BACHELOR OF SCIENCE

IN

CHEMISTRY

CURRICULUM AND SYLLABUS

(For students admitted from the academic year 2015 – 2016 Onwards)

UNDER CHOICE BASED CREDIT SYSTEM

DEPARTMENT OF CHEMISTRY
FACULTY OF SCIENCE AND HUMANITIES
SRM UNIVERSITY
SRM NAGAR, KATTANKULATHUR – 603 203

DETAILS OF THE CREDITS

Component	Course	Total number of Credits
Part I	Language	8
Part II	English & foreign language	8
Part III	Major & Allied subjects	93
Part IV	Skill based courses	7
Part IV	Value Added Course	10
Part V	Extension activity	1
Part VI	Major/Non-Major electives	16
Part VII	Enviromental studies Core Course	3
	Total	**146**

COURSES OFFERED TO OTHER DEPARTMENTS
(ALLIED SUBJECTS)

Code	Course	Total number of credits
UCY15361	Allied Chemistry – I	4
UCY15362	Allied Chemistry Practical- I	2
UCY15461	Allied Chemistry II	4
UCY15462	Allied Chemistry Practical- II	2

COURSE OFFERED TO STUDENTS OF ALL UG DEGREE (GENERAL SUBJECT)

Code	Course	Total number of credits
UES15501	Environmental Studies	3

MC- MAJOR CORE COURSE
It is offered by the parent department, totally related to the major subject, components like theory, practical, project.

ME-MAJOR ELECTIVE
It is also offered by the parent department. The objective is to provide choice and flexibility within the department. The student can choose his/her elective paper. Elective is related to the major subject. The difference between core course and elective course is that there is choice for the student. The department is at liberty to offer four elective courses in any semester.

NON-MAJOR ELECTIVE
TO include

SK-SKILL BASED COURSES AND VALUE ADDED SUBJECTS
It is an inter departmental course offered by a department for the students belonging to other departments. The objective is to provide mobility and flexibility outside the parent department. This is introduced to make every course multidisciplinary in nature.

SUPPORTIVE COURSE
The supportive course is the inter departmental course, computer literacy, professional ethics to develop computer skills and Social ethics.

GENERAL
As per the Supreme Court order Environmental Studies is offered to all with three credits**.**

TOTAL NUMBER OF CREDITS - 146

Bachelor of Science in Chemistry

(For students admitted from the academic year 2015 – 2016 onwards)

Curriculum 2015

(Choice Based Credit System)

Eligibility

The candidates seeking admission to the B.Sc. Degree program shall be required to have passed (10+2) (Higher Secondary) examination or any other equivalent examination of any authority, recognized by this University, with Physics, and Chemistry / Computer Science/Mathematics/ Biology.

Duration and Structure of the B. Sc Programme

3 Years in 6 Semester

BACHELOR OF SCIENCE IN CHEMISTRY
(For students admitted from academic year 2015 – 2016 onward)
CURRICULUM
SEMESTER I

Career Stream Title	Course Code	Course Title	L	T	P	Total L+T+P	C
Language	ULH15101	Hindi – I	4	1	0	5	4
	ULF15101	French – I					
	ULT15101	Tamil - I					
	ULE15101	English –I	4	1	0	5	4
Compulsory Core	UCY15101	General Chemistry-I	3	2	0	5	4
	UCY15102	Green Chemistry	3	2	0	5	4
Compulsory Core Lab	UCY15103	Inorganic Qualitative Analysis -I	0	0	4	4	4
Allied Subjects	UMA15161	Mathematics – I	4	0	0	4	4
	UBC15161	Biochemistry - I					
Supportive Course **(Internal Evaluation Only)**	CDC15101	Verbal Ability	2	0	0	2	2
Total Credit			**20**	**6**	**4**	**30**	**26**

SEMESTER II

Career Stream Title	Course Code	Course Title	L	T	P	Total L+T+P	C
Language	ULH15201	Hindi – II	4	1	0	5	4
	ULF15201	French –II					
	ULT15201	Tamil - II					
	ULE15201	English –II	4	1	0	5	4
Compulsory Core	UCY15201	General Chemistry II	3	1	0	4	4
Compulsory Core Lab	UCY15202	Inorganic Qualitative Analysis – II	0	0	4	4	3
Allied Subjects	UMA15261	Mathematics – II	4	0	0	4	4
	UBC15261	Biochemistry - II					

	UBC15262	Biochemistry Lab	0	0	3	3	2
Skilled Based Elective –I (**Laboratory as internal component**)	UCY15E51	Computer Literacy	2	0	1	3	2
	UCY15E52	Water Treatment and Analysis					
Supportive Course**(Internal Evaluation Only)**	CDC15201	Quantitative Aptitude and Reasoning – I	2	0	0	2	2
Extension Activity	UNS15201	NSS	0	0	0	0	1
	UNC15201	NCC					
	UNO15201	NSO					
	UYG15201	Yoga					
Total Credit			**19**	**3**	**8**	**30**	**26**

SEMESTER III

Career Stream Title	Course Code	Course Title	L	T	P	Total L+T+P	C
Compulsory Core	UCY15301	General chemistry-III	3	1	0	4	4
	UCY15302	Principles of Analytical chemistry	3	0	0	3	3
Compulsory Core Lab	UCY15303	Inorganic volumetric Estimation	0	0	4	4	3
Allied Subjects	UPY15361	Allied Physics -I	4	1	0	5	4
	UPY15362	Allied Physics Lab -I	0	0	4	4	2
Skill Based Elective **(Laboratory as internal component)**	UCY15E53	C Programming and its application to Chemistry	2	0	1	3	4
	UCY15E54	Basics of Bioinformatics					
Non-major Elective-I		Open Elective -I	2	0	0	2	2
Core Elective - I	UCY15E01	Industrial Chemistry	3	0	0	3	3
	UCY15E02	Polymer Chemistry					
Supportive Course **(Internal Evaluation Only)**	CDC15301	Quantitative Aptitude and Reasoning – II	2	0	0	2	2
Total Credit			**19**	**2**	**9**	**30**	**27**

SEMESTER IV

Career Stream Title	Course Code	Course Title	L	T	P	Total L+T+P	C
Compulsory Core	UCY15401	General Chemistry-IV	3	2	0	5	4
	UCY15402	Concepts in Physical Chemistry	3	2	0	5	4
Compulsory Core Lab	UCY15403	Physical Chemistry Practical -I	0	0	4	4	2
Allied Subjects	UPY15461	Allied Physics -II	4	1	0	5	4
	UPY15462	Allied Physics Lab - II	0	0	4	4	2
Core-Elective-II	UCY15E03	Chemistry of Natural Products	3	0	0	3	3
	UCY15E04	Pharmaceutical Chemistry					
Non-major Elective-II		Open Elective -II	2	0	0	2	2
Supportive Course **(Internal Evaluation Only)**	CDC15401	Communication Skills	2	0	0	2	2
Total Credit			**17**	**5**	**8**	**30**	**23**

SEMESTER V

Career Stream Title	Course Code	Course Title	L	T	P	Total L+T+P	C
Compulsory Core	UCY15501	Inorganic Chemistry	3	2	0	5	4
	UCY15502	Organic Chemistry	3	2	0	5	4
	UCY15503	Physical Chemistry	3	1	0	4	4
Compulsory Core Lab	UCY15504	Gravimetric Estimation and Preparation of organic Compounds	0	2	5	7	3
Core Elective - III	UCY15E05	Material Chemistry and Nano Technology	3	2	0	5	3
	UCY15E06	Energy and fuel cells					
Core Course	UES15501	Environmental Studies	3	0	0	3	3
Total Credit			**15**	**10**	**5**	**30**	**21**

SEMESTER VI

Career Stream Title	Course Code	Course Title	L	T	P	Total L+T+P	C
Compulsory Core	UCY15601	Organic Reagents and Reaction Mechanisms	3	2	0	5	4
	UCY15602	Coordination and Solid state Chemistry	3	2	0	5	3
	UCY15603	Fundamentals of Spectroscopy	3	0	0	3	4
Compulsory Core Lab	UCY15604	Qualitative analysis of Organic and Preparation of Inorganic compounds	0	0	5	5	3
	UCY15605	Physical Chemistry Practical -II	0	0	5	5	3
Core Elective – IV	UCY15E07	Chemistry In Every Day Life	3	1	0	4	3
	UCY15E08	Agricultural and Leather Chemistry					
Skilled Based Course-III	UCY15E55	Project	0	0	1	1	1
Supportive Course(**Internal Evaluation Only**)	CDC15601	Personality Development	2	0	0	2	2
Total Credit			**14**	**5**	**11**	**30**	**23**

Total Credits to be earned for the degree: 146

*Project Internal Evaluation

Legend

L - Number of lecture hours per week
T - Number of tutorial hours per week
P - Number of practical hours per week
C - Number of credits for the course

Category of courses

G - General
MC- Major Core
ME - Major Elective
NE - Non Major Elective
SC - Supportive Course
SK - Skill based course
AS - Allied Subjects
VC - Value Added Course

SEMESTER I

Subject Code	Title of the Subject	L	T	P	C
ULH15101	Hindi-I	4	1	0	4

INSTRUCTIONAL OBJECTIVES	
(i)	To express and communicate literature which is part of life
(ii)	To incorporate day to day personal & professional life's need to communicate in the language.
(iii)	To help the students to imagine & express their mind through Literature .

UNIT I - PROSE **(35 Hours)**

1. USNE KAHA THA (STORY) - **CHANDRADHAR SHARMA GULERI**
2. CHIEF KI DAWAAT (STORY)- **BHISHAM SAHNI**
3. PREMCHAND (NIBANDH) - **DR. RAMVILAS SHARMA**
4. BHOLARAM KA JEEV (SATIRE STORY)- **HARISHANKAR PARSAI**
5. BHAGWAN NE KAHA THA (SATIRE STORY) - **SURYA BALA**
6. CHAMAR KI BETI (STORY) - **DR.N. CHANDRSHEKHARAN NAIR**

UNIT II - ONE ACT PLAY **(15 Hours)**

1. LAXMI KA SAWAGAT - **UPENDRANATH ASHK**
2. JAB MAA RO PADI - **SETH GOVIND DAS**

UNIT III - CORRESPONDENCE **(10 Hours)**

1. OFFICIAL LETTER
2. DEMI- OFFICIAL LETTER

UNIT IV - COMPUTER **(10 Hours)**

UNIT V - TECHNICAL TERMINOLOGY **(5 Hours)**

TEXT BOOK

1. Hindi I Edited by Dr.S.Preethi, Dr.MD.Islam, Dr. S. Razia Begum Published by Department of Hindi, FS&H,SRM University

REFERENCE

1. Prayajon Mulak Hindi (Author - *Madhav Sontakke*)

SEMESTER I

Subject Code	Title of the Subject	L	T	P	C
ULF15101	French-I	4	1	0	4

INSTRUCTIONAL OBJECTIVES	
(i)	To encourage greater written skills through comprehension writing and composition writing.
(ii)	Improve their oral and written skills through a combination of theory and practice.
(iii)	Extend and expand their savoir-faire through the acquisition of latest skills and techniques by practical training.

Unité-I **(15 Heures)**

Vous comprenez? – Conjugaison des verbes – Masculin/Féminin – Singulier/Pluriel – Interrogation – Négation simple- L'identité- Les lieux de la ville- Les mots du savoir-vivre.

Unité-II **(15 Heures)**

Au travail ! Conjugaison – Les verbes en –ER – Accord des noms et des adjectifs - Articles indéfinis et définis- Interrogation- Est-ce-que, Qu'est-ce, Qu'est-ce que c'est, Où- L'état civil- Personnes et objets caractéristiques d'un pays.

Unité-III **(15 Heures)**

On se détend ?- Conjugaison- faire, aller, venir, vouloir, pouvoir, devoir- Futur proche - Pronoms moi, toi, lui, elle, etc.., après une préposition – On = Nous- Les loisirs, Sports, Spectacles, Activités.

Unité-IV **(15 Heures)**

Racontez-moi- Passé composé - Présentation d'un événement passé- La date et l'heure- Les moments de la journée, de l'année- Événements liés au temps - **Bon voyage !**- Comparaison simple- Adjectifs démonstratifs- Adjectifs possessifs- Les Voyages – Les transports.

Unité-V (15 Heures)

Bon appétit- Articles partitif- Emploi des articles- Interrogation, forme avec inversion- Réponses : Oui, Si, Non- Forme possessive : à+pronom- La nourriture, Les repas, La fête.

Référence Book

1. **"Echo-A1"**, Méthode de français, J.GIRARDET, J.PECHEUR, CLE International, Janvier-2011.

QUESTION PAPER PATTERN

FIRST SEMESTER

ULF15101

French-I

Time: 3 hours **Max: 100**

Série – A (40: Mark)

1.	Distinguer le masculin et le féminin :	(5Mark)
2.	Complétez avec les pronoms sujets :	(5Mark)
3.	Complétez avec une préposition : à, en, au, aux	(5Mark)
4.	Complétez avec les articles partitifs :	(5Mark)
5.	Mettez à la forme négative:	(5Mark)
6.	Ecrivez les heures en toutes lettres :	(5Mark)
7.	Chassez l'intrus :	(5Mark)
8.	Complétez avec l'adjectif démonstratif :	(5Mark)

Série – B (30 : Mark)

1.	Conjuguez les verbes au futur proche :	(5Mark)
2.	Quel est le participe passé des verbes suivants:	(5Mark)
3.	Conjuguez les verbes entre parenthèses au présent	(10Mark)
4.	Conjuguez les verbes au passé composé :	(10Mark)

Série – C (30 : Mark)

1.	Trouvez le nom correspondant au verbe :	(5Mark)
2.	Transformez les phrases avec « Est-ce-que »:	(5Mark)
3.	Répondez aux questions d'abord affirmativement, puis Négativement : Oui …. Non…	(5Mark)
4.	Lisez le document suivant et répondez aux questions :	(5Mark)
5.	Complétez les couples :	(5Mark)
6.	Associez les mots de chaque colonne :	(5Mark)

முதல் பருவம்

குறியீட்டு எண்	பாடம்	L	T	P	C
ULT15101	**தமிழ் - I**	**4**	**1**	**0**	**4**

பகுதி 1. தமிழ் இலக்கிய வரலாறு

(நூல் – தமிழ் இலக்கிய வரலாறு- முனைவர் சு.ஆனந்தன், கண்மணி பதிப்பகம், திருச்சி, 2010.)

1. சிற்றிலக்கியம் - தோற்றமும் வளர்ச்சியும்
2. புதுக்கவிதை - தோற்றமும் வளர்ச்சியும்
3. சிறுகதை - தோற்றமும் வளர்ச்சியும்
4. புதினம் - தோற்றமும் வளர்ச்சியும்
5. உரைநடை - தோற்றமும் வளர்ச்சியும்

பகுதி 2. இலக்கியம்

அ. இக்காலக்கவிதைகள்

1. பாரதியார்
   நெஞ்சு பொறுக்கு திலையே ...என்று தொடங்கும் கவிதை
2. பாரதிதாசன்
   உலக ஒற்றுமை - தன்பெண்டு தன்பிள்ளை ...என்று தொடங்கும் கவிதை
3. ந.பிச்சமூர்த்தி - கிளிக்கூண்டு
4. இன்குலாப் - மரங்களின் சுற்றம்
   சந்திக்கச் செல்வதில்லை...என்று தொடங்கும் கவிதை
5. நா. காமராசன் - கருப்பு மலர்கள்
   காகிதப் பூக்கள் - கால மழைத்தூறலிலே... என்று தொடங்கும் கவிதை
6. சு.வில்வரெத்தினம் --வேற்றாகி நின்ற வெளி

நிலவின் எதிரொலி – பறம்பு மலை …என்று தொடங்கும் கவிதை

7. பாரதி புத்திரன் - மாரிக்கால இரவுகள்

சிவகாசிச் சிசுக்கள் – மகனே அன்றொரு நாள் …என்று தொடங்கும் கவிதை

8. து.நரசிம்மன் - வானம் பிறந்தது

ஒரு பிஞ்சின் வேண்டுகோள்…என்று தொடங்கும் கவிதை

9. ப.கல்பனா- வானம் பிறந்தது

கீறல் விழுந்த மாலைக்காலங்கள்- இன்று வர… என்று தொடங்கும் கவிதை

ஆ. சிற்றிலக்கியம்

கலிங்கத்துப்பரணி- போர் பாடியது: 404 -- 408 பாடல்கள்

குற்றாலக்குறவஞ்சி – மலைவளம்

1. வானரங்கள் கனிகொடுத்து …. என்று தொடங்கும் பாடல்
2. முழங்கு திரைப் புனலருவி கழங்கென முத்தாடும் …. என்று தொடங்கும் பாடல்

இ. காப்பியங்கள்

சிலப்பதிகாரம் – வழக்குரை காதை - 'தேரா மன்னா! செப்புவது உடையேன்;-- இணை அடி தொழுது வீழ்ந்தனளே, மடமொழி. (30 – வரிகள்)

பகுதி 3 உரைநடைப் பகுதி

"**எண்ணங்கள்**" டாக்டர் எம்.எஸ்.உதயமூர்த்தி, கங்கை புத்தக நிலையம், 2005.

பாட நூல்கள் :

1. முனைவர் சு.ஆனந்தன் (2010), தமிழ் இலக்கிய வரலாறு, கண்மணி பதிப்பகம், திருச்சி, 2010.

2. எம்.எஸ்.உதயமூர்த்தி, "எண்ணங்கள்", கங்கை புத்தக நிலையம், 2005.

3. செய்யுள் புத்தகம், தமிழ்த்துறை, அறிவியல் மற்றும் மானுடவியல் புலம் , எஸ். ஆர். எம். வெளியீடு, 2014.

வினாத்தாள் அமைப்பு

முதல் பருவம்

குறியீட்டு எண்	பாடம்	L	T	P	C
ULT15101	**தமிழ் - I**	**4**	**1**	**0**	**4**

1. அகமதிப்பீட்டுத் தேர்வு - 50 மதிப்பெண்கள்
2. புறமதிப்பீட்டுத்தேர்வு - 50 மதிப்பெண்கள்

(வினாத்தாள் -100 மதிப்பெண்கள்)

வினாத்தாள் அமைப்பு

வ.எண்	வினாப்பிரிவு	வினாக்கள் இயல்பு	மதிப்பெண்கள் (100)
1.	சுருக்கமாக விடையளித்தல்	12 வினாக்கள் (பத்திற்கு மட்டும் விடையளித்தல் வேண்டும்) செய்யுள்- 5, இலக்கிய வரலாறு -5, உரைநடை-2.	10 x 3 = 30
2.	இருபக்க அளவில் விடையளித்தல்	7 வினாக்கள் (ஐந்திற்கு மட்டும் விடையளித்தல் வேண்டும்) செய்யுள்- 3, இலக்கிய வரலாறு -2, உரைநடை-2.	5 x 5 = 25
3.	கட்டுரை வடிவில்	5 வினாக்கள் (மூன்றனுக்கு	

	விடையளித்தல்	மட்டும் விடையளித்தல்) செய்யுள்- 3, இலக்கிய வரலாறு -1, உரைநடை-1	3x 15 = 45

SEMESTER I

Subject Code	Title of the Subject	L	T	P	C
ULE15101	English	4	1	0	4
INSTRUCTIONAL OBJECTIVES					
(i)	To enhance students proficiency in English language.				
(ii)	To enable the students to think in English .				
(iii)	To be abreast with the world literature. To equip students with the awareness and strategies needed to enable the study of English as a lifelong process.				
(iv)	To engage in ongoing professional development with respect to both teaching and research.				

UNIT I Poetry: **(15 Hours)**

1. If by Rudyard Kipling
2. Where the Mind is Without Fear by Rabindranath Tagore
3. The Road Not Taken by Robert Frost
4. Snake by D. H. Lawrence

UNIT II Prose: **(15 Hours)**

1. Of Truth by Francis Bacon
2. Spirit of India by A.P.J.Abdul Kalam

UNIT III Short Stories: **(15 Hours)**

1. The Bet by Anton Chekhov
2. The Postmaster by Rabindranath Tagore

UNIT IV Movie Review: **(15 Hours)**

1. Whose Life is it Anyway?
2. The Accused- Feature Film
3. Water

UNIT V Language Component : (15 Hours)

1. Tenses
2. Focus on Articles, Prepositions, Subject Verb Agreement
3. Comprehension Passage

TEXT BOOKS

1. Cambridge University Press,. Raymond Murphy, Essential Grammar in Use 3rd Edition 2010
2. Edited by Dr.Shanthichitra, Glean to ACME English Tex Book Published by Department of English, FSH, SRM University.

SEMESTER I

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15101	General Chemistry-I	3	2	0	4
INSTRUCTIONAL OBJECTIVES					
(i)	To promote interest in the periodic properties and chemical bonding				
(ii)	To understand the nomenclature of organic molecules				
(iii)	To learn periodicity of elements				
(iv)	To understand the structure of atoms				
(v)	To understand the theoretical aspects of inorganic qualitative and volumetric analyses				

UNIT I - ATOMIC STRUCTURE

Cathode rays- e/m ratio- charge of the electron – Rutherford atomic model - Quantum theory of radiation - Bohr's model of atom – Limitations of Bohr model – Sommerfeld's model – photoelectric effect - De Broglie equation - Compton effect –– Davisson and Germer experiment – Heisenberg's uncertainty principle.

UNIT II - PERIODIC TABLE AND PERIODIC PROPERTIES

Modern periodic law - Modern periodic table – division of elements into s,p,d and f-blocks, atomic properties – justification for their variation, factors influencing periodic trends and irregularities. Covalent radius, Ionic radius, Ionization energy – successive ionization energies, electron affinity and electronegativity – Pauling, Mullikan and Alfred – Rochow's definitions.

UNIT III - NOMENCLATURE OF ORGANIC COMPOUNDS

Naming of organic compounds (up to 10 carbon systems) –Hydrocarbons – monofunctional compounds – Bifunctional compounds – Isomerism – Types of isomerism (structural and stereoisomerisms) with appropriate examples.

UNIT IV - CHEMISTRY OF ALKANES AND CYCLOALKANES

Preparation of alkanes - Petroleum source of alkanes - Wurtz reaction, hydrogenation of alkenes. Reactions - halogenation, free radical substitution, nitration, oxidation and cracking.

Cycloalkanes: Preparation using Wurtz reaction, Dieckmann's ring closure reaction and reduction of aromatic hydrocarbons. Reactions - substitution and ring-opening reactions. Baeyer's strain theory– Limitations.

UNIT V - PRINCIPLES OF WET CHEMICAL ANALYSIS

Titrimetry: Solutions -Definitions of molarity, normality, molality, and mole fraction – primary and secondary standards. Types of titrimetric reactions – acid-base, redox, precipitation and complexometric titrations. Indicators – theory of indicators - neutralization, redox, adsorption and metal ion indicators.

Qualitative Analysis: Solubility Product, common ion effect. Reactions involved in group separation and identification of cations and anions in the analysis – Semi micro techniques- Principle of elimination of interfering anions, complexation reactions - spot tests in qualitative analysis.

TEXT BOOKS

1. Puri B.R..,Sharma L.R and Kalia K.K (1993): Principles of Inorganic Chemistry, 23rd edition, Shoban Lal Nagin Chand & Co, New Delhi.
2. Lee J.D (2009): Concise Inorganic Chemistry, 5thEdition, Black well science, UK.
3. Puri B.R..,Sharma L.R.and Pathania M.S. (1993): Principles of Physical Chemistry, Shoban Lal Nagin Chand & Co , 23rd edition, New Delhi.

REFERENCES

1. Glasstone S., Lewis D. (1960): Elements of Physical Chemistry, London, Macmillan and Company, Ltd, UK.
2. Morrison R.T. and Boyd R.N. (1992): Organic Chemistry, 6th edition, Prentice-Hall Inc, New Delhi.
3. Bahl B.S.., and Arun Bahl (1997): Advanced Organic Chemistry, 12th edition, New Delhi.

SEMESTER I

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15102	Green Chemistry-I	3	2	0	4

INSTRUCTIONAL OBJECTIVES	
(i)	To learn the principles of green chemistry
(ii)	To understand the microwave mediated organic synthesis
(iii)	To gain knowledge about ionic liquids and phase transfer catalysts

UNIT I - INTRODUCTION TO GREEN CHEMISTRY

Green chemistry - Anastas' twelve principles of green chemistry -Principle of atom economy. Examples of reactions following the principles of green chemistry and atom economy.

A) Green Preparation of propene
B) Green synthesis of Ibuprofen

UNIT II - GREEN REACTIONS

2.1 Acetylation of primary amine, base catalyzed aldol condensation (synthesis of dibenzalpropanone), halogen addition to C=C bond (bromination of trans-stilbene), [4+2] cycloaddition reaction (Diels-Alder reaction between furan and maleic acid).

2.2 Rearrangement reaction (benzyl-benzilic acid rearrangement), coenzyme catalyzed benzoin condensation (thiamine hydrochloride catalyzed synthesis of enzoin.

UNIT III - IONIC LIQUIDS

Introduction –classification of ionic liquids- synthesis of ionic liquids – Ionic liquids: simple preparation – types – properties and application – ionic liquids in organic reactions (Heck reaction, Suzuki reactions and epoxidation), analytical chemistry - gas chromatography stationary phases – advantages and disadvantages.

UNIT IV - SUPPORTED CATALYSTS AND PHASE TRANSFER CATALYST (PTC)

Supported metal catalysts – mesoporous silica. Phase transfer catalyst - Synthesis – applications.

UNIT V - ALTERNATIVE SYNTHESIS, REAGENTS AND REACTION CONDITIONS

Photo reduction of benzophenone to benzopinacol using sunlight. Photochemical alternative to Friedel-Crafts reaction and use of dimethyl carbonate as a methylating

agent. Reaction in water - furan and maleic acid. Supercritical liquids – water and CO_2. Extraction of D-limonene from orange peel.

TEXT BOOKS

1. Ahluwalia, V.K.., (2006): Green Chemistry – Environmentally benign reactions. Ane Books, India.
2. Paul T. Anastas & Tracy C.., Williamson (1998): Green Chemistry – Designing Chemistry for the Environment, 2nd Edn.

REFERENCES

1. Paul T. Anastas & Tracy C.., Williamson (1998): Green Chemistry – Frontiers in benign chemical synthesis and processes, Oxford University Press, New York.
2. Rashmi Sanghi., & M. M. Srivastava (2003): Green Chemistry – Environment friendly alternatives, Narora Publishing House.
3. Cann, M.C., & Connelly, M. E (2008): Real world cases in Green Chemistry, American Chemical Society.
4. Cann, M. C., & Thomas, P. (2008): Real world cases in Green Chemistry, American Chemical Society.

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15103	Inorganic Qualitative Analysis-I	0	0	4	4
INSTRUCTIONAL OBJECTIVES					
(i)	To enable the students to develop analytical skills in inorganic qualitative analysis.				
(ii)	To identify and detect various anions and cations through colored reactions of metal ions.				

Semi micro qualitative analysis: I

Qualitative analysis of simple salt containing **one anion** and **one cation**.

Semi micro qualitative analysis of inorganic salt mixtures containing one interfering acid radical.

Anions: Carbonate, sulphate, halides, nitrate, borate, chromate, fluoride, oxalate, tartrate, and phosphate.

Cations: Lead, bismuth, copper, cadmium, antimony, iron, zinc, cobalt, nickel, manganese, calcium, strontium, barium, & ammonium.

General scheme for distribution of marks in practical examination

Time: 3h Marks : 50(External) + 50 (Internal)
Two radicals: 15 +15 Marks
Procedure: 10 Marks
Record: 10 Marks
Internal: 50 Marks
Total: 100

TEXT BOOK

1. Venkateswaran V., Veerasamy R. and Kulandaivelu A.R. (1997): Basic principles of Practical Chemistry, 2nd edition, Sultan Chand & sons,New Delhi.

REFERENCES

1. V.V. Ramanujam (1974):Inorganic Semi Micro Qualitative Analysis, 3rd edition, The National Publishing Company, Chennai.
2. Vogel's Text Book of Inorganic Qualitative Analysis (1974): 4th edition, ELBS, London.

SEMESTER I

Subject Code	Title of the Subject	L	T	P	C
UMA15161	Mathematics- I	4	0	0	4
INSTRUCTIONAL OBJECTIVES					
(i)	To apply basic concepts for clear understanding of mathematical principles.				
(ii)	To solve practical problems				

UNIT I - SETS, RELATIONS AND FUNCTIONS 12 hours)

Sets: sets, representation of sets, types of sets, operation on sets, Venn diagram.
Relation: types of relation, equivalence relation.
Function: types of functions, composite of two functions, composite of three functions

UNIT II - MATHEMATICAL CONNECTIVES LOGIC (12 hours)

Statements, connectives, conjunction, disjunction, negation, tautology, contradiction, logical equivalence, tautological implications, arguments, validity of arguments – Normal forms – Principal disjunctive normal form - Principle conjunctive normal form.

UNIT III - THEORY OF EQUATIONS (12 hours)

Polynomial equations, irrational roots, complex roots,(up to third order equations only) - Reciprocal equations, Approximation of roots of a polynomial equation by Newton's and Horner's methods.

UNIT IV - MATRICES **(12 hours)**

Symmetric, skew symmetric, Hermitian, skew Hermitian, Orthogonal, Unitary matrices – Cayley Hamilton Theorem –Eigen values– Eigen vectors – solving the equations using cramers rule.

UNIT V - DIFFERENTIATION **(12 hours)**

Simple problems only – maxima and minima of functions of single variable – Radius of curvature (Cartesian co– ordinate) – partial differentiation – Euler's theorem.

TEXT BOOKS

1. Veerarajan, T.., (2006) Discrete Mathematics,7th Edition, Tata-Mcgraw hill, New Delhi.
2. Singaravelu, A.., (2011) ALLIED MATHEMATICS, 3rd Edition, Meenakshi Agency, Chennai.

Treatment as in : DISCRETE MATHEMATICS
Unit I: Chapter 2 (pg.no: 51-70), Chapter4 (pg.no: 182-186)
Unit II: Chapter 1 (pg.no: 1-14)

Treatment as in : ALLIED MATHEMATICS
Unit III :Chapter 3 (3.1 – 3.18, 3.36 – 3.60)
Unit IV : Chapter2 (2.1-2.22, 2.68-2.140)
Unit V : Chapter 5 (5.1 – 5.12, 5.31 – 5.35, 5.52-5.60)

REFERENCES

1. Vittal, P.R.., (2013) Allied Mathematics, 4th Edition Reprint, Margham Publications, Chennai.
2. Venkatachalapathy, S.G.., (2007) Allied Mathematics, 1st Edition Reprint, Margham Publications, Chennai.

SEMESTER I

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UBC15161	Biochemistry-I	4	0	0	4

INSTRUCTIONAL OBJECTIVES	
(i)	To study the structure and properties of carbohydrates
(ii)	To study structure, properties and reactions of proteins and amino acids
(iii)	To study the structure, properties of fats and lipids
(iv)	To study the composition, structure and functions of nucleic acids

UNIT I - CARBOHYDRATES

Classification of carbohydrates, stereo isomerism and optical isomerism of sugars, mutarotation. Occurrence, structure and biological importance of mono, di and polysaccharides- An introduction to mucopolysaccharide- Reaction of Carbohydrates due to the presence of hydroxyl, aldehyde and ketone groups.

UNIT II - AMINO ACIDS

Classification and structure of amino acids - Essential amino acids- isomerism-standard amino acid as zwitterion in aqueous solution.

UNIT III - PROTEINS

Classification based on solubility, shape, composition and function- Structure of proteins- Chemical synthesis of polypeptide chain and solid phase polypeptide synthesis

UNIT IV - LIPIDS

Fatty acids Classification, nomenclature, structures, properties of fatty acids - Structure and function of prostaglandins, tri-acyl glycerol- Structure and functions of phospholipids spingomyelin, plasmologens. Structure and function of glycolipids, cholesterol.

UNIT V - NUCLEIC ACID

Nature of genetic material, structure of purine and pyrimidine, nucleotide. Composition of DNA and RNA-Watson Crick model of DNA. Types of nucleic acids (DNA and RNA). Properties of nucleic acids -Tm, denaturation and renaturation, hypo and hyperchromicity.

TEXT BOOKS

1. David L. Nelson, Michael M. Cox , (2005) Lehninger Principles of Biochemistry-, W. H. Freeman; 5th edition, Newyork, USA.
2. Robert K. Murray, Daryl K. Grammer, (2009) Harper's Biochemistry McGraw Hill, Lange Medical Books. 29th edition. United Kingdom.

REFERENCES

1. Jain, J.L. Sunjay Jain, Nitin Jain, (2013). Fundamentals of Biochemistry, S. Chand & Company. India.
2. Amit Krishna De (2005), Selected Questions and answers in Biochemistry, S. Chand & Co., Ltd. India.
3. Ambika Shanmugam, (2012) Fundamentals of Biochemistry for medical students, Lippincott Willimas & Wilkins. Newdelhi, India.
4. Kannan C., (2007), Biomolecules, MJP Publishers. Chennai, India.

SEMESTER I

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
CDC15101	Verbal Ability	2	0	0	2
INSTRUCTIONAL OBJECTIVES					
(i)	At the end of this course, the students will be able to answer OBJECTIVES questions for any verbal ability exam.				

COURSE REQUIREMENT: At the end of every unit, the students will be expected to answer a model verbal ability exam.

COURSE REQUIREMENT: At the end of every unit, the students will be expected to answer a model verbal ability exam.

UNIT - I

Vocabulary- Synonyms, Antonyms, Idioms and phrases, ordering of words/sentences.

UNIT- II

Grammar- Sentence improvement, Change of speech, sentence correction.

UNIT- III

Vocabulary-One word Substitute, Verbal Analogies, Closet test.

UNIT- IV

Grammar- Spotting errors, selecting words, sentence completion

UNIT- V

Vocabulary- Word Quest, Puzzles, Crossword

TEXT BOOKS

1. Raymond Murphy, Essential English Grammar, Cambridge University Press, 2007.
2. Raymond Murphy, Intermediate English Grammar, Cambridge University Press, 2007.
3. Raymond Murphy, Advanced English Grammar Cambridge University Press, 2007.

REFERENCE

1. Prabhu.C, Vivekanandan.P "The Essentials of Quantitative Aptitude and Verbal Aptitude", Enrich & Excell, BEACON, Chennai, 2012.

SEMESTER II

Subject Code	Title of the Subject	L	T	P	C
ULH15201	Hindi - II	4	1	0	4

INSTRUCTIONAL OBJECTIVES	
(i)	To express and communicate literature which is part of life
(ii)	To incorporate day to day personal & professional life's need to communicate in the language.
(iii)	To help the students to imagine & express their mind through Literature .

UNIT I - POETRY **(30 Hours)**

1. Suprashid Dohey - **Kabir, Rahim, Bihari, Surdas**
2. Nar Ho Na Nirash Karo Mann Ko **- Maithlisharan gupt**
3. Jo Tum Aaa Jaate - **Mahadevi Varma**
4. Hum Panchi Unmukt Gagan Ke - **Shiv mangal singhsuman**
5. Chalawa - **Santosh shreeyansh**
6. Yahan Thi Vaha Nadi - **Manglesh Dabral**

UNIT II - STORY **(25 Hours)**

1. Eidgaha - **Premchand**
2. Vapsi **Priyamvada Usha**
3. Ek Muthi Aakash **Santosh Srivastav**
4. Ek Plate Sailab **Mannu Bhandari**

UNIT - III **(10 Hours)**

1. Anuvad : Anuvad Ki Paribhasha Evam Bhed

UNIT - IV **(5 Hours)**

1. Anuvad : English to Hindi

UNIT- V **(5 Hours)**

1. Administrative words

RECOMMENDED TEXT

1. Hindi I Edited by Dr.S.Preethi, Dr. MD.Islam, Dr.S.Razia Begum.Published by Department of Hindi, FS&H, SRM.University

REFERENCES

1. Prayajon Mulak Hindi (Author - Madhav Sontakke)
2. Practcal Guide to is Translation & Composition (Author- K. P. Thakur)

SEMESTER II

Subject Code	Title of the Subject	L	T	P	C
ULF15201	French -II	4	1	0	4
INSTRUCTIONAL OBJECTIVES					
(i)	Consolidate the knowledge of theoretical aspects of French grammar with examples provided from different angles: from present day literature, day to day conversation.				
(ii)	Improve their oral and written skills through a combination of theory and practice.				

UNITE - I **(15 Heures)**

Quelle journée !- La conjugaison pronominale- L'impératif- L'expression de la quantité : peu, un peu de, quelque, etc..,- Les activités quotidiennes- Les achats, L'argent - **Qu'on est bien ici !** Prépositions et adverbes de lieu- Verbes exprimant un déplacement : emploi des prépositions- Le logement, La localisation, L'orientation, L'état physique, Le temps qu'il fait.

UNITE - II **(15 Heures)**

Souvenez-vous- L'imparfait- Emploi du passé composé et de l'imparfait- Expression de la durée- L'enchainement des idées : alors, donc, mais- Les sens réciproque- Les moments de la vie- La famille- Les relations amicales, amoureuses, familiales.

UNITE - III **(15 Heures)**

On s'appelle ? – Les pronoms compléments directs- les pronoms compléments indirects de personne- L'expression de la fréquence et de la répétition – Les moyens de communication : courrier, téléphone, internet.

UNITE IV **(15 Heures)**

Un bon conseil ! – Expression du déroulement de l'action – Passé récent- Présent progressif – Futur proche – Action achevée/ inachevée – Les phrases rapportés – Les Corps – La santé et la maladie.

UNITE V **(15 Heures)**

Parlez-moi de vous – La place de l'adjectif – La proposition relative finale avec « qui » - C'est/il est – Impératif des verbes avec pronoms – La formation des mots – La description physique et psychologique des personnes – Les vêtements – Les Couleurs.

REFERENCE

1. **"Echo-A1"**, Méthode de français, J.GIRARDET, J.PECHEUR, CLE International, Janvier-2011.

இரண்டாம் பருவம்

குறியீட்டு எண்	பாடம்	L	T	P	C
ULT15201	**தமிழ் - II**	**4**	**1**	**0**	**4**

பகுதி -1 தமிழ் இலக்கிய வரலாறு

(நூல் – தமிழ் இலக்கிய வரலாறு - முனைவர் சு.ஆனந்தன், கண்மணி பதிப்பகம், திருச்சி, 2010.)

1. சங்க இலக்கியங்கள்
2. நீதி இலக்கியங்கள்
3. பக்தி இலக்கியங்கள்
4. காப்பியங்கள்

பகுதி - 2 அ. சங்க இலக்கியம்

1. முளி தயிர் பிசைந்த... என்று தொடங்கும் **குறுந்தொகை (167)** பாடல் முல்லை, செவிலித்தாய் கூற்று).
2. மனை நடு வயலை வேழம் சுற்றும்... என்று தொடங்கும் **ஐங்குறுநூறு** (11) பாடல் (மருதம், ஐங்குறுநூறு- வேழப்பத்து.)
3. எம் வெங் காமம் இயைவது ஆயின் ....என்று தொடங்கும் **அகநானூறு (15)** பாடல் (**பாலை , மகட் போக்கிய தாய் சொல்லியது**)
4. சுடர் தொடீஇ கேளாய்..... என்று தொடங்கும் **கலித்தொகை (51)** பாடல் (குறிஞ்சி, தலைவி கூற்று)
5. மண்டு அமர் அட்ட ... என்று தொடங்கும் **புறநானூறு (213)** பாடல், பாடியவர் : புல்லாற்றூர் எயிற்றியனார், பாடப்பட்டோன் : கோப்பெருஞ்சோழன்; திணை : வஞ்சி; துறை - துணைவஞ்சி.
6. **நறவுவாய் உறைக்கும் நாகுமுதிர் ...** என்று தொடங்கும் **பத்துப்பாட்டு –** சிறுபாணற்றுப்படை (51-67) பாடல்
7. கலந்தோர் உவப்ப எயில் பல கடையி... என்று தொடங்கும் **பத்துப்பாட்டு -- மதுரைக் காஞ்சி (220-237)** பாடல்.

ஆ. நீதி இலக்கியம்

1. திருக்குறள் - நட்பாராய்தல்
   புலவி நுணுக்கம் (2 அதிகாரம்)
2. நாலடியார்- பொருட்பால்- மேன்மக்கள் – 5 பாடல்

இ. பக்தி இலக்கியம்

சைவம் – பன்னிரு திருமுறைகள்

1. திருஞானசம்பந்தர் தேவாரம் – முதலாம் திருமுறை
   காதல் ஆகி, கசிந்து ... என்று தொடங்கும் பாடல்
2. திருநாவுக்கரசர் தேவாரம் - ஐந்தாம் திருமுறை

மாசில் வீணையும் மாலை … என்று தொடங்கும் பாடல்

3. சுந்தரர் தேவாரம் – ஏழாம் திருமுறை

பொன்னார் மேனியனே … என்று தொடங்கும் பாடல்

4. மாணிக்கவாசகர் – திருவாசகம் – பிடித்த பத்து

பால் நினைந்து ஊட்டும் தாயினும் சால … என்று தொடங்கும் பாடல்

5. திருமூலர் – திருமந்திரம்

மரத்தை மறைத்தது மாமத யானை … என்று தொடங்கும் பாடல்

வைணவம் – நாலாயிரத் திவ்யப் பிரபந்தம்

1. பூதத்தாழ்வார்

பெருகு மத வேழம் மாப்பிடிக்கு…என்று தொடங்கும் பாடல்

2. குலசேகராழ்வார்

ஆனாத செல்வத்து அரம்பையர்கள் தற்சூழ …என்று தொடங்கும் பாடல்

3. பெரியாழ்வார்

எந்நாள் எம்பெருமான் …என்று தொடங்கும் பாடல்

4. ஆண்டாள்

ஓங்கி உலகளந்த உத்தமன் … என்று தொடங்கும் பாடல்

5. திருப்பாணாழ்வார்

சதுர மாமதில் சூழ் இலங்கைக்கு … என்று தொடங்கும் பாடல்

இஸ்லாம்

குணங்குடி மஸ்தான் சாகிபு பாடல்கள் – தவமே பெற வேண்டுமெனல் - 3 பாடல்கள்

கிறித்துவம்

ஆதிநந்தாவனப் பிரளயம் – ஏதேன் தோட்டம் - 3 பாடல்கள்

பகுதி 3: சிறுகதை

"**ஒற்றைச் சிறகு**", இலக்கியச் சிந்தனை 2012 ஆம் ஆண்டின் சிறந்த சிறுகதைகள் தொகுப்பு.

பாட நூல்கள் :

1. முனைவர் சு.ஆனந்தன் (2010), தமிழ் இலக்கிய வரலாறு, கண்மணி பதிப்பகம், திருச்சி, 2010.
2. ஒற்றைச் சிறகு, இலக்கியச் சிந்தனை 2012 ஆம் ஆண்டின் சிறந்த சிறுகதைகள் தொகுப்பு, 2012.
3. செய்யுள் புத்தகம், தமிழ்த்துறை, அறிவியல் மற்றும் மானுடவியல் புலம் , எஸ். ஆர். எம். வெளியீடு, 2014.

SEMESTER II

Subject Code	Title of the Subject	L	T	P	C
ULE15201	English-II	4	1	0	4
INSTRUCTIONAL OBJECTIVES					
(i)	To enhance students' proficiency in English language.				
(ii)	To enable the students to think in English .				
(iii)	To be abreast with the world literature.				
(iv)	To equip students with the awareness and strategies needed to enable the study of English as a lifelong process.				
(v)	To engage in ongoing professional development with respect to both teaching and research.				

UNIT I - POETRY **(15 Hours)**

1. The Hawk in the Rain by Ted Hughes
2. Crutches by Bertolt Brecht
3. Obituary- A. K. Ramanujan
4. Dream Deferred- Langston Hughes

UNIT II - PROSE **(15 Hours)**

1. The Story of my Experiments with Truth by M.K. Gandhi (Excerpts)
2. I have a Dream by Martin Luther King
3. Farewell Speech by Mark Antony

UNIT III - PLAY AND SHORT STORY **(15 Hours)**

1. Monkey's Paw by W.W.Jacobs
2. Bear by Anton Chekhov

UNIT IV - BOOK REVIEW **(15 Hours)**

Excerpts from - 'To kill a Mocking Bird',
'Merchant of Venice'

UNIT V - LANGUAGE COMPONENT **(15 Hours)**

1. Transformation of Sentences
2. Jumbled Sentences
3. Précis Writing

RECOMMENDED TEXTS

1. Cambridge University Press., Raymond Murphy, Essential Grammar in Use 3rd Edition 2010.
2. English-I& II, Edited by Dr.Shanthichitra., Published by Department of English, FSH, SRM University.

SEMESTER II

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15201	General Chemistry - II	3	1	0	4
INSTRUCTIONAL OBJECTIVES					
(i)	To learn the principles of bonding				

(ii)	To understand the chemistry of s-block elements.
(iii)	To learn about the principles of alkenes and alkyne compounds
(iv)	To learn about the properties and applications of colloids
(v)	To understand the principles of gaseous state

UNIT I - CHEMICAL BONDING - I

VSEPR Theory – Lewis theory-the octet rule and its exception, effect of bonding and nonbonding electrons on the structure of molecules, effect of electronegativity, isoelectronic principle, illustration of structures by VSEPR model- $BeCl_2$, $SiCl_4$, PCl_5, SF_6, IF_7, NH_3, XeF_6, BF_3, H_2O.

Valance Bond theory - Concept of hybridization – Structure of organic molecules based on sp^3, sp^2 and sp hybridization. Covalent bond properties of organic molecules - bond length, bond angle, bond energy, bond polarity, dipole moment, inductive, mesomeric, electromeric, resonance and hyperconjugative effects.

UNIT II - CHEMISTRY OF GROUPS 1 & 2 ELEMENTS

Introduction-group properties- comparative study of group I A and group II A elements Anomalous behaviour of lithium and beryllium, Extraction of beryllium - diagonal relationship - Potash fertilizers – Preparation of KNO_3 , KCl and K_2SO_4.

UNIT III - ALKENES AND ALKYNES

Alkenes: Structure - Isomerisim - General methods of preparation- dehydrogenation, dehydrohalogenation, dehydration- Hoffmann and Saytzeff rules. Reactions- addition of hydrogen, halogen (Mechanism of electrophilic and free radical addition), hydrogen halide (Markownikoff's rule), hydrogen bromide (peroxide effect), ozonolysis, dihydroxylation with $KMnO_4$ and allylic bromination by NBS.

Dienes: General methods of preparation - mechanism of dehydrohalogenation. Stability of dienes (conjugated, isolated, allenes and cumulenes). Diels-Alder reaction - mechanism of 1,2- and 1,4-additions. Polymerization - addition polymerization, Ziegler Natta catalysed polymerization.

Alkynes: Preparation -mechanism of dehydrohalogenation and dehydrogenation. Acidity of alkynes, formation of acetylides, mechanism of addition of water, hydrogen halides and halogens, oxidation, ozonolysis, hydroboration and oxidation.

UNIT IV - COLLOIDS

Types of colloids – characteristics of true solutions, colloidal solutions and suspensions- preparation of colloids - purification of colloids - electrodialysis and ultrafiltration- properties of colloids - the origin of charge on colloidal particles- the electrical double layer- Zeta potential- Electro-osmosis - Electrophoresis - coagulation

of colloids- Hardy- Schulze rule and its exception - Gold number - protective colloids- applications of colloids.

UNIT V - GASEOUS STATE

Gaseous state – Laws of gaseous state- gas constant R in different units – deviation from ideal behaviour – Van der waals equation for real gases – critical phenomenon – PV isotherm of real gases, critical temperature – critical volume.Molecular velocities – root mean square, average and most probable velocities.Maxwell distribution law – collision number and mean free path – collision diameter.

REFERENCES

1. Puri B.R..,Sharma L.R., Kalia K.K., Principles of Inorganic Chemistry, (23rd edition), New Delhi, Shoban Lal Nagin Chand & Co., (1993).
2. Lee J.D., Concise of Inorganic Chemistry, UK, Black well science (2006).
3. Puri B.R..,Sharma L.R., Pathania M.S., Principles of Physical Chemistry, (23rd edition), New Delhi, Shoban Lal Nagin Chand & Co., (1993).
4. Glasstone S., Lewis D., Elements of Physical Chemistry, London, Mac Millan & Co. Ltd.
5. Morrison R.T. and Boyd R.N., Organic Chemistry (6th edition), New Delhi, Prentice-Hall Inc., 1992.
6. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (12th edition), New Delhi, Sultan Chand & Co., (1997).

SEMESTER II

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15202	Inorganic Qualitative Analysis - II	0	0	4	3
INSTRUCTIONAL OBJECTIVES					
(i)	To enable the students to develop analytical skills in identification and detection of inorganic ions in the mixture by semi micro analysis.				
(ii)	To appreciate the various colored chemical reactions of metal ions.				

Qualitative analysis of a mixture containing **two anions** and **two cations**.

Analysis of a mixture containing **two cations** and **two anions** of which one will be an interfering ion.

Anions to be studied: Carbonate, sulphate, chloride, nitrate, borate, chromate, oxalate, tartrate, and phosphate.

Cations to be studied: Lead, bismuth, copper, cadmium, antimony, iron, zinc, cobalt, nickel, manganese, calcium, strontium, barium, & ammonium.

General scheme for distribution of marks in practical examination

Time: 3h Marks : 50 (External) + 50 (Internal)
Four radicals : 20 Marks (Each 5 Marks)
Procedure : 10 Marks
Record : 20 Marks
Internal : 50 Marks
Total: 100

REFERENCES

1. Venkateswaran V., Veerasamy R. and Kulandaivelu A.R., Basic principles of Practical Chemistry, 2nd e
2. dition, New Delhi, Sultan Chand & sons (1997).
3. V.V. Ramanujam, *Inorganic Semi Micro Qualitative Analysis*, 3rd edition, The NationalPublishing Company, Chennai, 1974.
4. Vogel's *Text Book of Inorganic Qualitative Analysis*, 4th edition, ELBS, London, 1974.

SEMESTER II

Subject Code	Title of the Subject	L	T	P	C
UMA15261	Mathematics- II	4	0	0	4
INSTRUCTIONAL OBJECTIVES					
(i)	To apply basic concepts for clear understanding of mathematical principles.				
(ii)	To solve practical problems				

UNIT I - INTEGRAL CALCULUS

Integral calculus- polynomial and irrational function – partial fraction(Simple algebraic functions only) - Bernoulli's formula – reduction formula- $\int \sin^n x\,dx$ - $\int \cos^n x\,dx$ - $\int_0^{\frac{\pi}{2}} \sin^n x dx$ - $\int_0^{\frac{\pi}{2}} \cos^n x dx$

UNIT II - TRIGONOMETRY

Trigonomery – Expansion of Sin nθ, Cos nθ and tan nθ – expansion of $Sin^n\theta$ and $Cos^n\theta$ - Expansion of $Sin^n\theta.Cos^n\theta$

UNIT III - DIFFERENTIAL EQUATION

Differential Equation: Second order Differential Equation with constant coefficient. Problem based on R.H.S: $0, e^{ax}, Sin\,ax, Cos\,ax, x$.

UNIT IV - LAPLACE TRANSFORMATION

Laplace Transformation – basic properties and simple problems – L [e^{at} f (t)] – L [t f (t)] - L [e^{at} t f (t)] –L [f (t)/t] .

UNIT V - INVERSE LAPLACE TRANSFORMATION

Inverse Laplace transformation – Simple Problems based on Inverse Laplace Transformation - multiplied by 's'- multiplied by '1/s'- 'Partial Fraction Method'.

TEXT BOOK

1. Singaravelu, A. (2011) ALLIED MATHEMATICS, 3rd Edition, Meenakshi Agency, Chennai.

Treatment as in :ALLIED MATHEMATICS by Dr.A. Singaravelu.
Unit I: Chapter7 (7.1 – 7.85)(Simple Algebraic functions only), (7.87 – 7.95)
Unit II: Chapter6 (6.1 – 6.24)
Unit III: Chapter8 (8.41 – 8.50), (8.54 – 8.65), (8.70 – 8.86)
Unit IV: Chapter10 (10.1 – 10.27), (10.36 – 10.47)
Unit V: Chapter10 (10.64 – 10.82), (10.90-10.95)

REFERENCES

1. Vittal, P.R.(2013)Allied Mathematics, 4th Edition Reprint, Margham Publications, Chennai.
2. Venkatachalapathy, S.G.(2007)Allied Mathematics, 1st Edition Reprint, Margham Publications, Chennai.
3. Manickavasagam Pillai, T.K. and Narayanan, S.(2013) Ancillary Mathematics, Reprint, S.Viswanathan Printers & Publishers Pvt. Ltd.Chennai

SEMESTER II

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UBC15261	Biochemistry- II	4	0	0	4
INSTRUCTIONAL OBJECTIVES					

(i)	To study the Metabolism of carbohydrates
(ii)	To study the synthesis amino acids
(iii)	To Study the Metabolism of fats and lipids
(iv)	To study metabolism of Nucleic acids and ATP synthesis

UNIT I - METABOLISM OF CARBOHYDRATES

Glycolysis- Glucogenesis- Citric acid cycle and Glycogen metabolism.

UNIT II - PROTEIN METABOLISM

Biosynthesis of amino acids Protein turnover and Amino acid catabolism

UNIT III - FATTY ACID METABOLISM

Fatty Acid Metabolism- synthesis and degradation of fatty acids

UNIT IV - NUCLEIC ACID METABOLISM

Denovo Pyrimidine synthesis - Denovo Purine synthesis-Purine and Pyrimidine Catabolism, Interconversion of Nucleotides

UNIT V - OXIDATIVE PHOSPHORYLATION

Oxidative Phosphorylation - regulation - light reactions of Photosynthesis

TEXT BOOKS

1. Jeremy M. Berg, John L. Tymozko, Lubert Styer, (2002) *Biochemistry*, Fifth edition, W.H. Freeman and Company. Newyork, USA.
2. Albert L. Lehninger, David L. Nelson, Michael M. Cox, Karen Ocorr, (2005) Principles of *Biochemistry*, W H Freeman & Co Newyork, USA.

REFERENCES

1. Richard I. Gumport, Jeremy M. Berg, Nancy Counts Gerber, Frank H. Deis, Jeremy Berg, (2012) Student Companion to Accompany Biochemistry, W H Freeman & Co. Newyork, USA.

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UBC15262	**BIOCHEMISTRY LAB**	0	0	3	2

INSTRUCTIONAL OBJECTIVES

(i)	The students should be able to Learn methods to quantify biological compounds

2. Donald Voet and Judith G. Voet, (2005) Fundamentals of Biochemistry, John Wiley, USA.

SEMESTER II

1. pH measurement and preparation of buffers
2. Estimation of sugars
3. Estimation of proteins by Lowry's method/ Biuret method
4. Estimation of cholesterol by Zak's method
5. Separation of amino acids - Thin layer chromatography
6. Separation of sugars - Paper chromatography
7. Biochemical estimation of DNA/ RNA using Spectrophotometer

General scheme for distribution of marks in practical examination

Time: 3h Marks	: 50 (External) + 50 (Internal)
Experiment	: 20 Marks (Each 5 Marks)
Procedure	: 10 Marks
Record	: 20 Marks
Internal	: 50 Marks

REFERENCE

1. Departmental Lab reference manual

SEMESTER II

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15E51	Computer Literacy	2	0	1	2
INSTRUCTIONAL OBJECTIVES					
(i)	To understand the basic concepts of Microsoft office				
(ii)	To gain a knowledge about to solve the Programs				
(iii)	To Understand the basic ideas about internet concepts				

UNIT I - INTRODUCTION TO MS OFFICE

MS Word - Working with Documents-Opening & Saving files, Editing text documents, Inserting, Deleting, Cut, Copy, Paste, Undo, Redo, Find, Search, Replace, Formatting page & setting Margins, Converting files to different formats, Importing & Exporting documents, Sending files to others, Using Tool bars, Ruler, Using Icons, using help, Formatting Documents- Setting Font styles, Font selection- style, size, colour etc, Type face- Bold, Italic, Underline, Case settings, Highlighting, Special symbols, Setting Paragraph style, Alignments, Indents, Line Space, Margins, Bullets & Numbering. Setting Page style- Formatting Page, Page tab, Margins, Layout settings, Paper tray, Border & Shading, Columns, Header & footer, Setting Footnotes & end notes – Shortcut Keys; Inserting manual page break, Column break and line break, Creating sections & frames, Anchoring & Wrapping, Setting Document styles, Table of Contents, Index, Page Numbering, date & Time, Author etc., Creating Master Documents, Web page. Creating Tables- Table settings, Borders, Alignments, Insertion, deletion, Merging, Splitting, Sorting, and Formula, Drawing- Inserting ClipArts, Pictures/Files etc., Tools – Word Completion, Spell Checks, , Mail merge, Templates, Creating contents for books, Creating Letter/Faxes, Creating Web pages, Using Wizards, Tracking Changes, Security, Digital Signature. Printing Documents – Shortcut keys.

UNIT II - INTRODUCTION TO MS EXCEL

MS Excel: Spread Sheet & its Applications, Opening Spreadsheet, Menus-main menu, Formula Editing, Formatting, Toolbars, Using Icons, Using help, Shortcuts, Spreadsheet types. Working with Spreadsheets- opening, Saving files, setting Margins, Converting files to different formats (importing, exporting, sending files to others), Spread sheet addressing- Rows, Columns & Cells, Referring Cells & Selecting Cells – Shortcut Keys. Entering & Deleting Data- Entering data, Cut, Copy, Paste, Undo, Redo, Filling Continuous rows, columns, Highlighting values, Find, Search & replace, Inserting Data, Insert Cells, Column, rows & sheets, Symbols, Data from external files, Frames, Clipart, Pictures, Files etc, Inserting Functions, Manual breaks, Setting Formula-finding total in a column or row, Mathematical operations (Addition, Subtraction, Multiplication, Division, Exponentiation), Using other Formulae. Formatting Spreadsheets- Labelling columns & rows, Formatting- Cell, row, column & Sheet, Category- Alignment, Font, Border & Shading, Hiding /Locking Cells, Anchoring objects, Formatting layout for Graphics, Clipart etc., Worksheet Row & Column Headers, Sheet Name, Row height & Column width, Visibility- Row, Column, Sheet, Security, Sheet Formatting & style, Sheet background, Colour etc, Borders & Shading – Shortcut keys.

UNIT III - INTRODUCTION TO MS ACCESS

MS Access: Introduction, Planning a Database, Starting Access, Access Screen, Creating a New Database, Creating Tables, Working with Forms, Creating queries,

Finding Information in Databases, Creating Reports, Types of Reports, Printing & Print Preview – Importing data from other databases viz. MS Excel etc.

UNIT IV - INTRODUCTION TO MS POWER POINT

MS Power point: Introduction to presentation – Opening new presentation, Different presentation templates, Setting backgrounds, Selecting presentation layouts. Creating a presentation - Setting Presentation style, Adding text to the Presentation.Formatting a Presentation - Adding style, Colour, gradient fills, Arranging objects, Adding Header & Footer, Slide Background, Slide layout. Adding Graphics to the Presentation- Inserting pictures, movies, tables etc into presentation, Drawing Pictures using Draw. Adding Effects to the Presentation- Setting Animation & transition effect.Printing Handouts, Generating Standalone Presentation viewer.

UNIT V - INTRODUCTION TO INTERNET

Creating an e-mail id using yahoo.com -- Creating a text file and sent email -- Downloading files, text, picture from email -- Checking email -- Searching search engine -- Insert a text file into web -- Composing a email -- Sending a group of members to different user -- Chatting

TEXT AND REFERENCE BOOKS

1. D.P.Curtin, K.Foley, K. Sen and C.Mortin, Information Technology – the breaking wave, the edition-1999
2. Sawyer William a Hutchinson using information technology brief version McGraw Hill international edition 1999.
3. Fundamental of information technology, Alexis Leon &Mathew Leon- Vikas publishing
4. Home Pvt ltd -1999 Professional Office Procedure by Susan H Cooperman, Prentice Hall Information Technology:
5. Principles , Practices and Opportunities by James A Senn, Printice Hall
6. Technology And Procedures for Administrative Professionals by Patsy Fulton-Calkins, Thomson Learning
7. Public Information Technology and E-Governance: Managing the Virtual State (Paperback) by G. David Garson

COMPUTER LITERACY (OFFICE AUTOMATION) LAB SYLLABUS

MS-WORD

1. Text Manipulations
2. Usage of Numbering, Bullets, Tools and Headers
4. Usage of Spell Check and Find and Replace
5. Text Formatting
6. Picture Insertion and Alignment

7. Creation of Documents Using Templates
8. Creation of Templates
9. Mail Merge Concept
10. Copying Text and Picture From Excel
11. Creation of Tables, Formatting Tables
12. Splitting the Screen
13. Opening Multiple Document, Inserting Symbols in Documents

MS-EXCEL

1. Creation of Worksheet and Entering Information
2. Aligning , Editing Data in Cell
3. Excel Function (Date , Time, Statistical, Mathematical, Financial Functions)
4. Changing of Column Width and Row Height (Column and Range of Column)
5. Moving, copying, Inserting and Deleting Rows and Columns
6. Formatting Numbers and Other Numeric Formats
7. Drawing Borders Around Cells
8. Creation of Charts Raising Moving
9. Changing Chart Type
10. Controlling the Appearance of a Chart

MS-POWER POINT

1. Working With Slides
2. Creating, saving, closing presentation
3. Adding Headers and footers
4. Changing slide layout
5. Working fonts and bullets
6. Inserting Clipart
7. Working with Clipart
8. Applying Transition and animation effects
9. Run and Slide Show

INTERNET

1. Creating an E-mail ID
2. Creating a text file and send to E-mail
3. Downloading files, text, pictures from E-mail.
4. Checking E-mail.
5. Searching Search Engine
6. Inserting a text file into web.
7. Sending a group of members to different user
8. Chatting

9. Create a simple webpage using HTML.
10. Use frames to Include Image and Videos.
11. Add a Cascading Style sheet for designing the web page.
12. Design a simple online test web page in PHP.
13. Design of a website.

SEMESTER II

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15E52	Water Treatment and Analysis	2	0	1	2
INSTRUCTIONAL OBJECTIVES					
(i)	To get a basic idea about the qualities of water				
(ii)	To improve their skills through analysis of water				
(iii)	To understand the various technique to analysis the water				

UNIT-I Introduction to Hardness of Water

Introduction - characteristics of water - alkalinity - hardness - unit of hardness - Total solids - Oxidation - transparency - Silica content. Purification of water for drinking purpose - potability of water - clarification - coagulation - contact & electro chemical coagulation - sterilization & disinfection of water - precipitation - aeration - ozonisation - Chlorination.

UNIT-II . Methods to determine the Hardness of water

Water softening methods - Clark's process - lime soda process - modified lime soda process - permutit or zeolite process - Ion exchange process - demineralization of water. Determination of hardness of water - Titration method - complexometric method using EDTA - expressing hardness - equivalents of calcium carbonate - problems to determine temporary & permanent hardness.

UNIT-III Waste Water Treatment

Hard water and industries - industrial water treatment - boiler feed water method of softening - prevention of plumbo solvency - scales in boilers - consequences - internal conditioning methods. Desalination of brackish water - elecrodiaysis - Reverse osmosis - removal of Fe, Mn and Silicic acid - effluent treatment of water from paper industry, petrochemical, fertilizer industry and power station.

UNIT-IV Water quality Parameters

Water analysis - sampling of water for analysis - chemical substances affecting potability - colour, turbidity odour, taste, temperature, pH and electrical conductivity. Analysis of solids present in water - suspended solids - dissolved solids - total acidity - alkalinity - free CO2 - free chlorine - Ca, Mg, Fe, Mn, Ag & Z

UNIT-V Analysis of Water Treatment

Analysis of chemical substances affecting health - NH3, Nitrate, Nitrite, cyanide, sulphate, sulphide, chloride, fluoride - measurement of toxic chemical substances - analysis of chemical substances indicative of pollution - Dissolved oxygen - Bio Chemical Oxygen Demand (BOD) - Chemical Oxygen Demand (COD)

Reference Books:

1. Industrial Chemistry (including chemical - engineering) - B.K. Sharma - Goel publishing house, Meerut.
2. Pollution control in process industries - S.P. Mahajan - Tata McGraw - Hill Publishing Company Ltd., New Delhi.
3. Water pollution and management - C.K. Varashney - Wiley Eastern Ltd., Chennai - 20.

SEMESTER II

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
CDC15201	Quantitative Aptitude and Reasoning –I	2	0	0	2

INSTRUCTIONAL OBJECTIVES

(i) **At the end of this course, the students will be able to,**

- Critically evaluate various real life situations by resorting to Analysis of key issues and factors
- Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.

COURSE REQUIREMENT: At the end of every unit, the students will be expected to answer a model quantitative aptitude test for internal assessment.

UNIT I

- Simple equations
- Ratio & Proportion
- Variation

UNIT II

- Percentages
- Profit and loss
- Partnership
- Simple interest and Compound interest

UNIT III

- Deductions
- Connectives

UNIT IV

- Analytical Reasoning puzzles
- Problems on Linear arrangement
- Problems on Circular arrangement

UNIT V

- Clocks
- Calendars
- Blood relations

TEXT BOOKS

1. Agarwal R S, 'Quantitative Aptitude'S.Chand Publishers,2013
2. Agarwa lR S,'A modern approach to Logical reasoning' S.Chand Publishers

REFERENCES

1. AbhijitGuha, Quantitative Aptitude - McGraw Hills Publishers
2. AgarwalR S, , 'A modern approach to Logical reasoning'S.Chand Publishers

SEMESTER II

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UNS15201/ UNC15201/ UNO15201/ UYG15201	NSS/NCC/NSO/Yoga	0	0	0	1

SEMESTER III

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15301	General Chemistry - III	3	1	0	4

INSTRUCTIONAL OBJECTIVES

(i)	To study the chemistry of alcohols and phenols.
(ii)	To study about benzene and benzenoid compounds
(iii)	To learn the chemistry of p-block elements.
(iv)	To study the laws of thermodynamics and their applications

UNIT I - CHEMISTRY OF BENZENE AND OTHER BENZENOID COMPOUNDS

Structure of benzene, general methods of preparation of benzene, electrophilic substitution reaction mechanisms - nitration, sulphonation, halogenation, Friedel Crafts alkylation and acylation. Orientation and reactivity of substituted benzenes. Polynuclear aromatic hydrocarbons – preparation, properties and uses of naphthalene, anthracene and phenanthrene.

UNIT II - CHEMISTRY OF ALCOHOLS, PHENOLS AND ETHERS

Nomenclature, classification and preparation of alcohols–properties and uses – chemistry of glycols and glycerols-preparation, properties and uses.

Mono, di and tri hydric phenols: preparation, properties and uses. Aromatic electrophilic substitution reaction mechanism – theory of orientation and reactivity.

UNIT III - CHEMISTRY OF GROUPS–13, 14 & 15 ELEMENTS

General characteristics of boron group elements with reference to electronic configuration and oxidation states. Metalloids and inert pair effect. Diagonal relationship between B and Si. Diborane – structure.Componds of boron - boric acid and borazole.

UNIT IV - CHEMISTRY OF CARBON AND NITROGEN ELEMENTS

General characteristics of carbon group elements with reference to electronic configuration, oxidation states, metallic character, inert pair effect and catenation. Allotropy- structure of graphite and diamond.

General characteristics of nitrogen group elements– the unique features of nitrogen from the rest of the family –industrial preparation of ammonia, hydrazine, hydroxylamine

UNIT V - THERMODYNAMICS – I

Chemical thermodynamics – system – surrounding – isolated, closed and open systems – Homogeneous and heterogeneous systems. State of the system – intensive and extensive properties. Thermodynamic processes – cyclic process – reversible and irreversible process – isothermal and adiabatic process. State and path functions. Work of expansion at constant pressure and free expansion. First law of thermodynamics – statement – definition of internal energy (U), enthalpy (H) and heat capacity – U and H as thermodynamic properties. Relationship between C_p and C_v.

TEXT BOOKS

1. Puri B.R. ,Sharma L.R., Kalia K.K., (1993): Principles of Inorganic Chemistry, 23rd edition, Shoban Lal Nagin Chand & Co, New Delhi.
2. Lee J.D., (2006): Concise of Inorganic Chemistry, Black well science, UK.
3. Glasstone S., Lewis D., (1960): Elements of Physical Chemistry, Mac Millan & Co. Ltd, London.

REFERENCES

1. Puri B.R..,Sharma L.R., Pathania M.S., (1993): Principles of Physical Chemistry, 23rd edition, Shoban Lal Nagin Chand & Co, New Delhi.
2. Morrison R.T. and Boyd R.N., (1976): Organic Chemistry, 6th edition, New York
3. Bahl B.S. and Arun Bahl, (1997) : Advanced Organic Chemistry, 12th edition, Sultan Chand & Co, New Delhi.

SEMESTER III

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15302	Principles of Analytical Chemistry	3	0	0	3
INSTRUCTIONAL OBJECTIVES					
(i)	To learn the principles of chemical analysis and analytical chemistry.				
(ii)	To use modern instruments and classic techniques to design experiments and to record the results scientifically.				
(iii)	To apply statistical analysis to experimental measurements.				
(iv)	To understand the various purification techniques available and the need for purity of components.				
(v)	To have a knowledge about Chromatographic techniques and their applications in daily life.				
(vi)	To be able to skillfully decide the choice of precipitants and list the factors that affect the solubility of a precipitate.				

UNIT I - INTRODUCTION TO ANALYTICAL CHEMISTRY AND SAFETY METHODS

Analytical Chemistry-its role, classification of analytical methods, advantages of instrumental methods - good lab habits - common lab operations, safety in the analytical lab- first aid in the case of burns and cuts.

UNIT II - DATA ANALYSIS

The Mean- The Median- Precision-Accuracy-Confidence limits-Standard Deviation-Errors- Rules for improving Accuracy-Rejection of Data- Significant figures- Reporting of Data- Presentation of Tabulated Data-Scatter Diagrams- Method of Least Squares-S.I. Units.

UNIT III - PURIFICATION TECHNIQUES

Dessicant: Types of dessicant- Relative efficiencies of dessicant- Drying powder and temperature- Regeneration of dessicant- choice of dessicant-technique of drying: drying of solids- Distillation: Theory of distillation- Technique: Fractional-Steam, Azeotropic- Vacuum – Recrystallization- Sublimation Criteria and Tests for purity: Melting point, boiling point- Refractive index and density.

UNIT IV - SEPARATION TECHNIQUES

Precipitation- Solvent Extraction- Chromatography: Types- Column, thin layer, paper, Ion exchange , Gas-Liquid Chromatography- HPLC and Electrophoresis (Introduction)

UNIT V - PRINCIPLES OF GRAVIMETRIC ANALYSIS

Methods of obtaining the precipitate- Conditions for precipitation- Choice of precipitants- Advantages of using Organic Precipitants- Specific and Selective Precipitants- Sequestering Agents- Solubility Products and Precipitation- Factors which affect Solubility of Precipitates- Theories of Precipitation- Co-precipitation – post precipitation- procedures to minimize occlusion- procedures to minimize surface adsorption- Effect of digestion- General rules for precipitation- precipitation from homogeneous medium- washing of precipitates- Drying of precipitates- Types, care and use of crucibles.

TEXT BOOKS

1. Gopalan R.., (2004): Elements of Analytical Chemistry, 3rd Edition, Sultan Chand and Co, New Delhi
2. Skoog D.A., West D.M., (1988): Fundamentals of Analytical Chemistry, Saunders College Publishing, New York.
3. Vogel A.I.., (1957): A Textbook of Practical Organic Chemistry, Longman, London.

REFERENCES

1. Sharma B.K., (2004): Principles of Instrumental Analytical Chemistry, Krishna Prakashan Media, Meerut.
2. Willard, Merrit, Dean, Settle., (1986): Instrumental Methods of Analysis: CBS Publishers, Delhi.
3. Sivasankar, B..,(2012): Instrumental methods of analysis, Oxford University Press.

SEMESTER III

Subject Code	Title of Subject	CREDITS			
		L	T	P	C
UCY15303	Inorganic Volumetric Estimation	0	0	4	3
INSTRUCTIONAL OBJECTIVES					
(i)	To enable the students to acquire the quantitative skills in volumetric analysis.				
(ii)	At the end of the course, the students should be able to plan experimental projects and execute them				

Volumetric Practical: Calibration of volumetric kits: burette, pipettes and standard flasks.

ESTIMATION OF THE FOLLOWING Volumetric Practical

Calibration of volumetric kits: burette, pipettes and standard flasks.

Estimation of the following

1. Oxalic acid (Link $KMnO_4$)
2. Mohr salt (Link $KMnO_4$)
3. Sodium Hydroxide (Link Standard acid)
4. Sodium Carbonate (Link H_2SO_4)
5. Potassium dichromate (Link Fe^{2+})
6. Potassium permanganate (Link Fe^{2+})
7. Estimation of Copper sulphate pentahydrate using $K_2Cr_2O_7$ (Link thio)
8. Estimation of Zn^{2+} (Link EDTA)
9. Total and permanent hardness of water sample (Link EDTA)

General scheme for distribution of marks in practical examination

Time: 3h Marks : 50 (External) + 50 (Internal)

Procedure : 10 Marks

Calculation and Table : 20 Marks

Result : 5 Marks

Viva : 5 Marks

Record : 10 Marks

Internal : 50 Marks

SEMESTER III

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UPY15361	Allied Physics - I	4	1	0	4

INSTRUCTIONAL OBJECTIVES	
(i)	To understand the fundamentals of physics.
(ii)	To give the basic understanding of material properties.
(iii)	To educate and motivate the students in the field of science.
(iv)	To acquire knowledge on magnetism and dielectrics

UNIT I - SIMPLE HARMONIC MOTION AND CIRCULAR MOTION

Time period, Amplitude – Phase – Spring mass system – Simple pendulum, Composition of two simple harmonic motions of equal periods in a straight line and at right angles – Lissajous figures –Damping force – Damped harmonic oscillator – Uniform circular motion – Acceleration of a particle in a circle – centripetal and centrifugal forces - Banking on curved roads – motion of a car around a circle.

UNIT II - PROPERTIES OF MATTER

Elasticity and plasticity - Elastic constants. Bending of beams – Young's modulus by non - uniform bending, Torsion in a wire – determination of rigidity modulus of by torsion pendulum – Viscosity –Coefficient of viscosity – Poissuelle's formula - Stoke's law – terminal velocity. Surface tension: Molecular theory of surface tension – Excess pressure inside a drop and bubble.

UNIT III - HEAT AND THERMODYNAMICS

Kinetic theory of gases – basic postulates, ideal gas laws –Van Der Waal's equation of states, pressure of an ideal gas, RMS speed. Laws of thermodynamics – entropy – change of entropy in reversible and irreversible processes. Low temperature: Joule – Kelvin effect, theory and applications – Liquefaction of gases – Linde's process – adiabatic demagnetization.

UNIT IV - ELECTRICITY AND MAGNETISM

Electric charge, conservation of charge – permittivity – Coulomb's law –Electric field – electric potential –Gauss's law and its applications –conductors – dielectrics –electric current – Ohm's law - Magnetic induction – permeability - susceptibility - Magnetic field due to a current carrying conductor – Biot – Savart's law – field along the axis of a coil – force on a conductor carrying current in a magnetic field. Ampere's circuital law - Faraday's law – Gradient, Curl and Divergence. E - M waves - Maxwell's equations in free space.

UNIT V – OPTICS - I

Light and Optics - Fermat's principle, laws of reflection and refraction - total internal reflection and its illustrations. Mirrors and lenses – lens formula – combinations of thin lenses - Refraction through a prism - combination of two prisms to produce dispersion without deviation and deviation without dispersion - Defects of images– Coma distortion – spherical and chromatic aberration in lenses.

TEXT BOOK

1. Resnick R.., and Halliday D.., Fundamentals of Physics, Wiley Publication, 8th Edition, 2011.
2. Dr. R. K. Agarwal, Rekha Jain., Dr. Garima Jain,Optics., Krishna Prakashan Media Ltd., 2006.

3. Dayal, D.C.., Fundamentals of Electricity & Magnetism, Himalaya Publishing House, 2013.
4. Brijilal & Subramanyam., Heat & Thermodynamics,S.., Chand Limited, 2001.

REFERENCES

1. Naik P.V.., Principles of Physics, PHI Learning Pvt. Ltd, 2006.
2. Dr. D. John Thiruvadigal, Dr. S. Ponnusamy, Dr. L. Sudha and M. Krishnamohan, Physics for Technologists, Vibrant Publication, 2013.
3. Rajam, J. B.., Chand, S.., Physics for Technologists, 1981.
4. Brijilal and Subramanian, Elements of properties of matter, S. Chand Limited, 1974.
5. Zemansky M. W.., and Ditlman, R.H.., Heat and Thermodynamics, Tata Mcgraw Hill, 2011.

SEMESTER III

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UPY15362	Allied Physics Lab - I	0	0	4	2

INSTRUCTIONAL OBJECTIVES	
(i)	To acquire basic understanding of laboratory techniques.
(ii)	To educate the basics of instrumentation, data acquisition and interpretation of results.
(iii)	To educate and motivate the students in the field of science.
(iv)	To allow the students to have a deep knowledge of fundamentals of optics

LIST OF EXPERIMENTS

1. Determination of Young's Modulus- Uniform bending Method
2. Determination of Young's Modulus- Non Uniform bending Method
3. Determination of Rigidity Modulus of a wire – Torsional pendulum
4. Determination of thermal conductivity of a bad conductor using Lee's disc method
5. Calibration of Voltmeter using potentiometer
6. Calibration of Ammeter using potentiometer
7. Determination of magnetic susceptibility using Quincke's Method
8. Determination of dispersive power of a prism using spectrometer
9. Determination of Cauchy's constant using spectrometer

TEXT BOOKS

1. Bernard C.H.., and Epp, C.D.., John, Laboratory Experiments in College Physics Wiley and Sons, Inc., 1995.
2. Gupta, S. K.., Engineering Physics Practical, Ninth Edition, Krishna Prakashan Media publishers, 2010.

REFERENCES

1. Squires, G. L.., Practical Physics, Fourth edition, Cambridge University Press, 2001.
2. Geeta Sanon, B. Sc., Practical Physics, 1st Edition. R. Chand & Co, 2007.
3. Benenson, Walter, and Horst Stöcker, Handbook of physics, Springer, 2002.
4. Chattopadhyay, D., Rakshit, P. C.., and Saha, B., An Advanced Course in Practical Physics, 8th Edition, Books & Allied Ltd., 2007.
5. Indu Prakash and Ramakrishna., A Text Book of Practical Physics, 11th Edition, Kitab Mahal, New Delhi, 2011.

SEMESTER III

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15E53	C Programming and Its Application to Chemistry	2	0	1	4
INSTRUCTIONAL OBJECTIVE					
(i)	To understand the basic fundamentals of C programming by learning various operators, arrays and functions.				

UNIT I - INTRODUCTION, VARIABLES, CONSTANTS AND OPERATORS

Importance of C programming - basic structure of C program - character set- key words and identifiers - variables and data types- declaration of variables - assigning values to variables - defining symbolic constants – operators - expressions-type conversion in expressions - hierarchy of operations - input and output operations.

UNIT II - DECISION MAKING – BRANCHING AND LOOPING

a) **Decision Making and Branching**

Use of simple *if* statement, *if…else* statement – nesting of *if…else* statement -*switch* statement - conditional operator (? : operator), *GO TO* statement.

b) **Decision Making and Looping**

Use of *while* statement -*do…while* statement -*for loops*- nesting of *for loops* -jumps in loops (break)- skipping a part of a loop (continue).

UNIT III - ARRAYS AND CHARACTER STRINGS

Arrays-Introduction -one dimensional arrays- two dimensional arrays, initializing two dimensional arrays, multi dimensional arrays.

Declaring and initializing string variables- reading strings from terminal- writing strings to screen -putting strings together- comparison of two strings- string handling functions.

UNIT IV - FUNCTIONS, STRUCTURES AND UNIONS

Function definition-function call - function declaration (brief overview only)- Definition of a Structure -processing and types of statements in structures- union -pointers (basic ideas only).

UNIT V - PRACTICAL 'C' PROGRAMMING

Application of C programming in chemical problems

1) Calculation of pH of a solution
2) Calculation of number of vibrational modes of linear and non-linear molecules
3) Calculation of RMS, Average and Most Probable velocity
4) Conversion of Fahrenheit to Centigrade and vice versa

TEXT BOOKS

1. Balagurusamy, E..,Programming in ANCI C, Tata Mc Graw- Hill, New Delhi,2004.
2. Raman, K.V.., Computers in Chemistry, 1st edition, Tata Mc Graw- Hill, New Delhi,1993.

REFERENCE

1. Ramesh Kumari., Computers and their Applications to Chemistry, 2nd edition, 2014.

SEMESTER III

Subject Code	Title of the Subject	Credits			
		L	T	P	C
UCY15E54	Basics of Bioinformatics	2	0	1	4
INSTRUCTIONAL OBJECTIVES					
(i)	To teach how to transform a chemical structure into a language for computer representation and manipulation				
(ii)	To provide how to extract knowledge from chemical reactions				
(iii)	To teach QSAR model generation and virtual screening				
(iv)	Provide applications of computational models				

UNIT I Representation and Manipulation of Chemical Structures

2D Chemical Structures: Computer representation of chemical structures, Structure and substructure searching, Reaction databases. 3D Chemical Structures: 3D Pharmacophore, Conformational search and analysis of 3D database, Methods to derive 3D pharmacophores.

UNIT II Introduction to Protein Modeling

Amino acids, Protein structure and conformational properties, Ramachandran Plot and dihedral angles, Enzyme mechanisms: Michaelis–Menten kinetics, Introduction of Protein Data Bank (PDB): file format.

UNIT III Computational Models

Introduction, Deriving a Quantitative Structure Activity Relationship (QSAR) Equation: Simple and Multiple Linear Regression, Designing a QSAR Experiment: Selection of Descriptors, Experimental Design, Indicator variables, Molecular field analysis and Partial Least Squares.

UNIT IV Drug Design and Development

Drug Discovery Process, Target Identification and Validation, Lead Discovery, Lead Modification, Identification of active part: Pharmacophore, functional group modification,

UNIT V Application of Computational Chemistry

Prediction of properties of compounds, Lead finding and Optimization, Molecular docking: Searching and scoring algorithm, Computer assisted synthesis design, Design of Combinatorial Chemistry.

Text Books

1. Andrew R Leach, Valerie J Gillet, (2003.): "An Introduction to Chemoinformatics", Kluwer Academic publishers.
2. Rick NG. (2004): "Drugs: from Discovery to Approval", John Wiley & sons.
3. Andrew R Leach, (1996): "Molecular Modelling- Principles and applications", 2nd Edition, Prentice Hall

References

1. Johann Gasteiger, Thomas Engel (2003): "Chemoinformatics - A Textbook", Wiley- VCH.
2. Jürgen Bajorath, "Chemoinformatics: Concepts, Methods, and Tools for Drug Discovery", Humana Press, 2004.
3. Garland R Marshall (2006): "Chemoinformatics in Drug Discovery", John Wiley & Sons.

SEMESTER III

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15E01	INDUSTRIAL CHEMISTRY	3	0	0	3

INSTRUCTIONAL OBJECTIVES	
(i)	To gain knowledge in various industrial fuels
(ii)	To study in depth about the use of various fertilizers in agriculture
(iii)	To learn the basic concepts in water treatment and about pollution control

UNIT I - INDUSTRIAL FUELS

Energy Sources- classification of fuels - solid, liquid and gaseous.Calorific value of fuels and its determination.Solid fuels – coal, lignite, sub-bituminous coal, bituminous coal and anthracite.Coking and non-coking coal.

Liquid fuels –Petroleum refining and uses. Hydrodesulphurisation andcracking(thermal and catalytic - fixed bed and fluidised bed). Octane number. Production and uses of tetraethyl lead, ETBE and MTBE. Gaseous fuels - natural gas and gobar gas - production, composition and uses, Gobar electric cell.

UNIT II - CHEMISTRY IN AGRICULTURE

Fertilizers- NPK, superphosphate, triple superphosphate, uses of mixed fertilizers. Micronutrients and their role, biofertilizers, plant growth harmones.

Pesticides- classification of pesticides with examples. Insecticides - stomach poisons, contact insecticides, fumigants. Manufacture and uses of insecticides. DDT, BHC (gammaxane: Conformation of gamma isomer) pyrethrin-Banned pesticides. Herbicides -manufacture of 2,4-D and 2,4,5-T. Fungicides -preparation of Bordeaux mixture, lime-sulphur creosote oil (formula only).

Sugar industry - double sulphitation process. Refining and grading of sugar. Saccharin - use as a sugar substitute - aspartame.

UNIT III - WATER TREATMENT

Introduction- sources of water.Hardness of water-temporary and permanent hardness - units of hardness, disadvantages of hard water. Effect of iron and manganese in water.Estimation of hardness – EDTA method and alkali titration method.Water softening methods - Zeolite process. Ion-exchange - Demineralisation. Mixed – bed

deionisation. Domestic waste water treatment.Purification methods – chlorination, break point chlorination. Reverse osmosis - Desalination.

UNIT IV - POLLUTION AND CHEMICAL TOXICOLOGY

Pollution: Air pollution –causes and effects. Acid rain- Green house effect (global warming), ozone layer depletion - photochemical oxidants. Control measures of air pollution. Water pollution – organic pollutants, Chemical oxygen demand (COD), Biological oxygen demand (BOD) and total organic carbon.

Chemical toxicology: Effect of toxic chemicals on enzymes. Lead, mercury and cyanide pollution and their biochemical effects. Carbon monoxide, sulfur dioxide, oxides of nitrogen, ozone – biochemical effects.

UNIT V - SEMINAR TOPICS

Glass, Cement, Dyes, Paints, Special paints, Lubricants and greases, Refractories, Abrasives, Plastics, Perfumes and flavoring industries, Fermentation industries, Explosives, Pulp and paper industries, Rubber industries, Pharmaceutical industries, Food and food products industries, Photographic product industries, Ceramic industries, Petrochemicals.

TEXT BOOKS

1. Norris Shreve, R.., and Joseph A. Brink, Jr., (1977): Chemical process industries, 4th Edition, Mc Graw – hill Kogakusha, ltd, New York.
2. George T.., Austin (1984): Shreve's chemical process industries, 5th Edition, Mc Graw – hill, New York.
3. Subba Rao, N. S.., (1982): Biofertilizers in Agriculture, Oxford and IBH Publishing Co Pvt Ltd, New Delhi.

REFERENCES

1. Jain, P. C.., and Jain, M.C., (1993): Engineering Chemistry, 10th Edition, Dhanpat Rai and Sons, New Delhi.
2. De A. K., (1986): Environmental chemistry 2nd Edition, Wiley Eastern Ltd., Delhi.
3. Stanley E.., Mahanen (2000): Fundamentals of Environmental Chemistry, 2nd Edition, CRC Press, Florida
4. Jugal, Kishore.., Agrawal (1976): Practicals in Engineering Chemistry; Oxford and IBH Publishing Co., New Delhi.

SEMESTER III

Subject code	Title of course	CREDITS			
		L	T	P	C
UCY15E02	POLYMER CHEMISTRY	3	0	0	3

INSTRUCTIONAL OBJECTIVES	
(i)	To learn the basic concepts of polymers
(ii)	To understand the properties of polymers
(iii)	To learn the techniques involved in polymerisation
(iv)	To understand the chemistry of some important polymers.
(v)	To get the knowledge about the advance techniques in polymers

UNIT I - INTRODUCTION TO POLYMERS

Monomers and polymers-definition-classification of polymers on the basis of microstructures, macrostructures and applications (thermosetting and thermoplastics) Distinction among plastics, elastomers and fibers.Homo and heteropolymers.Copolymers.Chemistry of polymerization- chain polymerization- free radical, ionic, coordination. Step polymerization – miscellaneous- ringopening & group transfer polymerization.

UNIT II - PHYSICAL PROPERTIES AND REACTIONS OF POLYMERS

Properties : Glass transition temperature (Tg) – Definition – Factors affecting Tg - relationships between Tg and molecular weight and melting point. Importance of Tg. Molecular weight of polymers: number average, weight average, sedimentation and viscosity average molecular weights-degree of polymerization-molecular weight distribution.

Reactions : hydrolysis - hydrogenation – addition – substitutions-cross-linking vulcanization and cyclisations reaction. Polymer degradation. Basic idea of thermal, photo and oxidative degradation of polymers

UNIT III - POLYMERIZATION TECHNIQUES AND PROCESSING

Polymerisation techniques - Bulk, solution, suspension, emulsion, melt condensation and interfacial polycondensation polymerizations. Polymer processing: Calendering – die casting, rotational casting –compression. Injection moulding.

UNIT IV - CHEMISTRY OF COMMERCIAL POLYMERS

Preparation, properties and uses of Teflon, polymethylmethacrylate. Polyethylene, polystyrene, PAN, polyesters, polycarbonates, polyamides (Nylon and Kevlar),

polyurethanes, PVC, epoxy resins, rubber –styrene and neoprene rubbers, Phenol – formaldehydes and urea-formaldehyde resins.

UNIT V - ADVANCES IN POLYMERS

Biopolymers and Biodegradable Polymers in medical field- High temperature and fire resistant polymers.Silicones.Conducting polymers-Composites. (basic idea only).

TEXT BOOKS

1. Billmeyer F.W. Jr.., (1984): Text book of Polymer Science, John Wiley and Sons, 1984.
2. Gowariker V.R.., Viswanathan N.V.., and Jayader Sreedhar., (1978): Polymer Science, Wiley Eastern Ltd., New Delhi

REFERENCES

1. Sharma, B.K.., (1989): Polymer Chemistry, Goel Publishing House, Meerut..
2. Arora M.G.., Singh M.., and Yadav M.S.., (1989): Polymer Chemistry, 2nd Revised edition, Anmol Publications Private Ltd., New Delhi.

SEMESTER III

Subject Code	Title of the Subject	L	T	P	C
CDC15301	Quantitative Aptitude and Reasoning-II	2	0	0	2

INSTRUCTIONAL OBJECTIVE

(i) .**At the end of this course, the students will be able to,**

- Critically evaluate various real life situations by resorting to Analysis of key issues and factors
- Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.

COURSE REQUIREMENT: At the end of every unit, the students will be expected to answer a model quantitative aptitude test for internal assessment.

UNIT I

- Numbers
- Time and Distance
- Time and Work
- Averages, Mixtures and Allegations

UNIT II

- Data Interpretation
- Data Sufficiency
- Mensuration
- Permutation and Combinations

- Probability

UNIT III

- Cubes
- Venn diagrams
- Binary Logic

UNIT IV

- Number and letter series
- Number and Letter Analogies
- Odd man out

UNIT V

- Coding and decoding
- Direction sense test
- Critical Reasoning
- Lateral reasoning puzzle

TEXT BOOKS

1. AgarwaR S I, 'Quantitative Aptitude' S.Chand Publishers,2013
2. AgarwalR S,'A modern approach to Logical reasoning' S.Chand Publishers

REFERENCES

1. AbhijitGuha, Quantitative Aptitude - McGraw Hills Publishers
2. AgarwalR S, , 'A modern approach to Logical reasoning' S.Chand Publishers

SEMESTER IV

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15401	General Chemistry - IV	3	2	0	4

INSTRUCTIONAL OBJECTIVES	
(i)	To understand the concepts of chemical bonding.
(ii)	To learn the chemistry of p-block elements.
(iii)	To learn the chemistry of organo halogen compounds.
(iv)	To learn the chemistry and applications of carbonyl compounds.
(v)	To study the second law of thermodynamics and their applications

UNIT I - CHEMICAL BONDING - II

Ionic bond

Properties of ionic compounds, factors favoring the formation of ionic compounds-ionization potential, electron affinity, and electronegativity. Lattice Energy – Born – Haber Cycle – enthalpy of formation of ionic compound and stability. Polarizing power and Polarisability – partial ionic character from electro negativity – transitions from ionic to covalent character and vice versa – Fajan's rule - effects of polarization on solubility, melting points and thermal stability of typical ionic compounds.

MO theory

LCAO method, criteria of orbital overlap, types of molecular orbitals- σ and π - MO energy level diagram for homo and hetero diatomic molecules- H_2 to N_2, CO, NO, HCl . Bond order and stability of molecules, Difference between VB theory and MO theory.

UNIT II - CHEMISTRY OF ELEMENTS OF GROUP 16, 17 & 18

Paramagnetic nature of oxygen-preparation, properties, structure and uses of oxyacids of sulphur. Classification of oxides based on their chemical behaviour – acidic oxide, amphoteric oxide and neutral oxides, peroxides, super oxides, dioxides, sub oxides and mixed oxides.

UNIT III - ALKYL AND ARYL HALIDES

Nomenclature – general methods of preparation of haloalkanes – properties and uses – nucleophilic substitution reaction mechanisms (S_N1 , S_N2 and S_Ni) – stereochemical aspects of nucleophilic substitution reactions – general methods of preparation of halobenzenes - properties and uses – mechanism of electrophilic and nucleophilic substitution reactions.

UNIT IV - ALDEHYDES AND KETONES

Nomenclature – Laboratory preparation of aliphatic carbonyl compounds –properties and uses – molecular orbital picture of carbonyl group – nucleophilic addition mechanism at carbonyl group – condensation reactions– Beckmann rearrangement – acidity of alpha-hydrogen. General methods of preparation of aromatic carbonyl compounds –properties and uses – effect of aryl group on the reactivity of carbonyl group- Perkin reaction, Knovenegal condensation reaction and Cannizzarro reaction.

UNIT V - THERMODYNAMICS II

Limitations of first law and the need for the second law – Heat engine – Carnot's cycle and its efficiency –thermodynamic principle of the working of refrigerator - thermodynamic scale of temperature – Entropy as a state function – Entropy as a function of P, V and T - Entropy change in phase change – Entropy of mixing – Entropy as a criterion of spontaneous and equilibrium processes in isolated systems.

TEXT BOOKS

1. Puri B.R.., Sharma L.R.., Kalia K.K.., (1993): Principles of Inorganic Chemistry, 23rd edition, Shoban Lal Nagin Chand & Co, New Delhi.
2. Lee J.D.., (2006): Concise Inorganic Chemistry, Black well science, UK.
3. Puri B.R..,Sharma L.R., Pathania M.S., (1993): Principles of Physical Chemistry, 23rd edition, Shoban Lal Nagin Chand & Co, New Delhi.

REFERENCES

1. Glasstone S.., Lewis D. (1960): Elements of Physical Chemistry, MacMillan Co. Ltd, London.
2. Morrison R.T.., and Boyd R.N., (1976): Organic Chemistry, 6th edition Allyn & Bacon Ltd, New York.
3. Bahl B.S.., and Arun Bahl ., (1997): Advanced Organic Chemistry, 12th edition, Sultan Chand & Co, New Delhi.

SEMESTER IV

Subject Code	Title of Subject	CREDITS			
		L	T	P	C
UCY15402	Concepts in Physical Chemistry	3	2	0	4

INSTRUCTIONAL OBJECTIVES

(i)	To understand the concepts of chemical kinetics
(ii)	To understand the colligative properties of solutions
(iii)	To learn the objectives of chemical equilibriums and thermodynamics
(iv)	To acquire knowledge about the solutions of Non-electrolytes
(v)	To understand the concepts of surface phenomena

UNIT I - CHEMICAL KINETICS

Rate of a reaction – order and molecularity – derivation of rate constant for first and second order reactions - zero order reaction - pseudoorder reaction. Hydrolysis of ethyl acetate, saponification of esters – methods of determining order of a reaction – half-life time method.Effect of temperature on reaction rates – concept of activation energy – Arrhenius equation –collision theory.

UNIT II - COLLIGATIVE PROPERTIES OF DILUTE SOLUTIONS

Solution- Dilute solutions-definition - Raoult's law for vapour pressure lowering (equation only) - van't Hoff equation (no derivation) – determination of molar mass from osmotic pressure measurement-reverse osmosis. Boiling point elevation-derivation of molal elevation constant (K_b)-determination of molar mass from boiling point elevation. Freezing point depression- determination of molar mass from freezing point depression.

UNIT III - CHEMICAL EQUILIBRIUM AND THERMODYNAMICS - III

Law of mass action- thermodynamic treatment of the law of mass action – van't Hoff reaction isotherm, temperature dependence of the equilibrium constant -relationship between K_p and K_c Homogeneous equilibria - dissociation of PCl_5.- Factors affecting chemical equilibrium - Le-chatlier principle

Zeroth and Third law of Thermodynamics

Zeroth law of thermodynamics – absolute temperature scale. Statement of third law - Nernst heat theorem

UNIT IV - SOLUTIONS OF NON ELECTROLYTES

Solution of liquids in liquids - Raoult's law – chemical potentials of ideal and non-ideal solutions – Gibbs–Duhem – Margules equation.Fractional distillation of binary liquid systems - azeotropic mixture – steam distillation of immiscible liquids. Solubility of

partially miscible liquids – phenol-water system - effect of impurities on critical solution temperature. Henry's law – applications of Henry's law.

UNIT V - SURFACE PHENOMENA

Catalysis: General characteristics – types of catalysis – acid base catalysis – enzyme catalysis — explanation with suitable examples– Michaelis–Menten equation.

Adsorption: Definition – difference between adsorption and absorption – factors influencing adsorption –Freundlich adsorption isotherm – Langmuir adsorption isotherm – applications**.**

TEXT BOOKS

1. Puri B.R, Sharma L.R.., Pathania M.S.., (2004) : Principles of Physical Chemistry, 41st edition, Shoban Lal Nagin Chand & Co, New Delhi.
2. Glasstone S., Lewis D.., (1960): Elements of Physical Chemistry, Mac Millan & Co. Ltd, London.
3. Bahl B.S.., and Arun Bahl., (1997): Physical Chemistry, 12th edition, Sultan Chand & Co, New Delhi.

REFERENCES

1. Soni P.L.., and Dharmara, O.P..,(1979): Text of Physical Chemistry, 11th Edition, Sultan Chand & Sons Educational Publishers , New Delhi.
2. Gilbert .W. Castellan.., (1985):Physical Chemistry, 3rd Edition, Narosa Publishing House**.**

SEMESTER IV

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15403	PHYSICAL CHEMISTRY – PRACTICAL - I	0	0	4	2
INSTRUCTIONAL OBJECTIVES					
(i)	To understand the Principles of kinetic Reaction				
(ii)	To impart knowledge with respect to the phase transformation of different systems.				

LIST OF EXPERIMENTS

1. Determination of Transition Temperature of the hydrated salt
2. Effect of impurity on Critical solution Temperature
3. Phase Diagram (Simple eutectic system)
4. Kinetics of Iodination of Acetone
5. Determination of Rate constant of Acid –catalysed Hydrolysis of an Ester

General scheme for distribution of marks in practical examination

- Principle & table : 10 Marks
- Calculation : 10 Marks
- Procedure : 10 Marks
- Accuracy : 10 Marks
- Record : 10 Marks
- Internal : 50 Marks

Total : 100

REFERENCES

1. Venkateswaran V. Veerasamy R. Kulandaivelu A.R., (1997): Basic principles of Practical Chemistry, 2nd edition, New Delhi, Sultan Chand & sons.
2. Sundaram, Krishnan, Raghavan, (1996): Practical Chemistry (Part III), S. Viswanathan Co. Pvt.,.
3. Vogel's(1989): Text Book of Quantitative Chemical Analysis. 5th Edition ELBS/Longman England.

SEMESTER IV

Subject Code	Title of the Subject	L	T	P	C
UPY15461	Allied PHYSICS – II	4	1	0	4

INSTRUCTIONAL OBJECTIVES	
(i)	To understand the fundamentals of physics.
(ii)	To emphasize the significance of Green technology and its applications.
(iii)	To understand the structural, optical, nuclear and electronic properties of solids.
(iv)	To acquire knowledge on elementary ideas of integrated circuits

UNIT I - ENERGY PHYSICS

Sources of conventional energy – Need for non – conventional energy – resources, Solar energy – solar cells and its applications, Wind energy – generation and applications - Bio mass energy – generation and applications, Geothermal energy – generation and applications, Tidal energy – generation and applications - Hydro energy – generation and applications.

UNIT II - MODERN PHYSICS

Atomic structure - Alpha, beta and gamma radiation - Law of radioactive decay - decay constant - half life - mean life - nuclear energy - mass defect - Binding energy - fission and fusion - Biological effects of radiation - Black body radiation - Plank's quantum hypothesis - Photoelectric effect - Compton effect – De - Broglie equation - uncertainty principle.

UNIT III - OPTICS – II

Wave nature of light - Huygens's principle - Interference - Young's double slit experiment - Coherence - interference from thin films - Michelson's interferometer - Newton's rings. Diffraction: wave theory of light - single slit experiment - diffraction grating – Polarization - Fiber optics - propagation of light in optical fiber - Acceptance angle - numerical aperture –attenuation - Types of optical fibers and its Applications

UNIT IV - CRYSTAL PHYSICS

Space lattice – basis - Unit Cell - Lattice parameters - two dimensional and three dimensional Bravais lattices and Crystal systems - Cubic crystal system - Crystal symmetry - reciprocal lattice and its importance - Density & atomic packing fraction – Directions - planes and Miller indices - inter - planar distance - NaCl, Zinc sulphide, Hexagonal Closely Packed (HCP) structure – crystal imperfections – X ray diffraction – Laue method - single crystal and powder diffraction

UNIT V - ELECTRONICS

Basic Electronics: P and N – type semiconductors, Junction Diode and their characteristics, half wave and full wave rectifiers - voltage regulations - Zener diode. Junction transistor – PNP. Digital electronics: AND, OR, NOT gates, NAND and NOR as universal building Blocks. Boolean algebra, Laws of Boolean algebra, DE Morgan's theorem - their verification using truth table. Elementary ideas of integrated circuits (ICs).

TEXT BOOKS

1. Kittel, C., (2005): Introduction to Solid state Physics, 8th Edition, Wiley Eastern Ltd.
2. Malvino & Leach., (2010) Digital Principles & their applications — TataMcGraw Hill.
3. Murukesan, R.., (2005) Modern Physics, S. Chand & Co.
4. Brijilal & subramanyam,(2001) A Textbook of Optics, S. Chand Ltd.

REFERENCES

1. Jha, A.K.., (2011): Textbook of Applied Physics, International Publishing house pvt. Ltd,
2. Mansi Karkare., and Rajni Bahuguna., I.K.,(2010) Applied Physics, Volume – II International Publishing house pvt. Ltd.
3. Tasneem Abbasi., Abbasi S. A., Renewable Energy Sources (2013)*:* Their Impact on Global Warming and Pollution PHI Learning Pvt. Ltd.
4. K. Thyagarajan and Ajay Ghatak, (1998): Introduction to Fiber Optics, Cambridge, University Press.
5. B. Grob, McGrw (2010): Basic Electronics, 6th Edition– Mc Graw Hill.

SEMESTER IV

Subject Code	Title of the Subject	L	T	P	C
UPY15462	Allied Physics Lab – II	0	0	4	2

INSTRUCTIONAL OBJECTIVES

(i)	To familiarize with the concept of material properties.
(ii)	To educate the basics of instrumentation, data acquisition and analysis.
(iii)	To understand the optical and electronic properties of solids through experimentations.
(iv)	To enhance the students to understand the concepts in integrated chips.

LIST OF EXPERIMENTS

1. Study the I-V Characteristic of a Solar Cell.
2. Determination of wire thickness using air wedge experiment.
3. Study of attenuation and propagation characteristics of optical fiber cable.
4. Band gap determination using Post Office Box – Specific resistance.
5. Dielectric constant Measurement.
6. Hall effect- Hall coefficient determination.
7. Construction of AND, OR, NOT gates using diodes, resistors and Transistors.
8. NAND gate as a Universal gate.
9. Determination of regulation properties of a given power supply using a integrated circuit (IC).

TEXT BOOKS

1. Arora, C. L.., (2007): B.Sc., Practical Physics, S. Chand & Company Ltd.
2. Gupta, S. K..,(2010):Engineering Physics Practical, 9th Edition, Krishna Prakashan Media Publishers, 2010.

REFERENCES

1. Ouseph, C.., Rangarajan, K..,A(1997): Text Book of Practical Physics, Volume I,II,S.Viswanathan Publishers.

2. Chauhan and Singh,Advanced (1985): Practical Physics, Revised Edition, Pragati Prakashan.
3. Geeta Sanon, B. Sc., Practical Physics ,(2007) 1st Edition,S. Chand & Co.
4. R. K. Shukla & Anchal Srivastava (2006): Practical Physics, New Age International (P) Ltd, Publishers.
5. Thiruvadigal, J. D., Ponnusamy, S. and Vasuhi.P. S.,(2012): Materials Science, Vibrant Publications.

SEMESTER IV

Subject Code	Title of Subject	CREDITS			
		L	T	P	C
UCY15E03	Chemistry of Natural Products	3	0	0	3

INSTRUCTIONAL OBJECTIVES	
(i)	Introduction to chemistry of natural products like alkaloids, terpenoids, etc.,
(ii)	Understanding of the methods of isolation, purification and structural elucidation of natural products.
(iii)	An introduction to synthesis of important natural products.
(iv)	An appreciation of bio-activity of natural products

UNIT I - ALKALOIDS

Introduction, occurrence, isolation and biological functions of alkaloids.General methods of preparation and structural elucidation of coniine, piperine, nicotine and papaverine.

UNIT II - TERPENOIDS AND CAROTENOIDS

Terpenoids: Introduction, isoprene rule. Structural determination and synthesis of citral, menthol, Geraniol and camphor.

Carotenoids: Introduction, geometrical isomerism, structure determination and synthesis of β-carotene and vitamin-A

UNIT III - ANTHOCYANINS AND FLAVONES

Anthocyanins: Introduction to anthocyanins. Structure and general methods of synthesis of anthocyanins- Cyanidine.

UNIT IV - PURINES AND STEROIDS

Purines: Introduction, occurrence, isolation and biological importance. Synthesis and structural elucidation of Uric acid, Xanthine and Caffeine.

UNIT V - NATURAL DYES

Occurrence, isolation, purification, classification, colour and constitution.Structural determination and synthesis of indigoitin and alizarin.

TEXT BOOKS

1. Agarwal O. P.., (1997): Chemistry of Natural Products, Vol 1, Goel Publishing House, Meerut.
2. Gurdeep Chatwal and Anand, S.K.,(2001)*:* Chemistry of Natural Products, Himalaya Publishing Co, New Delhi.

REFERENCE

1. Finar I. L., (1975): Organic Chemistry, Vol 2, 5th edition, Pearson education, London.

SEMESTER IV

Subject Code	Title of Subject	CREDITS			
		L	T	P	C
UCY15E04	Pharmaceutical Chemistry	3	0	0	3
INSTRUCTIONAL OBJECTIVES					
(i)	To learn the fundamentals of drug properties				
(ii)	To understand the clinical and biochemical analysis				
(iii)	To learn the properties of common drugs.				
(iv)	To understand the basic concepts of biotechnology				

UNIT I - CLINICAL HYGIENE AND BIOCHEMICAL ANALYSIS

Definition of health. Standards of WHO. Sterilization of surgical instruments. Disinfectants, antiseptics, sanitation. Biochemical analysis of urine, serum and fecal matter. Toxicity: Introduction and treatment for specific poisons-acids, alkalis, arsenic and mercury compounds.

UNIT II - COMMON DRUGS

Manufacture of drugs (e.g. quinine, reserpine, etoposide and d – tubocurarine) from Indian medicinal plants. Testing of drugs : Types of drugs and their modes of action : Depressant drugs (special reference to sedatives and hypnotics). Anticonvulsant drugs (sodium valproate, hydantoins). Narcotic analgesics (only morphine compounds).Antipyretic analgesics (acetyl salicyclic acid, p – amino phenol derivatives). Nuclear medicine (Radiation therapy)

UNIT III - ENZYMES

Classification, specificity. coenzymes, cofactor, ATP, Mechanism of enzyme action and Immobilisation of enzymes.

UNIT IV - BODY FLUIDS

Blood volume, blood groups, coagulation of blood.Plasma lipo protiens. Blood pressure. Arteriosclerosis, diseases affecting red cells: Hyperchromic and hypochromic anaemia. Blood tranfusion.Blood sugar and diabetes.

UNIT V - BIOTECHNOLOGY

Heredity, recombinant DNA, Genetic engineering and its possible hazards, Gene splicing, manufacture of interferon and human insulin (Humulin),

VISITS - One full day visit to a medical research laboratory and/or pharmaceutical industry.

TEXT BOOKS

1. Jayashree Ghosh (1999): A Text Book of Pharmaceutical Chemistry, S.Chand and Co. Ltd.
2. Rastogi S.C.., (1993): Biochemistry, Tata McGraw Hill Publishing Co.
3. Ashutosh Kar (1993): Medicinal Chemistry, Wiley Eastern Limited, New Delhi.

REFERENCES

1. Roy O.Le., (1976): Natural and synthetic organic medicinal compounds, Ealemi.
2. Oser B.L.., Hawk's (1965): Physiological chemistry, 14th edition, Tata-McGraw – Hill Publishing Co.Ltd.
3. Kleiner O. and Martin J., (1974): Bio-Chemistry, Prentice-Hall of India (P) Ltd, New Delhi.

SEMESTER IV

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
CDC15401	Communication Skills	2	0	0	2

INSTRUCTIONAL OBJECTIVE

At the end of this course, the students will be able to communicate fluently and develop all the four skills in communication namely listening, speaking, reading and writing

COURSE REQUIREMENT: At the end of every unit, the students will be expected to submit an assignment or make a presentation as a part of internal assessment.

UNIT I - LISTENING SKILL

Listening comprehension and response through various modes- face-to-face conversations, telephone conversations, reading out written material, audio-video recorded material, mimes.

UNIT II - SPEAKING SKILL

Group communication- Features of an effective, fluent speechthrough regular practice- role-play, extempore-situational conversations-Greetings, requests, demands, instructions and enquiries.

Informal speech- Facing audience-Body language- Conversion of mother tongue to English language, Formal speech-Paper presentation and essential aspects of Business communication.

UNIT-III - READING SKILL

Reading Comprehension-Poems, passages- conversations, short messages, e-mails, formal/informal letters, Phonics, Speed Reading, Reading comprehension strategies.

UNIT IV - WRITING SKILL

Letter Writing- Formats and language- Types-Personal, Business, Applications, Thanks, Invitation, Condolence, Requests, Complaints-E-mail etiquette.Reports, Essay Writing.

UNIT V - INTERPERSONAL AND INTRAPERSONAL COMMUNICATION

Ways to communicate in different scenarios- job interview, business meeting, project submission/proposal, informal gathering, speech for a large audience, a debate etc.- dress code, Eye contacts, body language and handshakes.

TEXT BOOK

1. Soft Skills- Know Youand Know the World, Author-Dr.Alex.K.

REFERENCE

1. Communication Skills-Language in Use-Cambridge Edition.

SEMESTER V

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15501	Inorganic Chemistry	3	2	0	4

INSTRUCTIONAL OBJECTIVES	
(i)	To learn about the chemistry of transition and inner transition metals
(ii)	To learn the concepts of acids and bases
(iii)	To understand nuclear chemistry
(iv)	To understand the uses of inorganic complexes

UNIT I - TRANSITION METALS (d – BLOCK ELEMENTS)

First, second and third transition series - general characteristics –metallic character, atomic and ionic radii – oxidation states, color, complex formation, catalytic and magnetic properties-Non-stoichiometric compounds- Important compounds of transition metals: Ziegler – Natta catalyst - Prussian blue, Sodium nitro prusside, Turnbull's blue, Nickel- DMG complex, Wilkinson's Catalyst, $KMnO_4$ and $K_2Cr_2O_7$.

UNIT II - INNER TRANSITION METALS (f – BLOCK ELEMENTS)

Lanthanides: lanthanide series - occurrence - abundance, - lanthanide contraction-color and magnetic properties - extraction of mixture of lanthanides from monazite sand and separation of lanthanides. Uses of lanthanides.

Actinides: Actinide series - occurrence - abundance – preparation of transuranic elements- electronic configuration – oxidation states – ionic radii – color of ions – comparison with lanthanides- extraction of thorium and uranium - uses.

UNIT III - ACIDS AND BASES

Theories of acids and bases - Arrhenius, Bronsted-Lowry theory, Lewis theory, solvent system Definition. Relative strengths of acids and bases – dissociation constant of acids and bases – leveling effect of water. Hard and soft acids and bases (HSAB). Nonaqueous solvents – classification- liquid ammonia as solvent.

Oxidation and Reduction Reactions -Oxidation number concept – Balancing redox equations by oxidation number method and ion-electron method – Equivalent weight of oxidizing and reducing agents.

UNIT IV - NUCLEAR CHEMISTRY AND RADIOACTIVITY

Radioactivity Natural and artificial radioactivity and half life period.Applications of radio isotopes in reaction mechanism, medicine, agriculture and carbon dating.

Nuclear Chemistry Isotopes, isobars, isotones, mass defect, binding energy. Nuclear fission and fusion with examples.

UNIT V - INDUSTRIALLY IMPORTANT COMPOUNDS

Titanium dioxide, cis-$[Pt(NH_3)_2C1_2]$, $CoAl_2O_4$ (Cobalt blue), autocatalyst, vanadium pentaoxide, potassium dichromate, potassium permanganate, zirconyl chloride, uranyl nitrate.

TEXT BOOKS

1. Puri B.R..,Sharma L.R., Kalia K.K. (1993): Principles of Inorganic Chemistry, 23rd edition, Shoban Lal Nagin Chand & Co, New Delhi..
2. Lee J.D.(2006): Concise Inorganic Chemistry, Black well science, UK.

REFERENCE

1. Shriver D.F.., and P.W.Atkins.., : (1999) Inorganic Chemistry, W.H.Freeman and Co, London.

SEMESTER V

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15502	Organic Chemistry	3	2	0	4

INSTRUCTIONAL OBJECTIVES	
(i)	To learn the chemistry of carboxylic acids and their uses
(ii)	To learn the chemistry of organo nitrogen compounds
(iii)	To understand the molecular rearrangements
(iv)	To learn about heterocyclic compounds
(v)	To learn the chemistry of vitamins and proteins

UNIT I - CARBOXYLIC ACIDS AND THEIR FUNCTIONAL DERIVATIVES

Nomenclature and classification of aliphatic and aromatic carboxylic acids. Preparation, acidity and reactions - reduction and oxidation. Preparation and properties of dicarboxylic acids such as oxalic, malonic, succinic, adipic and phthalic acids and unsaturated carboxylic acids such as acrylic, crotonic and cinnamic acids. Preparation and reactions of acid chlorides, acid anhydrides, amides and esters, trans-esterification.

UNIT II - CHEMISTRY OF NITROGEN CONTAINING COMPOUNDS

Nitrocompounds: aliphatic and aromatic nitro compounds, classification, general Properties - Preparation by nitration. Reduction reactions. Di- and tri-substitution of

aromatic nitro compounds: synthesis of o-, m-, p- dinitrobenzenes and trinitrobenzene.

Aliphatic and aromatic amines - preparation of primary, secondary and tertiary amines - reactions and basicity of amines, effect of substituents on basicity of aromatic amines

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UNIT III - MOLECULAR REARRANGEMENTS

Molecular rearrangements - types of rearrangement (nucleophilic and electrophilic) – mechanism for the following rearrangements: pinacol - pinacolone, benzil - benzilic acid, benzidine, Claisen, Fries, Hofmann and Beckmann.

UNIT IV - CHEMISTRY OF HETEROCYCLIC COMPOUNDS

Heterocyclic compounds - nomenclature - preparation, properties and uses of furan, pyrrole, thiophene.

UNIT V - CHEMISTRY OF PROTEINS AND VITAMINS

Amino acids - general methods of preparation and reactions of amino acids, zwitter ion - isoelectric point, action of heat on α, β, and γ amino acids. Peptides and proteins - peptide linkage. Classification of protein structure. Denaturation and colour reactions of proteins. Vitamins (no structural elucidation) - classification, biological importance of vitamins A, B1, B2, B6, B12 and C.

TEXT BOOKS

1. Finar I.L. (1996): Organic Chemistry, Vol 1&2, 6th Edition, Addison Wesley Longman Ltd, England.
2. Morrison R.T., Boyd R.N., (1976): Organic Chemistry, 4th Edition, Allyn & Bacon Ltd, New York.
3. Bahl B.S, Arun Bahl, (1986): Advanced Organic Chemistry, 12th Edition, Sultan Chand and Co, New Delhi.

REFERENCES

1. Pine S.H., (2008): Organic Chemistry, 5th edition, McGraw – Hill International Book Company , New Delhi.
2. Seyhan N. Ege, (2004): Organic Chemistry, Houghton Mifflin Co., New York

SEMESTER V

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15503	Physical Chemistry	3	1	0	4

INSTRUCTIONAL OBJECTIVES	
(i)	To learn about the principles and applications of electrochemistry
(ii)	To understand phase equilibria
(iii)	To learn the principles of photochemistry
(iv)	To know the fundamentals of group theory

UNIT I – ELECTROCHEMISTRY-I

Faraday's laws of electrolysis- properties of electrolytes -Ionic strength of solutions – van't Hoff factor. Electrical transport and conductance in metal and in electrolytic solution.specific conductance and equivalent conductance - variation of conductance with concentration – equivalent conductance at infinite dilution - Kohlrausch's law and its applications. Arrhenius theory of electrolytic dissociation and its limitation - weak and strong electrolyte according to Arrhenius theory - Ostwald's dilution law - applications and limitation.

UNIT II - ELECTROCHEMISTRY-II

Electrolytic & galvanic cells - reversible and irreversible cells. Types of reversible electrodes - gas/metal ion - metal/metal ion; metal/insoluble salt/ anion and redox electrodes - electrode reactions - conventional representation of electrochemical cells. Electromotive force of a cell and its measurement- computation of E.M.F - Nernst equation.

UNIT III - PHASE RULE

Phase rule, meaning of the terms - phase, component, degrees of freedom – derivation of Gibbs phase rule – application of Clapeyron-Clausius equation in phase transitions. Phase diagrams of one component systems (water and sulphur systems) –Phase diagrams of two component systems: (i) Simple eutectic - Lead-silver system (ii) Formation of compound with congruent melting point - Freezing mixtures – $CuSO_4$-water system – Efflorescence – Deliquescence.

UNIT IV - PHOTO CHEMISTRY

Consequences of light absorption - Jablonski diagram- radioactive and non-radioactive transitions. Laws of photo chemistry: Lambert – Beer, Grothus - Draper and Stark – Einstein. Quantum efficiency. Rate law and kinetics of photo chemical reactions: H_2-Cl_2 reaction. Comparison of thermal and photochemical reactions.Photo

sensitization and quenching.Fluorescence, phosphorescence and chemiluminescence.Laser and uses of lasers.

UNIT V - GROUP THEORY

Symmetry elements and symmetry operations - group postulates and types of groups - Abelian and non Abelian. Illustration of symmetry operation for H_2O molecule - construction of multiplication table for H_2O molecule - point group - definition – elements of symmetry operations of the following point groups: C_n (C_2, C_3), C_V (C_{2V}, C_{3V}) and C_h (C_{2h}, C_{3h}).

TEXT BOOKS

1. Maron S.H. and Lando J.B. (1974): Fundamentals of Physical Chemistry, Macmillan, New York.
2. Puri B.R., Sharma L.R., and Pathania B.K. (1993): Principles of Physical Chemistry, 23rd Edition, Vishal Publishing Company.
3. Rajaram and Kuriacose (1986): Thermodynamics for students of chemistry, Shoban Lal Nagin Chand.

REFERENCES

1. Glasstone S. and Lewis D (1960): Elements of physical Chemistry, Macmillan
2. Jain D.V.S and Jainhar S.P., (1988): Physical chemistry, Principles and problems, Tata Mc Graw Hill, New Delhi

SEMESTER V

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15504	Gravimetric Estimation and Preparation of Organic compounds	0	2	5	3

INSTRUCTIONAL OBJECTIVES	
(i)	To enable the students to acquire the quantitative skills in gravimetric analysis
(ii)	Preparative skills in organic and inorganic preparations.
(iii)	At the end of the course, the students should be able to plan experimental projects and to execute them
	To enable the students to identify an Inorganic compounds

GRAVIMETRIC ANALYSIS

1. Estimation of Lead as lead chromate.
2. Estimation of Barium as barium chromate.
3. Estimation of Nickel as Nickel - DMG complex.
4. Estimation of Copper as copper (I) thiocyanate

5. Estimation of Magnesium as magnesium oxinate
6. Estimation of Barium as barium sulphate.

ORGANIC PREPARATION

Preparation of Organic Compounds involving the following chemical transformations

1. O

xidation 2. Reduction 3.Hydrolysis 4.Nitration 5.Bromination 6.Diazotization

Determination of boiling /melting points by semimicro method.

General scheme for distribution of marks in practical examination

Time : 3 h Marks : 50 (External) + 50 (Internal)

- Procedure : 10 Marks (Each 5 Marks)
- Calculation : 10 Marks
- Organic Preparation : 10 Marks
- Recrystallisation : 5 Marks
- Physical constant : 5 Marks
- Record : 5 Marks
- Viva : 5 Marks
- Internal : 50 Marks

Total : 100

REFERENCES

1. Venkateswaran V. Veerasamy R. Kulandaivelu A.R., (1997): Basic principles of Practical Chemistry, 2nd edition, New Delhi, Sultan Chand & sons
2. Sundaram, Krishnan, Raghavan, 1996: Practical Chemistry (Part III), S.Viswanathan Co. Pvt.,
3. Vogel's (1989): Text Book of Quantitative Chemical Analysis. 5th Edition, ELBS/Longman England,.

SEMESTER V

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15E05	Material Chemistry and NanoTechnology	3	2	0	3

INSTRUCTIONAL OBJECTIVES

(i)	To learn about the different properties and applications of materials
(ii)	To understand nanomaterials and their advantages

UNIT I - IONIC CONDUCTIVITY AND SOLID ELECTROLYTES

Types of ionic crystals: alkali halides, silver chloride, alkaline earth fluoride and simple stoichiometric oxides. Types of ionic conductors: halide ion conductors and oxide ion conductors. Solid electrolytes – applications of solid electrolytes. Electrochemical cell – principle – batteries, sensors and fuel cells. Crystal defects in solids – line defect - plane defect – point defects: Schottky and Frenkel defects. Electronic properties - band theory – metals - semiconductors – inorganic solids – colour – magnetic properties - optical properties - luminescence

UNIT II - MAGNETIC MATERIALS

Introduction – types of magnetic materials – diamagnetism – paramagnetism - ferromagnetism. Ferrites: preparation and their applications in microwave, floppy disk and magnetic bubble memory. Insulating Materials - Classification on the basis of temperature – Blymer insulating materials - ceramic insulating materials. Ferro electric materials: examples and applications of ferroelectrics.

UNIT III - MODERN ENGINEERING MATERIALS

Shape memory alloys: introduction – examples – application – advantages - disadvantages. Biomaterials: Introduction – metals and alloys in biomaterials – ceramic biomaterials, composite biomaterials - polymeric biomaterials.

UNIT IV - NANOPHASE MATERIALS

Introduction – techniques for synthesis of nanophase materials: sol-gel synthesis,- electrodeposition, inert gas condensation and mechanical alloying (Elementary level) - properties - applications of nanophase materials.

UNIT V - NANO TECHNOLOGY

Introduction –importance – various stages of nanotechnology – nanotube technology – CVD diamond technology –FCVA technology and its applications. Nanoparticles - fullerenes-nanodendrimers – nanopore channels, fibres and scaffolds - nanoimaging techniques.

TEXT BOOKS

1. Anthony R. West, (1989): Solid state chemistry and its applications John Wiley & Sons.
2. Raghavan V.R., (2001) : Materials Science and Engineering Printice Hall (India) Ltd.

REFERENCE

1. Kenneth J. Klabunde, : Nanoscale Materials In Chemistry A. John Wiley and Sons Inc. Publication,

SEMESTER - V

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15E06	Energy and Fuel Cells	3	2	0	3
INSTRUCTIONAL OBJECTIVES					
(i)	To learn about the different properties and applications of materials				
(ii)	To understand nanomaterials and their advantages				

UNIT I - INTRODUCTION TO ENERGY

Definition and units of energy, power, Forms of energy, Conservation of energy, second law of thermodynamics, Energy flow diagram to the earth. Origin of non renewable energy source-fossil fuels, time scale of fossil fuels, Renewable Energy Resources, Role of energy in economic development and social transformation

UNIT II - INDIAN ENERGY SCENE

Commercial and non-commercial forms of energy, energy consumption pattern and its variation as a function of time, energy resources available in India, urban and rural energy consumption, nuclear energy - promise and future, energy as a factor limiting growth, need for use of new and renewable energy sources

UNIT-III - ENVIRONMENTAL IMPACT

Status of Nuclear and Renewable Energy: Present Status and future promise Energy Policy Issues: Fossil Fuels, Renewable Energy, Power sector reforms, restructuring of energy supply sector,

UNIT IV - SOLAR ENERGY

Definition, Energy available from Sun, Solar radiation data, solar energy conversion into heat and electricity, Principle of natural and forced convection, Photo voltaics: p-n junctions. Solar cells, Types of Solar cells

UNIT V - FUEL CELL TECHNOLOGY

Introduction and overview of fuel cell technology, Difference between batteries and fuel cells, Fuel cell principle, Components of fuel cells, Classification by operating temperature / electrolyte types, Mechanism and applications of Solid oxide fuel cells,

Molten carbonate fuel cells, Alkaline fuel cells, Polymer electrolyte membrane fuel cells, Direct methanol fuel cells.

TEXT BOOKS

1. Energy for a sustainable world: Jose Goldenberg, Thomas Johansson,
2. A.K.N.Reddy, Robert Williams (Wiley Eastern).
3. Energy policy for : B.V.Desai (Weiley Eastern).
4. World Energy Resources : Charles E. Brown, Springer 2002.
5. Hoogers , (2003): Fuel cell technology handbook- CRC Press.

REFERENCES

1. Foster R., Ghassemi M., Cota A., (2010) : Solar Energy , CRC Press.
2. Duffie J.A., Beckman W.A. (2006): Solar Engineering of Thermal Processes , 3rd ed., Wiley.
3. Liu, H., (2006): Principles of fuel cells, Taylor & Francis, N.Y.

SEMESTER-V

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UES15501	Environmental Studies	3	0	0	3

INSTRUCTIONAL OBJECTIVES

(i)	To gain knowledge on the importance of natural resources and energy.
(ii)	To understand the structure and function of an ecosystem.
(iii)	To imbibe an aesthetic value with respect to biodiversity, understand the threats and its conservation and appreciate the concept of interdependence
(iv)	To understand the causes of types of pollution and disaster management.
(v)	To observe and discover the surrounding environment through field work.

45 HRS OF TEACHING + 5 HRS OF FIELD WORK

UNIT I - INTRODUCTION TO NATURAL RESOURCES/ENERGY

Environmental Studies: Definition, scope, objectives and awareness- Introduction to natural resources: food, forest, water and energy – Renewable and non renewable resources-coal, oil, tidal, wind, geothermal, solar, biomass(over view) – nuclear fission and fusion-nuclear energy.

UNIT II - ECOSYSTEMS

Concept of an ecosystem-structure and function of an ecosystem-producers, consumers and decomposers- ecological succession- food chains(any 2 eg)- food webs(any 2 eg)-ecological pyramids.

UNIT III - BIODIVERSITY AND ITS CONSERVATION

Introduction, definition: genetic, species and ecosystem diversity-Values of biodiversity: consumptive, productive, social, ethical, aesthetic and option values-hot spots of biodiversity-Threats to biodiversity: habitat loss, poaching of wildlife, endangered species and endemic species of India -conservation of biodiversity: in – situ and ex-situ conservation of biodiversity.

UNIT IV - ENVIRONMENTAL POLLUTION /DISASTER MANAGEMENT

Definition-causes, effects and control measures of : Air, Water and Soil pollution- e-waste management- Disaster management: Natural and man-made - food/earthquake/cyclone, tsunami and landslides.

UNIT V - SOCIAL ISSUES AND THE ENVIRONMENT

Sustainable development- Climate change: global warming, acid rain, ozone layer depletion and nuclear radiation- Environment Protection Act (any imp 2) air, water, wildlife and forest.

FIELD WORK

Students will visit any one of the following place of interest and submit a written report by the end of the semester:

1. Visit to a hospital/industry/canteen for solid waste management
2. Visit to a chemical industry to study about the practices followed there for waste disposal
3. Visit to Vandalur zoo for study of animal conservation/plants- flora and fauna
4. Study of simple ecosystems-lake/hill slopes
5. Naming the trees in the campus at SRM
6. Study of common plants, insects, birds in the neighbourhood
7. Study of common diseases and their prevention
8. Optional: Street plays and rally for awareness of obesity/diabetes/ vitamin D deficiency/health issues/ waste management/ solid waste management/ no plastics/ energy consumption/wild life protection.

TEXT BOOKS

1. Sharma B.K., 2001. Environmental Chemistry. Goel Publ. House, Meerut
2. Dr.R.Jeyalakshmi.2014.,Text book of Environmental Studies, Devi publications, Chennai.

REFERENCES

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. De A.K., Environmental Chemistry, Wiley Eastern Ltd.

e-BOOK

1. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380013, India, Email:mapin@icenet.net (R)

SEMESTER VI

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15601	Organic Reagents and Reaction Mechanisms	3	2	0	4

INSTRUCTIONAL OBJECTIVES	
(i)	To learn the chemistry of carbohydrates
(ii)	To understand the principles of aromaticity
(iii)	To understand the chemistry and application of compounds containing active methylene group
(iv)	To study the applications of organometallics reagents in organic synthesis
(v)	To understand the mechanisms of name reactions

UNIT I - COMMON REAGENTS IN ORGANIC SYNTHESIS

Structure and applications (no mechanism) of $AlCl_3$, BuLi, B_2H_6, DCC, Grignard reagent, NBS.

UNIT II - REDOX REAGENTS IN ORGANIC SYNTHESIS

Structure and applications (no mechanism) of the following oxidants and reductants.

Oxidants: PCC, H_2O_2, m-CPBA, MnO_2, OsO_4.

Reductants: $NaBH_4$, Li/Liq.NH_3, Raney Ni, Lindlar's catalyst and Wolf-Kishner reductants.

UNIT III - CARBOHYDRATES

Nomenclature – classification – monosaccharides – epimerization – mutarotation – interconversion of glucose and fructose. Ascending and descending the aldose series (pentoses to hexoses and vice-versa). Structural elucidation of glucose & fructose – configuration. Sucrose – structure (only) – properties and uses.

UNIT IV - AROMATICITY AND ACTIVE METHYLENE GROUP

Aromaticity:

Stability of benzene –Reasonance structure of benzene - Huckel's rule: $(4n+2)\ \pi$ electron rule – annulenes – aromatic, antiaromatic and nonaromatic compounds.

Active methylene group– Malonic and acetoacetic esters: Characteristic reactions of active methylene group, synthetic uses of malonic and acetoacetic ester.

UNIT V - NAME REACTIONS

Aldol, Perkin, Knovenegal, benzoin, Claisen condensation, Cannizaro reaction, Reformatsky reaction, Hoffmann elimination, Michael addition reactions with mechanism.

TEXT BOOKS

1. Soni P.L & Chawla H.M, (2010). : Organic Chemistry , 29th Edition, Sultan Chand & Sons
2. Sanyal S N, (2010): Reactions, Rearrangements and Reagents, Bharati Bhawan Publishers and Distributors, Ranchi.

REFERENCE

1. Meharotra Anirudh Singh R.C., (1991): Organometallic Chemistry, Wiley-Eastern Ltd., New Delhi.

SEMESTER VI

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15602	Coordination and Solid state Chemistry	3	2	0	3
INSTRUCTIONAL OBJECTIVES					
(i)	To understand the principles and rules governing coordinate compounds				
(ii)	To know about the chemistry of biologically important inorganic complexes				
(iii)	To understand the principles of solid state chemistry				
(iv)	To study the chemistry and applications of organometallic compounds				

UNIT I - COORDINATION COMPOUNDS-I

Coordination complexes and complex ions – coordination number - types of ligands.Werner's theory of complexes - Nomenclature of coordination complexes - EAN rule. Isomerism (structural and stereo) in coordination complexes –stability, stability constant and Factors affecting the stability of complexes.Labile and inert complexes.VB theory- applications to some complexes and limitations.

UNIT II - COORDINATION COMPOUNDS-II

Crystal Field theory. Crystal field splitting in octahedral, tetrahedral and square planar fields – factors influencing the magnitude of crystal field splitting –magnetic properties and color of coordination complexes.

UNIT III - BIO-INORGANIC CHEMISTRY

Biologically important coordination compounds - chlorophyll, haemoglobin, vitamin B12 - structure and applications.

UNIT IV - SOLID STATE CHEMISTRY

Introduction-Classification of solids – differences between crystalline and amorphous solids -types of crystal symmetry – interfacial angle —point group – space lattice and unit cell – bravais lattices-seven crystal systems – law of rationality of indices and Miller indices. X-ray diffraction and crystal structure. Bragg's equation– types of crystals – ionic crystals - structure of sodium chloride and CsCl- covalent crystals.

UNIT V - ORGANOMETALLIC CHEMISTRY

Valence electron count (16/18 electron rules). Synthesis and structure of metal carbonyl and nitrosyl compounds.Dinitrogen and dioxygen as ligands in organometallic compounds.

TEXT BOOKS

1. Puri B.R..,Sharma L.R., Kalia K.K., (1993) : Principles of Inorganic Chemistry, 23rd edition, New Delhi, Shoban Lal Nagin Chand & Co.,
2. Lee J.D., (2006): Concise Inorganic Chemistry, Black well science, UK.

REFERENCES

1. K. Hussain Reddy, (2007): Bioinorganic Chemistry,1st Edition, New Age International Publishers.
2. Ajay Kumar Bhagi and Chatwal G.R., (2003): Bio inorganic and supramolecular Chemistry, 1st Edition, Himalaya Publishing House.

SEMESTER VI

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15603	Fundamentals of Spectroscopy	3	0	0	4
INSTRUCTIONAL OBJECTIVES					
(i)	To learn the fundamentals of spectroscopic techniques				
(ii)	To understand the application of spectroscopy for the structural identity of organic molecules				

UNIT I - SPECTROSCOPY I

Interaction of low energy radiation with matter - Electromagnetic radiation - quantisation of energies in molecules (Translational, rotational, vibrational and electronic) – transitions between energy levels in atoms and molecules - Absorption and emission spectra. Boltzman distribution (formula only). Relative population of translational, rotational, vibrational and electronic energy levels .

UNIT II - ELECTRONIC SPECTROSCOPY

Absorption laws, calculations involving Beer – Lambert's law, verification and its limitations. Instrumentation of photocolorimeter and spectrophotometer- block diagram. Types of electronic transitions - chromophores and auxochromes - absorption bands and intensity - factors governing absorption maximum and intensity.

UNIT III - INFRARED SPECTROSCOPY

Principle, types of stretching and bending vibrations, vibrational frequencies, instrumentation- block diagram-IR spectrum of simple compounds.

UNIT IV - NMR SPECTROSCOPY

Principle of nuclear magnetic resonance, basic instrumentation, block diagram. Shielding mechanism, chemical shift, number of signals, splitting of signals - coupling constants - Applications of NMR to simple organic compounds-ethanol.

UNIT V - MASS SPECTROMETRY

Basic principles of mass spectrum, molecular peak, base peak, isotopic peak, metastable peak and their uses, fragmentation – nitrogen rule. Instrumentation - block diagram - mass spectrum of simple organic compounds – alkanes.

TEXT BOOKS

1. Sharma Y. R., (1980.)Elementary Organic Spectroscopy, 1st Edition, Sultan Chand and Sons.
2. Banwell C. N. and Mccash E. M., (2007): Fundamentals of Molecular Spectroscopy, 4th edition. Tata McGraw-Hill Pvt. Ltd.

REFERENCE

1. Puri, B.R Sharma L.R. and Madan S. Pathania, (2006): Principles of Physical chemistry, 43rd edition, Vishal Publishing Co.

SEMESTER VI

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15604	Qualitative analysis of Organic and Preparation of Inorganic Compounds	0	0	5	3
INSTRUCTIONAL OBJECTIVES					
(i)	To enable the students to develop analytical skills in organic qualitative analysis and preparative skills in organic preparations				

SYSTEMATIC ANALYSIS OF MONOFUNCTIONAL ORGANIC COMPOUNDS

Analysis of Simple Organic compounds (a) characterization of functional groups (b) confirmation by preparation of solid derivatives / characteristic color reactions.

Note: Mono –functional compounds are given for analysis. In case of bi-functional compounds, students are required to report any one of the functional groups.

e. Identification of functional groups:

i) Carboxylic acids ii) Phenols iii) Aldehydes iv) Ketones

v) Esters vi) Carbohydrates vii) Amines viii) Amides

ix) Halogen compounds

PREPARATION OF INORGANIC COMPOUNDS

a. Preparation of Prussian Blue
b. Preparation of Tetrammine Copper(II) sulphate tetrahydrate
c. Preparation of Tristhiourea copper (II) sulphate dihydrate
d. Preparation of Potassium trioxalato ferrte (II)
e. Preparation of $CuCl_2$

GENERAL SCHEME FOR DISTRIBUTION OF MARKS IN PRACTICAL EXAMINATION

❖ Aromatic/ Aliphatic	: 10 Marks
❖ Sat/Unsat	: 5 Marks
❖ Element Present	: 5 Marks
❖ Functional group & Derivative	: 10 Marks
❖ Preparation	: 10 Marks
❖ Record	: 10 Marks
❖ Internal	: 50 Marks
Total	**: 100**

REFERENCES

1. Venkateswaran V., Veerasamy R. and Kulandaivelu A.R., (1997): Basic principles of Practical Chemistry, 2nd edition, New Delhi, Sultan Chand & sons.
2. Sundaram, Krishnan, Raghavan, (1996): *Practical Chemistry* (Part III), S. Viswanathan Co. Pvt.
3. Vogel's (1989):Text Book of Quantitative Chemical Analysis. 5th Edition, ELBS/Longman England,.

SEMESTER VI

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15605	Physical Chemistry Practical - II	0	0	5	3

INSTRUCTIONAL OBJECTIVES	
(i)	To understand the principles potentiometry and conductometry.
(ii)	To impart knowledge with respect to the phase transformation of different systems.
(iii)	To get a knowledge about the molecular weight of polymer

LIST OF EXPERIMENTS

1. Precipitation Titration (KCl vs.$AgNO_3$)
2. Conductometric Acid-Base Titration
3. Potentiometric Redox Titration
4. Determination of pH of a buffer solution potentiometrically using quinhydrone electrode
5. Determination of Frendlich adsorption Isotherm
6. Determination of Molecular Weight of Polymer

General scheme for distribution of marks in practical examination

- Principle & table : 10 Marks
- Calculation : 10 Marks
- Procedure : 10 Marks
- Accuracy : 10 Marks
- Record : 10 Marks
- Internal : 50 Marks

Total : 100

REFERENCES

1. Venkateswaran V. Veerasamy R. Kulandaivelu A.R., (1997): Basic principles of Practical Chemistry, 2nd edition, New Delhi, Sultan Chand & sons.
2. Sundaram, Krishnan, Raghavan, (1996): Practical Chemistry (Part III), S. Viswanathan Co. Pvt.,
3. Vogel's(1989): Text Book of Quantitative Chemical Analysis. 5th Edition ELBS/Longman England.

SEMESTER-VI

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15E07	Chemistry in Every Day Life	3	1	0	3
INSTRUCTIONAL OBJECTIVES					
(i)	To know the basics of chemistry in our life				
(ii)	To know about the food colours, Plastics, drugs etc				

UNIT I - GENERAL SURVEY OF CHEMICALS USED IN EVERYDAY LIFE

Cosmetics: Talcum Powder- Tooth pastes- Shampoos- Nail Polish –Perfumes – Soaps and detergents -General formulations and preparation -Possible Hazards of cosmetic use.

UNIT II - FOOD AND NUTRITION

Carbohydrates –proteins -fats- minerals and vitamins- definitions- sources and their physiological importance-balanced diet. Adulterants in milk – ghee – oil -coffee powder – tea –asafoetida - chilli powder -pulses and turmeric powder -identification.

UNIT III - FOOD PRESERVATION

Food preservatives- Definition- examples- methods of preservation-Low and high temperature-dehydration-osmotic pressure-food irradiation -colour chemicals used in food -soft drinks and its health hazards -chemicals in food production -fertilizers used in natural sources –fertilizers- urea- NPK and super phosphates need -uses and hazards. Pesticides –definition and examples.

UNIT IV - FERMENTATION INDUSTRIES

Introduction – industrial alcohol – manufacture of industrial alcohol – Absolute alcohol – manufacture of absolute alcohol – manufacture of beer and wine – manufacture of n-butyl alcohol, Vinegar, and Citric acid**.**

UNIT V - DYES AND COSMETICS

Introduction – sensation of colors – fibers to be dyed – cross dyeing – basic operation of dyeing – formation of dye on the fiber. b) Cottage industrial goods: Preparation of face powder, shampoo, agarbatti, camphor tablets, pain balm, tooth paste, washing powder, detergents, cleaning powder, ink, phenoyl (Black and White) and Wax candles**.**

TEXT BOOKS

1. Poucher, W.A.., Perfumes, Cosmetic and Soaps (Vol 3),10th edition.
2. Vermani, O. P.., A. K. Narula Industrial Chemistry Galgotia Publications Pvt. Ltd., New Delhi.
3. Bagavathi Sundari . K.., (2006): Applied chemistry - MJP Publishers Published by MJP Publishers, New Delhi.
4. Lillian Hoagland Meyer.., (2004) : Food Chemistry , CBS publishes & distributors.

REFERENCES

1. R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry Vikas Publications, New Delhi
2. Jayashree Ghosh : Fundamental concepts of Applied Chemistry, S.Chand & Co Ltd., New Delhi.

SEMESTER-VI

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15E08	Agricultural and Leather Chemistry	3	1	0	3

INSTRUCTIONAL OBJECTIVES	
(i)	To understand the basic concepts and importance of agriculture
(ii)	To gain a knowledge for analyzing, cultivate and promote agricultural methods
(iii)	To acquire knowledge about different types of pollution, control measures and treatment methods.

UNIT I - SOIL CHEMISTRY

Introduction - Formation of Soil. Classification of soil and properties of soil - soil Acidity - Causes of acidity - soil alkalinity - determination of soil pH - Buffering of soils - Amending the soil - Reclamation of acid soil - Liming agents.

UNIT II - SOIL FERTILITY AND PRODUCTIVITY

Organic Manures - Farmyard Manure - Compost - Oil cakes - Bone meal - Meat meal - Fish meal - Blood meal and green Manures - Fertilizers - Classification of fertilizers - Requisites of a good fertilizers - Nitrogenous fertilizers - Phosphatic fertilizers - super Phosphate of lime - Triple super phosphate - NPK fertilizers - ill effects of fertilizers - effect of mixed fertilizers on soil pH - Micronutrients - role of micronutrients sources - Need for nutrient balance - Soil management and Micronutrients needs.

UNIT III - PESTICIDES

Classification of Insecticides - Stomach poisons - Contact poisons and Fumigants - Insecticides - Organic Insecticides - DDT - Gammexane - Malathion - Parathion - Fungicides - Herbicides - Rodenticides - Pesticides in India - Adverse environmental effects of pesticides.

UNIT IV - LEATHER CHEMISTRY

Introduction - Constituents of Animal Skin - Preparing skins and hides - Cleaning and soaking - Liming and degreasing - Manufacture of Leather - Leather Tanning - Vegetable Tanning - Chrome Tanning and Mineral Tanning - Dyeing and Fat liquoring - Leather finishing - oil tanning - by products.

UNIT V - POLLUTION

Tannery effluents - Pollution and its control - Water pollution and Air pollution - waste management - primary, secondary - tertiary treatment - pollution prevention.

TEXT BOOKS

1. Industrial chemistry by B.K. Sharma. Goel Publishing House, Meerut.
2. Applied chemistry by K.Bagavathi - Sundari, MJP Publishers.
3. Fundamental concept of Applied chemistry by Jayashree Ghosh, S. Chand & Company Ltd.,
4. Chemical treatment of hides a leather by J. Partridge Noyes, Park Ridge, N.J
5. Agricultural Chemistry Vol I & Vol II edited by B.A. Yagodin - New Century books (P) Ltd.,

REFERENCES

1. Soils and soil fertility - Louis M.Thompson - and Frederick. R.Troch - Tata Mc Graw hill.
2. Text book of soil science - T.D. Biswas and S.K. Mukerijee - II Edition.
3. Fundamental of leather science - wood roffe.

SEMESTER VI

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
UCY15E55	PROJECT	0	0	1	1

B.Sc projects should be socially relevant and research oriented ones.
Each student is expected to do an individual/Group project.
The project internally will be evaluated by the concerned guide.
*Skill Based course
The method of assessment

Assessment Tool weightage
Internal - 50 Marks
External - 50 Marks

SEMESTER VI

Subject Code	Title of the Subject	CREDITS			
		L	T	P	C
CDC15601	Personality Development	2	0	0	2

INSTRUCTIONAL OBJECTIVE

(i) **At the end of this course, the students will be able to,**
- Understand the concept of Personality Development
- Summarize the principles of proper courtesy as practiced in the workplace

COURSE REQUIREMENT : At the end of every unit, the students will be expected to submit an assignment or make a presentation as a part of internal assessment.

UNIT I- INTRODUCTION

Personality –Definition, Determinants of Personality-Personality Characteristics and Behaviour at work-Big Five dimensions of Personality

UNIT II - PERSONALITY TYPES

Sensation –Intuitive- Feelers & Thinkers category - Filling the GAP- Grooming, Attitude and Personality- Time management-Projective Personality Tests.

UNIT III - INTRODUCTION

Meaning and Definition of Ethics- Nature and OBJECTIVES of Ethics- Ethics and Morality – Ethics and Religion - Morals, Values and Ethics – Integrity – Work Ethic – Honesty – Courage –Empathy – Self-Confidence – Character .

UNIT IV - ETHICAL THEORIES

Classification- Basic Moral theories –Peace – Justice **Ethical Decision Making**- Structure-competence in professional ethics- How to use ethical reasoning-approaches and methods of resolving ethical dilemmas

UNIT V - DEVELOPMENT OF ETHICAL CORPORATE BEHAVIOUR

Factors affecting managerial work-codes of ethics- Importance of attitudes in personal and professional lives.

TEXT BOOKS

1. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.
2. Elizbeth Hurlock, Personality Development, McGraw Hill, 4th Edition, 2007.

REFERENCES

1. Stephen P. Robins, Organisational Behavior, PHI Learning / Pearson Education, 15th edition, 2012.
2. Subramaniam.R , Professional Ethics, Oxford Publication, 2013