

Materials of Solid Devices:Rectifiers, transistors, capacitors IV-V compounds, low dimensional quantum structure; optical properties.

TEXT BOOKS:

1. N. W. Ashcrott and N. D. Mermin, 1976. Solid State Physics, Saunders College Publishing, USA.
2. W. D. Callister, 2007. Material Science and Engineering: An introduction, John Wiley & Sons, New York.

REFFERNCES:

1. H. V. Keer, 1993. Principals of Solid State, , Willey Eastorn Ltd., New Delhi.
2. G. W. Gray, 1987. Thermotropic Liquid Crystals, John Willey, New York.
3. Kelkar and Halz , Text book of liquid crystals, Chemie Verlag.

Semester-VI

15CHU611 CHEMISTRY PRACTICAL- VI 5H- 3C
(PHYSICAL CHEMISTRY)

Instruction Hours/week:L: 0 T:0 P:5 Marks: Internal:40 External: 60 Total:100

Course Objectives

- To provide the skill of the Physical chemistry experiments.
- To provide students with basic laboratory skills and techniques including partition, Rast method and Eutectic system and some basic instrumental methods.
- To develop skills in determining the rate constant of a reaction
- Determination of critical solution temperature of Phenol-water system
- Determination of effect of added electrolyte on critical solution temperature of Phenol-water system.
- Phase Diagram- Simple Eutectic system.

Course Outcomes

1. Students have the skill of the Physical chemistry experiments.
2. Students with basic laboratory skills and techniques including partition, Rast method and Eutectic system and some basic instrumental methods.
3. They have a Skills in determining the rate constant of a reaction
4. Determination of critical solution temperature of Phenol-water system
5. Determination of effect of added electrolyte on critical solution temperature of Phenol-water system.
6. Phase Diagram- Simple Eutectic system.

Methodology

Black board teaching and demonstration.

Content

1.Determination of partition coefficient of iodine between Carbontetrachloride and water.

2.Determination of partition coefficient of iodine between Benzene and Water.

3.Determination of equilibrium constant for the reaction between Potassium iodide and iodine.

4.Determination of rate constant of acid- catalyzed hydrolysis of an ester Methyl acetate or Ethyl acetate

5.Determination of K_f molecular weight by Rast method –Naphthalene, Diphenyl and m-dinitrobenzene as solvents.

6.Determination of critical solution temperature of Phenol-water system.

7.Determination of effect of added electrolyte on critical solution temperature of Phenol-water system.

8.Determination of concentration of an electrolyte NaCl/KCl/Succinic acid.

9.Determination of transition temperature of sodium acetate, sodium thiosulphate and $SrCl_2.6H_2O$

10. Phase Diagram- Simple Eutectic system.

TEXT BOOK:

1. Pandey, O.P, D.N.Bajpai and S.Giri, 2001. Practical Chemistry, 8th Edition, S.Chand Publications, New Delhi

REFERENCES:

1. Lepse, Paul A., Lyle B.Peter, 1986.. Lab Manual for Lingren's Essentials of Chemistry, Prentice Hall, New Delhi
2. Santi Rajan palit and Sadhan Kumar, 1971. Practical Physical Chemistry, Ist Edition, Joy Publishers, Calcutta
3. Siddhiqui, Zeba N, 2002. Practical industrial Chemistry, 1st Edition, Anmol Publications Pvt. Ltd., New Delhi

	Self study course	Semester -V
15CHU506	**LEATHER CHEMISTRY**	**4C**

Instruction Hours/week:L: 0 T:0 P:0 **Marks: External: 100**

Course Objectives

- Through this course the student gains knowledge on the technology involved in processing of leathers.
- To learn about principles involved in different process of leather manufacturing
- To understand the tanning of leather and dyeing
- To learn the pollution problems accompanied with the leather manufacturing.
- To understand about animal bye products.
- To know about Tannery effluents and treatment

Course Outcomes

1. Through this course the student gained knowledge on the technology involved in processing of leathers.
2. Learnt about principles involved in different process of leather manufacturing
3. Understand the tanning of leather and dyeing
4. Learnt the pollution problems accompanied with the leather manufacturing.
5. Understand about animal bye products.
6. Knowledge about Tannery effluents and treatment

Methodology

Self Study

UNIT I

Hides, Skins,Leather-An elementary knowledge of the structure and composition of hides and skins. proteins and their characteristics, Anatomy and histology of protein constituents of leather (an elementary concept).

Basic principle involved in pre-taning such as soaking, liming, deliming, bating, pickling involved in pre-tanning such as soaking, liming, deliming, bating, pickling and depickling.

UNIT II

Types of tanning-vegetable and mineral tanning, Different types of vegetable tanningmaterials classification and chemistry of vegetable tanning. Factros and Physio-chemical principle involved in vegetable tanning, Fixation of vegetable tanning. Synthetic tannings-their classifications, general methods of manufacture and use.

UNIT III

The preparation and chemistry of chrome tanning liquids, Olation, Oxolation and hydrolysis of chrome liquids. Effect of adding tanning agents-Role of pH in the reaction of chromium complexes with hide proteins. Factors governing chrome tanning-chemistry of neutralization process.

A brief survey of chemistry of other tanning like Al, Zr and Te salts and their relative merit in contrast with chrome tanning.

Chemistry of combination of tannages involving vegetable tanning aldehydes, chrome and other mineral tanning agents.

UNIT IV

Chemical methods of curing and preservation of hides and skins in acid and alkaline solution.

Principles of analytical methods employed in curing, liming, deliming, bating, pickling.

Analysis of vegetable tanning materials and extract.

Process of dyeing leather-Use of mordants, dyeing auxillaries such as leveling, wetting and dispersing agents-Dye fixations.

UNIT V

Animal bye-products-their collection, handing and preservation methods (such as hair, blood, bones, glands, Kerationus materials and their utilization).

Tannery effluents and treatment: Types of water pollution-phsical, chemical, physiological and biological. Different types of tannery effluents and wastes-beamhouse waste-liquors-tanning and finishing yard waste liquors, solid waste-origin and disposal.

REFERENCES:

1. Chemical technology of Leather (ISI).
2. Fundamentals of Leather Science-Woodroffe.
3. Tanning processes-Crthmann.
4. Chemistry of Leather manufacture-Mchanghlils.
5. Vegetable tanning materials-Howes.

	Self study course	**Semester -VI**
15CHU604	**FORENSIC CHEMISTRY**	**4C**

Instruction Hours/week:L: 0 T:0 P:0 **Marks: External: 100**

Course Objectives

- To give the students the importance of forensic chemistry and an exposure to find,
- analyse and find a suitable method to detect the crime .
- To know about food adultration
- To gain knolewdge about transportation
- To gain knolewdge about crime detection
- To knowabout Forgery and counterfeiting
- To learn about Medical aspects

Course Outcomes

1. Students know the importance of forensic chemistry and an exposure to find,analyse and find a suitable method to detect the crime .
2. Knowledge about food adultration
3. Gained knowledge about transportation
4. Gained knowledge about crime detection
5. Knowledge about Forgery and counterfeiting
6. Learnt about Medical aspects

Methodology

Self study

UNIT I

Food adultration

Contamination of wheat, rice, dhal, milk, butter, etc. With clay, sand, stone, water and toxic chemicals (e.g. Kasseri dhal with mentanil yellow).

Food poisons: natural poisons (alkaloids, nephrotoxins), pesticides (DDT, BHC, Follidol), Chemical poisons (KCN). First aid and Antidotes for poisoned persons.

Heavy metal (Hg, Pb, Cd) Contamination of Sea food. Use of neutron activation analysis in detecting poisoning (e.g., As in human hair)

UNIT II

Transportaion

Drunken driving: brath analyzer for ethanol. Incendiary and timed bombs in road and railway tracks. Defusing live bombs.

Hit -and-go traffic accidents : paint analysis by AAS. Soill of toxic and coorosive chemicals (e.g., conc.acids) from tankers.

UNIT III

Crime detection

Accidental explosions during manufacture of matches and fire-works (as in Sivakasi). Human bombs, possible explosives (gelatin sticks,RDX). Metal detector devices and other security measures for VVIP. Composition of bullets and detection of powder burns. Scene of crime: finger prints and their matching using compuetr records. Smell tracks and police dogs. Analysis of blood and other body fluids in rape cases.Typing of blood. DNA finger printing for tissue identification in disembered bodies.Blood stains on clothing. Cranial analysis (head and teeth).

UNIT IV

Forgery and counterfeiting

Detecting forgery in bank cheques / drafts and educational records (mark lists, certificates), using UV-light. Alloy analysis using AAS to detect counterfeit coins. Checking silverline wter mark in currency notes.

Jewellery : detection of gold purity in 22 carat ornaments, detecting gold plated jewels, authenticity of diamonds (natural, synthetic and glassy).

UNIT V

Medical aspects

AIDS : Cause and prevention . Misuse of scheduled drugs. Burns and their treatment by plastic surgery. Metabolite analysis, using mass spectrum - gas chromotography. Detecting steroid consumption among athletes and race horses.

TEXT BOOKS:

1. B.R. Sharma, Forensic Science in Criminal Investigation and Trial, 4th edn. Universal Law Publishing Company. New Delhi.**,** 2011.

REFERENCES:

1. Stuart H. James, Forensic Science: An Introduction to Scientific and Investigative Techniques 3rd ed. 2013
2. Richard Saferstein, Criminalistics: An Introduction to Forensic Science, 9th edn., 2014.
3. R.K. Tiwari, Computer Crime and Computer Forensic., 2002.
4. Brent E. Turvey, Criminal Profiling: An Introduction to a Behavioral Evidence Analysis, 3rd edn. 2011.

15CHU507 SPECTROSCOPY 6C

Course Objectives

This course enables the students to

- Discuss the principle and the theory behind the UV spectroscopy.
- Discuss the principle and the theory behind the IR spectroscopy.
- Explain the principle and the theory behind the NMR spectroscopy.
- Explain the principle and the theory behind the mass spectroscopy.
- Explain the principle and the theory behind the ESR spectroscopy.
- Identify the free radicals using ESR

Course Outcome

The Student have gained knowledge about

1. The principle and the theory behind the UV spectroscopy.
2. The principle and the theory behind the IR spectroscopy.
3. The principle and the theory behind the NMR spectroscopy.
4. The principle and the theory behind the Mass spectroscopy
5. The principle and the theory behind the ESR spectroscopy
6. Identification of the free radicals using ESR

Methodology

Self study

UNIT – I

Ultraviolet and Visible Spectroscopy: Electronic spectra of diatomic molecules - laws of photochemistry - electronic absorption transitions-correlation of electronic structure with molecular structure - Simple chromophoric groups - effects of conjugation - Instrumentation**.**

UNIT – II

Infrared Spectroscopy: The vibrating diatomic molecules-the simple harmonic oscillator, identification of fundamental groups. Finger print region-application to organic and inorganic compounds-Instrumentation**.**

UNIT – III

NMR Spectroscopy: Principle of NMR spectroscopy – description of the PMR instrument, factors affecting chemical shifts-chemical shift equivalence and magnetic equivalence - spin-spin coupling -double resonance-shift reagents-applications to organic and inorganic compounds - problems. FT NMR

UNIT – IV

Mass Spectroscopy: Principles of mass spectrometry – resolution - description of single focusing and double focusing electron impact mass spectrometers - presentation and analysis of spectra - determination of molecular formulae - nitrogen rule- stevenson's rule - isotope abundance analysis - meta stable ions and peaks the molecular ion peak - fragmentation processes .

UNIT - V

ESR spectroscopy - theory - derivative curves - g shift - hyperfine splitting-isotropic and anisotropic systems-zero field splitting and Kramer's degeneracy. Identification of free radicals – applications to copper complexes.

TEXT BOOKS:

1. Jag Mohan, 2001. Organic Spectroscopy Principles and Applications. Narose Publishing House, New Delhi.
2. Kemp W., 2004. Organic Spectroscopy. III Edition, Pal Grave, New York.

REFERENCES

1. Russell S. Drago, 1965. Physical Methods in Inorganic Chemistry. Reinhold Publishing Corporation, New York.

15CHU605 BIO-ORGANIC CHEMISTRY 6C

Course Objectives

- To give the students the importance of Greener reagents and chemicals and an exposure to knowledge about the clinical training and synthesis of drugs.
- Summarize the twelve principles of green chemistry
- To know the special emphasis of an atom economy.
- Explain the catalysis and alternate sources of energy.
- Explain the basics of medicinal chemistry
- Pharmacokinetics and clinical trial

Course Outcomes

1. The students know the importance of Greener reagents and chemicals and an exposure to knowledge about the clinical training and synthesis of drugs.
2. Summarize the twelve principles of green chemistry
3. Knowledge about the special emphasis of an atom economy.
4. the catalysis and alternate sources of energy.
5. the basics of medicinal chemistry
6. Pharmacokinetics and clinical trial

Methodology

Self study

UNIT – I

Introduction to green chemical principles: Definition, tools and twelve principles of green chemistry, solvent less reactions and reactions in water, microwaves and fluorous solvents, green resolution of racemic mixtures, atom efficient processes,

UNIT – II

Greener reagents and Products: Greener reagents and products, minimizing bioavailability and use of auxiliary materials, examples of greener reagents including replacement of phosgene , solid state polymerizations, alternative nitrile synthesis.

UNIT - III

Basics of Medicinal chemistry: Brief history of medicinal chemistry, classification of drugs- brief description of biological, design of pro drugs system- multiple pro drug formation – soft drug principle and application

UNIT - IV

Pharmacokinetics and drug metabolism and development of new drugs

Natural resources of lead compounds – absorption, distribution, metabolism, elimination – oxidation and hydrolysis - Five classic steps in the design of a new drug – procedures in drug design isolation of bio active compounds - accidental discovery

UNIT – V

Clinical training and synthesis of drugs

Various phases in pre-clinical testing– designing organic synthesis – convergent synthesis – patenting and manufacture – complexes and chelating agents – metal clusters – detoxification – drug action and metal chelation.

TEXT BOOKS:

1. Anastas, P.T. and J.C. Warner, 1998. Green chemistry; theory and practice. Oxford Uni.press; Oxford.
2. Matlack, A.S.2001. Introduction to Green chemistry Marcel Dekker. New York
3. Cann.M.C. Connelly, M.E.2000.Real world cases in green chemistry. ACS; Washington D.C

REFERENCES:

1. Clarke.J.H.and D.Macquarrine, 2002. Hand book of Green chemistry and technology. Balackwell; Oxford.U.K.
2. Kirchoff, M. and Ryan.M.A. 2002. Editors.Greener approaches to under graduate chemistry experiments. ACS; Washington .D.C
3. Lancastor.M.2002. Green chemistry; An introductory text. Royal society of chemistry; London