G.T.N. ARTS COLLEGE(Autonomous)

Dindigul

(Affiliated to Madurai Kamaraj University)
(Accredited with 'B' Grade by NAAC)

DEPARTMENT OF CHEMISTRY SYLLABUS

(With effect from the academic year 2017 – 2018)

PRINCIPAL

Dr. N.Krishnamoorthy, M.Com., M.B.A., M.Sc., M.Phil., M.Ed., PGDCA., PGDFM., Ph.D.,

STAFF

1. **Dr. J.Sathiyabama, M.Sc., M.Phil., B.Ed., Ph.D., - Associate Professor and Head**
2. **Dr. G.N Kousalya, M.Sc., M.Phil., Ph.D., - Assistant Professor**
3. **Mr. T.Srinivasan, M.Sc., M.Phil., B.Ed., - Assistant Professor**
4. **Mr. S. Kannan, M.Sc., M.Phil., B.Ed., - Assistant Professor**
5. **Dr. A.Sahaya Raja, M.Sc., M.Phil.,B.Ed., Ph.D., - Assistant Professor**
6. **Dr.M.Pandeeswaran, D.S.I., M.Sc., Ph.D., - Assistant Professor**

G.T.N. ARTS COLLEGE (Autonomous), DINDIGUL

SYLLABUS FOR B.Sc., (Chemistry) UNDER CBCS

(With effect from the academic year 2017 – 2018)

1. OBJECTIVES:

The Syllabus for B.Sc., Chemistry degree under semester system has been designed on the basis of Choice Based Credit System (CBCS), which would focus on job oriented programmes and value added education. It will be effected from June 2017 onwards.

2. ELIGIBILITY:

A pass in +2 examination conducted by the Board of Higher Secondary Education, Government of Tamilnadu with Chemistry, Physics & Mathematics Or Biology/Botony/Zoology OR any other examination accepted by the Governing Body, as equivalents thereto are eligible to join this course.

3. DURATION OF THE COURSE**:**

The students who are joining the B.Sc., (Chemistry) degree shall undergo a study period of three academic years – Six semesters.

4. SUBJECTS OF STUDY AND SCHEME OF EXAMINATION:

The subjects offered in major Chemistry for six semesters and the scheme of examination are given .

5. QUESTION PAPER PATTERN:

The Internal and External marks is 25 : 75

EXTERNAL:

The pattern of Question Paper will be as follows:

Time: 3 Hours Max Marks: 75

SECTION – A [10 x 1 = 10 marks]

Question No: 1 to 10

1. Two questions from each unit
2. Four choices in each question
3. No ‘none of these ‘choice

SECTION – B [5 x 7 = 35 marks]

Question No: 11 to 15

1. Answer all questions choosing either (a) or (b)
2. Answers not exceeding two pages
3. One question from each unit

SECTION – C [3 x 10 = 30 marks]

Question No: 16 to 20

1. Answer any three out of five questions
2. Answers not exceeding four pages
3. One question from each unit

Note: There must be at least one problem in Section B and Section C

INTERNAL:

The pattern for internal valuation will be

1. Two tests – 15 marks each: average 15 marks
2. Group Discussion / Seminar / Quiz – 5 marks
3. Two Assignments – 5 marks each: average 5 marks
4. Third test may be allowed for absentees of anyone of the two tests
5. For Quiz, two quizzes should be conducted

Blue Print of the Question Paper (External)

Maximum Marks: 75

Sections	Types of questions	No. of questions	No. of questions to be answered	Marks for each question	Total Marks
A	Multiple Choice : Two questions from each unit	10	10	1	10
B	Not exceeding two pages (either or type) : One question from each unit *	5	5	7	35
C	Not exceeding four pages (any three out of five) : one question from each unit	5	3	10	30

- There must be at least one problem in Section – B and Section – C

6. There will be TWO Allied subjects to fulfill the course during three years.

Subject	Maximum Marks	Year of Study
Mathematics / Zoology	600	I and II
Physics	600	II and III

The syllabus for the Allied subjects can be got from the Allied Department of Mathematics, Zoology and Physics

7. PRACTICALS:

Record Note Book : 10 marks
Internal : 30 marks
External examination : 60 marks
Total : 100 marks

8. ELIGIBILITY FOR THE DEGREE:

(i) A candidate will be eligible for the B.Sc., (Chemistry) degree by completing three years (six semesters) and passing all the prescribed examinations.

(ii) A candidate shall be declared as passed the course, if he / she scored a minimum of 40 % marks in each paper of all the subjects.

Courses studied by B.Sc., Chemistry students:

(Chemistry students study Mathematics / Zoology and Physics as Allied I and Allied II respectively)

G.T.N ARTS COLLEGE (AUTONOMOUS), DINDIGUL-624005
Choice Based Credit System for B.Sc Chemistry
SCHEME OF EXAMINATION
(For those joined in June 2017 and after)

B.Sc., Chemistry – Semester – I

Part	Study Component	Course Code	Course Title	Hours	Credit	Internal marks	External marks	Total
I	Tamil/Other languages	17UTAL11	Ikkala ilakkiyamum punaikadhaium	6	3	25	75	100
II	English	17UENL11	English For Enrichment-I	6	3	25	75	100
III	Core Course - I	17UCHC11	Inorganic Chemistry - I	4	4	25	75	100
	Core Practical - I	17UCHC2P	Inorganic Semi micro Qualitative Analysis	2	-	-	-	-
	Allied Course - I	17UMAA11 /17UZOA11	Allied Mathematics paper – I/ Invertebrata	6/4	5/4	25	75	100
	Allied Practical -I	17UZOA2P	Invertebrata and Chordata practical	2	-	-	-	-
IV	Skill Based Course - I	17UCHS11	Sugar Technology	2	2	25	75	100
	Skill Based Course - II	17UCHS12	Perfume Chemistry	2	2	25	75	100
IV	Non-Major Elective	17UCHN11	Industrial Chemistry	2	2	25	75	100
V	Physical Education	17UPEV21	Physical Education	-	-	25	75	100
			Total	30	21/20			

B.Sc., Chemistry – Semester – II

Part	Study Component	Course Code	Course Title	Hours	Credit	Internal marks	External marks	Total
I	Tamil/Other	17UTAL21	Idaikala ilakkiyamum	6	3	25	75	100

	languages		puthinamum					
II	English	17UENL21	English For Enrichment-II	6	3	25	75	100
III	Core Course - II	17UCHC21	Organic Chemistry – I	4	4	25	75	100
	Core Practical - I	17UCHC2P	Inorganic Semi micro Qualitative Analysis	2	2	40	60	100
	Allied Course - II	17UMAA21 / 17UZOA21	Allied Mathematics paper – II/ Chordata	4	2/4	25	75	100
	Allied Course - II/Allied Practical -I	17UMAA22 / 17UZOA2P	Allied Mathematics Paper – III/ Invertebrata and Chordata practical	2	2/1	25/40	75/60	100
IV	Skill Based Course - I	17UCHS21	1.Food and nutrition chemistry	2	2	25	75	100
	Skill Based Paper - II	17UCHS22	2. Paper and Pulp Technology	2	2	25	75	100
IV	Non-Major Elective	17UCHN21	Drugs and Cosmetics	2	2	25	75	100
V	Physical Education	17UPEV21	Physical Education	-	1	25	75	100
			Total	30	23/24			

B**.Sc., Chemistry – Semester – III**

Part	**Study Component**	**Course Code**	**Course Title**	**Hours**	**Credit**	**Internal marks**	**External marks**	**Total**
I	Tamil/Other languages	17UTAL31	Kaapiya ilakkiyamum Nadagamum	6	3	25	75	100

II	English	17UENL31	English For Enrichment-III	6	3	25	75	100
III	Core Course - III	17UCHC31	Physical Chemistry – I	4	4	25	75	100
	Core Practical II	17UCHC4P	Volumetric Analysis	2	-	-	-	-
	Allied Course - III	17UMAA32/ 17UZOA31	Allied Mathematics Paper – IV/Micro Biology, Cell Biology, Genetics, Molecular Biology and Biotechnology	6/4	5/4	25	75	100
	Allied Course - I	17UPHA11	Mechanics, Properties of Matter and Sound	4	4	25	75	100
IV	Allied Practical - II	17UZOA4P	Micro Biology, Cell Biology, Genetics, Molecular Biology, Biotechnology and Developmental Biology practical	2	-	-	-	-
	Allied Practical - I	17UPHA2P	Allied Physics practical – I	2	2	-	-	-
Total				30	19/18			

B**.Sc., Chemistry – Semester – IV**

Part	**Study Component**	**Course Code**	**Course Title**	**Hours**	**Credit**	**Internal marks**	**External marks**	**Total**
I	Tamil/Other languages	17UTAL41	Palanthamilum ilakkiyamum urainadaum	6	3	25	75	100
II	English	17UENL41	English For Enrichment-IV	6	3	25	75	100

III	Core Course - IV	17UCHC41	Inorganic Chemistry – II	4	4	25	75	100
	Core Practical II	17UCHC4P	Volumetric Analysis	2	2	25	75	100
	Allied Course-IV	17UMAA42/ 17UZOA41	Allied Mathematics Paper – V/ Developmental biology, Bio Chemistry, Physiology, Immunology and Evolution	4	2/4	25	75	100
	Allied Course - II	17UPHA21	Thermal Physics	4	4	25	75	100
	Allied Practical -I	17UPHA2P	Allied Physics practical – I	2	1	40	60	100
IV	Allied Course -VI / Allied Practical II	17UMAA43/ 17UZOA4P	Allied Mathematics Paper – VI/ Micro Biology, Cell Biology, Genetics, Molecular Biology, Biotechnology and Developmental Biology practical	2	2/1	25/ 40	75/ 60	100
IV	Extension Activities	17UEX4SC	Extension activities	-	1	-	-	100
			Total	30	22/23			

B**.Sc., Chemistry – Semester – V**

Part	Study Component	Course Code	Course Title	Hours	Credit	Internal marks	External marks	Total
	Core Course - V	17UCHC51	Organic Chemistry – II	4	4	25	75	100
	Core	17UCHC5	Physical	4	4	25	75	100

	Course - VI	2	Chemistry – II					
III	Core Course - VII	17UCHC53	Inorganic, Analytical and Applications of Computers in Chemistry	4	4	25	75	100
	Core Practical - III	17UCHC6P	Gravimetric Analysis and Organic Preparation	3	-	-	-	-
	Core Practical - IV	17UCHC6Q	Organic Analysis and Estimation	3	-	-	-	-
	Core Practical - V	17UCHC6R	Physical Chemistry Experiments	3	-	-	-	-
	Allied Course - III	17UPHA31	Electricity and Electronics	4	4	25	75	100
	Allied Practical - II	17UPHA4P	Allied Physics practical – II	2	-	-	-	-
IV	Elective	17UCHE51/ 17UCHE52	Pharmaceutical & Medicinal Chemistry/ Nanoscience and Technology	2	2	25	75	100
V	Environmental studies	17UESV51	Environmental studies	2	2	25	75	100
Total				31	20			

B.**Sc., Chemistry – Semester – VI**

Part	Study Component	Course Code	Course Title	Hours	Credit	Internal marks	External marks	Total
III	Core Course - VIII	17UCHC61	Organic Chemistry – III	4	4	25	75	100
	Core Course - IX	17UCHC62	Physical Chemistry – III	4	4	25	75	100
	Core Coure - X	17UCHC63	Applied Chemistry -III	4	3	25	75	100
	Core Practical - III	17UCHC6P	Gravimetric Analysis and Organic Preparation	3	5	40	60	100
	Core Practical - III	17UCHC6Q	Organic Analysis and Estimation	3	5	40	60	100
	Core Practical - III	17UCHC6R	Physical Chemistry Experiments	3	5	40	60	100
	Allied Course - IV	17UPHA41	Optics and Spectroscopy	4	4	25	75	100
	Allied Practical - II	17UPHA4P	Allied Physics practical – II	2	1	40	60	100
IV	Elective	17UCHE61 / 17UCHE62	Medical Laboratory Technology & Bio Chemistry/Analytical Chemistry	2	2	25	75	100
V	Value Education	17UVEV61	Value Education	2	2	25	75	100
			Total	31	35			

CERTIFICATE COURSES/DIPLOMA COURSES/ALLIED COURSES

S.No	Semester	Course Code	Course Title	Hrs per cycle	Credit	Internal marks	External marks	Total
1	V	17CCHE51	Certificate course in Dairy Technology-I	30	1	25	75	100

2	VI	17CCHE61	Certificate course in Dairy Technology-II	30	1	25	75	100

Summary of credits and marks

Part	Study Component	Total Credits	Total Marks
I	Tamil/Other Languages	12	400
II	English	12	400
III	Core Papers , Elective Courses & Allied Courses	98	2900
IV	Skill Based Courses, NME, EVS & Value Education	16	1600
V	Physical Education & Extension Activities	2	200
Grand Total		140	5500

G.T.N ARTS COLLEGE, (Autonomous) DINDIGUL

SYLLABUS FOR B.Sc., (Chemistry) UNDER CBCS

(With effect from the academic year 2017 – 2018)

Course Title: ,f;fhy ,yf;fpaKk; GidfijAk; Semester : 1

Course Code : 17UTAL11 Part : I Contact Hours /Week : 6 Credit : 3

Nehf;fk;

,f;fhyf; ftpij> rpWfij> Gjpd tiffis mwpKfk; nra;jy;> ,f;fhy ,yf;fpaq;fspd; topg; GydhFk; fUj;Jf;fisg; ngwr; nra;jy;>gad;ghl;Lj; jkpo; ,yf;fzj;ij mwpar; nra;jy;.

gad;

ftpij> rpWfij gilf;Fk; Mw;wy; ngWjy;> r%f czHT+l;Lk; gilg;Gfis mwpe;J fw;wy;.

$W 1 kuGf;ftpijfs; 20 kzp

Neuk;

ghujpahH fz;zd; vd; Nrtfd; - ghujpjhrd; njhopyhsH tpz;zg;gk; - ftpkzp ciuf;f Ntz;Lk; - gl;Lf;Nfhl;il fy;ahz Re;juk; kdpjdhf tho;e;jpl Ntz;Lk; - fz;zjhrd; xU ghidapd; fij - Kbaurd; ahH ftpQd;.

$W 2 GJf;ftpijfs; 20 kzp

Neuk;

e.gpr;r%Hj;jp Mj;J}ud; %l;il – eh.fhkuhrd; fhfpjg;G+f;fs; – K.Nkj;jh vd;Dila tpLKiw ehs; – mg;Jy; uFkhd; Mwhj mwpT – ituKj;J Ie;J nghpJ MW rpwpJ – kPuh neQ;Nr! epy;! epy;! – ghyh thdk; trg;gLk; – ney;iy n[ae;jh njhg;Gs; nfhb – ckh kNf];thp Rak; – i`f;$ ftpijfs;.

$W 3 rpWfijfs; 20 kzp

Neuk;

GJikg;gpj;jd; rhg tpNkhrdk; – F.g.uh[Nfhghyd; cz;ikf;fij –F.mofphprhkp uh[h te;jpUf;fpwhH – fy;fp fbjKk; fz;zPUk; – n[afhe;jd; Af re;jp – mz;zh nrt;thio – fp.uh[ehuhazd fjT.

$W 4 ,yf;fzk; 15 kzp

Neuk;

KjnyOj;Jf;fs; – rhHngOj;Jf;fs; – nkhop Kjy; vOj;Jf;fs; – nkhop ,Wjp vOj;Jf;fs; – ty;nyOj;J kpFk; ,lq;fs; – ty;nyOj;J kpfh ,lq;fs;.

$W 5 ,yf;fpa tuyhWk; gad;ghl;Lj;jkpOk; 15 kzp

Neuk;

20 Mk; Ew;whz;;;;;;;;;by; kuGf;ftpijapd;; tsHr;rp – GJf;ftpijapd; Njhw;wKk; tsHr;rpAk; – rpWfijapd; Njhw;wKk; tsHr;rpAk; – kuGg;gpio ePf;Fjy; – gpwnkhopr; nrhw;fis ePf;Fjy; – XnuOj;J xU nkhopfs; – xyp NtWghLfSk; nghUs; NtWghLfSk;

ghlE}y;

1. R[hjh .rh (njh.M).> (2017)> “*,f;fhy ,yf;fpaKk; GidfijAk*”;> epA+ nrQ;Rhp Gf; `T]; (gp) ypl;.> nrd;id.

ghh;it E}y;fs;

1. rptj;jk;gp.fh.> (1978)> “*jkpopy; rpWfijapd; Njhw;wKk; tsHr;rpAk”*;> jkpo;g; Gj;jfhyak;> nrd;id.
2. Rg;Gnul;bahu;.e.> (1982)> “*fz;zd; ghl;Lj;jpwd;> rHNthja ,yf;fpag; gz;iz”*> kJiu
3. jz;lghzp NjrpfH.r.> (2008)> “*ed;D}y; tpUj;jpAiu*”> rhujh gjpg;gfk;> nrd;id.

4. ty;ypf;fz;zd;.> (2011)> “*GJf;ftpijapd; Njhw;wKk; tsHr;rpAk*;”> rPijg; gjpg;gfk;> nrd;id.

Course Title: English for Enrichment - I

Semester : 1

Course Code : 17UENL11 Part : II Contact Hours /Week : 6 Credit : 3

Objectives

To teach language through Literature and to enable students to learn and imbibe good values of life gained from Literature.

Unit I – Poetry

18 Hours 1

1. D.H.Lawrence -Snake
2. Wole Soyinka -Telephone Conversation
3. John Milton -On His Blindness
4. Shelley - Ozymandias

Unit II – Prose

18 Hours

1. Abraham Lincoln - Letter to his son's Headmaster
2. Stephen Leacock -With the Photographer
3. W.R. Inge -Spoon Feeding
4. Martin Luther king - I have a Dream

Unit III - Short Stories

18 Hours

1. Rev. G.W.Cox - Orpheus and Eurydice
2. Flora Annie Steele -Valiant Vicky
3. Guy De Maupassant -The Wedding Gift
4. R. K. Narayan - Engine Trouble

Unit-IV-Grammar

18 Hours

1. Noun, Pronoun, Verb, Adjective
2. Adverb, Preposition, Conjunction, Interjection
3. Transitive & Intransitive Verb
4. Articles

Unit-V-Composition

18 Hours

1. Letter Writing
2. Precis Writing
3. Reading Comprehension
4. Advertisement

Text Book

1. Sudha, A.D and Kavitha R., (Eds.). "*English for Enrichment I",* Chennai, New Century Book House, 2018

Reference Books

1. Radhakrishna Pillai, G.*,* (1990), *"Emerald English Grammar and Composition",* Chennai, Emerald Publication.
2. Green David, (2015), "*Contemporary English grammer structures and compositions*", Maemillen India Limited, Chennai.

3. Nesfield, J.C. English grammer, (2004), “composition and usage”, Maemillen, Chennai:.

Course Title: Inorganic Chemistry-I

Semester : 1

Course Code : 17UCHC11 Part : III Contact Hours /Week : 4 Credit : 4

Objectives

To understand the laboratory hygiene and safety, Principles and techniques of semi micro methods, the basic concepts needed for understanding Periodicity, the Lattice energy of ionic compounds and the position of halogens in the periodic table and its preparation, uses.

Unit I **14 Hours**

A. Laboratory hygiene and safety – Storage and handling of chemicals – Carcinogenic chemicals – Toxic and poisonous chemicals – Waste disposal – Fume disposal – General precautions for avoiding accidents – First aid techniques – Poisoning – methods to avoid poisoning – Treatment for specific poison laboratory safety measures.

B. Principles and techniques of semi micro methods – Aims of semi micro qualitative analysis – Types of reactions involved in qualitative analysis – Dry reactions – Precipitation reactions – applications of solubility product principle in qualitative analysis – Complexation reaction – Oxidation and reduction reactions – Spot tests – Preparation of solution for cation testing on semi micro scale – Removal of interfering ions in the analysis of cations – Oxalate, tartrate, borate, fluoride, chromate, phosphate and arsenite.

C. Oxidation – reduction : Concepts of oxidation – reduction in terms of oxidation number – calculation of oxidation number – redox reactions – half reactions–Balancing ionic equations by ion-electron method (half reaction) – Reactions involving – $Cr_2O_7^{2-}$ and Fe^{2+} - MnO_4^- and Fe^{2+} - $Cr_2O_7^{2-}$ in acid medium – CrO_4^{2-} and SO_3^{2-}.

Unit II **10 Hours**

Periodicity of properties – cause of periodicity – atomic and ionic radii-electron affinity-ionisation energy – electronegativity – Pauling and Mulligan scale – Allred and Rochow‘s sclae – factors affecting the magnitude of electronegativity – application of electronegativity.

Unit III **14 Hours**

Chemical bonding – valence bond approach – types of overlapping and orbital diagrams – sigma and pi bonds. Hybridization and geometry of molecules – sp. sp^2, sp^3, sp^3d and d^2sp^3 hybridization with example, VSEPR theory – shapes of molecules – molecular ortibal theory – Bonding and antibonding orbitals relative order of energies of molecular orbitals – MO theory applied to homonuclear molecules – H_2 O_2, F_2 and Cl_2 – heteronuclear molecules – HF, CO and NO – comparative study of VB and MO theories.

Unit IV **11 Hours**

Lattice energy of ionic compounds – Definitions – Experimental determination of lattice energy – Born Haber cycle – Explanation of some properties of ionic crystals on the basis of lattice energy – Fajans rule – van der waals forces – Ion-ion, ion-dipole interactions.

Unit V **11 Hours**

Halogens – position of halogens in the periodic table – anomalous behaviour of fluorine – modern method of isolation of fluorine – perchloric acid - Potassium perchlorate. Oxides and oxy acids of bromine - periodic acid – preparation - properties – uses – inter halogen compounds – polyhalides – pseudohalogens.

Text Books

1. Puri. B.R., Sharma. L.R., and Kalia. K.C, (2016), "*Text Book of Inorganic Chemistry*", Milestone publishers, Delhi.
2. R.D.Madan,(2013), "*Modern Inorganic chemistry*", Latest Edition
3. Puri, Sharma and Kalia,(2013), "*Principles of Inorganic Chemistry*", Sulthan Chand, New Delhi

Reference Books

1. Lee. J.D, (2011), "*Concise Inorganic Chemistry*", Wiley India Private Limited, New Delhi.
2. Puri, Sharma and Kalia, (2009), "*Principles of Inorganic Chemistry*", Sulthan Chand,New Delhi
3. Arthur, I., Vogel, (2008), "A text book of quantitative inorganic analysis", Latest Edition.

Course Title: Allied Mathematics **- I**

Semester: 1

Course Code: 17U MAA11 Part : III Contact Hours /Week :6 Credit : 4

Objectives

The aim of this course is to understand the fundamental concepts of Algebra and Analytical Geometry of three dimensions. Also to introduce the Fundamentals of Trigonometry and Calculus.

Unit I **6 Hours**

Algebra Introduction – Formation of Equations - Relation between the roots and the Coefficients.

Unit II **6 Hours**

Differential calculus Curvature – Formula for radius of curvature – Evolutes - Centre and Circle of curvature.

Unit III **6 Hours**

Integral Calculus Evaluation of Definite Integrals - Reduction Formulae for $\sin^n x$, $\cos^n x$, $\tan^n x$, $\sec^n x$, $\cot^n x$, $\operatorname{cosec}^n x$ and $\sin^m x \cos^n x$ and simple problems.

Unit IV **6 Hours**

Trigonometry Expression for **sin n, cos n & tan n**- Expansion of **sin, cos & tan** in powers of **-** Hyperbolic Functions – Logarithm of complex numbers.

Unit V **6 Hours**

Analytical Geometry of Three Dimensions Direction cosines - direction ratios of a line-angle between two straight line –Equation of a plane - Equation of Straight line - Angle between a plane and a line – Co-planar lines – Shortest distance.

Text Book

1. Dr. Arumugam. S, June, (2002), “Ancillary Mathematics paper-I”, New Gamma Publications, Palayamkottai.

Reference Books

1. Manickavasagam Pilai. T.K. & Narayanan S., (2015), “*Calculus, Volumes I & II*”, Publishers, S.Viswanathan.
2. ManickavasagamPillai.T.K & Narayanan. T., (2002), “*Analytical Geometry of Three Dimensions and Vector Calculus*” Viswanathan Publishing Company.
3. Manickavasagam pillai.T.K & Narayanan, (2011), “*Algebra Volume I and Trigonometry*”, S.Viswanathan Publications.

Course Title: Invertebrata Semester : 1

Course Code : 17UZOA11 Part : III Contact Hours /Week :4 Credit : 4

Objectives

To cater basic knowledge in animal diversity, classification, nomenclature, characteristics of different phyla and structure and functions organ systems in invertebrates.

Unit I Taxonomy and Protozoa: 12 Hours

Outline classification and nomenclature - General characters of Phylum Protozoa (10 points) **Amoeba - Type study**- External morphology, Nutrition, Locomotion, excretion and reproduction (Binary fission) - Plasmodium: Life history and transmission.

Unit II Porifera and Coelenterata: 12 Hours

General characters of phylum Porifera and Coelenterata - **Obelia - Type study**-Structural organization of Obelia colony, Medusa and Life cycle of Obelia (Metagenesis) - Canal system of Sponges - Coral reef – Types, formation and significance.

Unit III Platyhelminthes and Nematoda: 12 Hours General characters of Platyhelminthes and Nematoda - **Fasciola- Type study**- External characters, Excretion, Reproduction and Development (Lifecycle) - **Filarial Worm:** Life history and transmission - Parasitic adaptations of helminthes worms.

Unit IV Annelida and Arthropoda: 12 Hours

General characters of Annelida and Arthropoda - **Earth worm - Type study**. External Morphology, Digestive system, Nervous System - Peripatus and its affinities - Pest and pest control: Pest of Paddy- *Leptocorisa varicornis*, Triporeyaincertulas - Pest of Coconut-Oryctes rhinoceros, Rhyncophorus

Unit V Mollusca and Echinodermata

12 Hours

General characters of Mollusca and Echinodermata - **Star fish – Type Study** External Morphology, Water vascular System, Reproduction and Development - **Oyster Culture:** Structure of edible oyster-types of culture and its food value - Economic importance of Mollusca

Text book

1. Nair, N. C., Leelavathy, S., Soundara Pandian, N., Murugan, T., Arumugam, N. A., (2010) "*Text Book of Invertebrata*", Saras Publication, Kottar, Nagercoil.

Reference Books

1. Dhami P.S. and Dhami, J. K., (2003), "*Invertebrate Zoology*", R. Chand and Company, New Delhi.
2. Ekambaranatha Ayyer, M and Ananthakrishna, T. M., (2003), "*Manual of Zoology*", Viswanathan Publishers , Chennai.
3. Jordon, E. L. and Verma P.S., (2005), "*Invertebrate Zoology*", R. Chand and Company, 7361, Ram nagar, New Delhi – 110 055; ISBN 81-219 - 0367.

Course Title: Sugar Technology

Semester : 1

Course Code : 17UCHS11 Part : IV Contact Hours /Week :2 Credit : 2

Objectives

To understand the various steps involved in sugar manufacturing and to learn the testing and estimation of Sugar and its applications

Unit I **6 Hours**

Sugar Industry in India – Sugarcane and Sugar Beet – Manufacture of cane sugar.

Unit II **6 Hours**

Extraction of Juice – Concentration – Separation of crystals – Recovery of glucose from molasses Defection.

Unit III **6 Hours**

Sulphitation and carbonation – Testing and Estimation of Sugar

Unit IV **6 Hours**

Double Sulphitation Process, Double Carbonation

Unit V **6 Hours**

Preparation of Alcohol from Molasses, Preparation of Absolute Alcohol Manufacture of Wine, Beer, Methylated Spirit, Power Alcohol.

Text Book

1. Sharma B.K., (2016), "*Industrial Chemistry (Including Chemical Engineering)*", 16th Revised and Enlarged Edition, Goel Publishing House, Meerut

Reference Books

1. Sharma B.K., (2016), "*Industrial Chemistry (Including Chemical Engineering)*", 16th Revised and Enlarged Edition, Goel Publishing House, Meerut
2. Bhal Arun, (2016), "*Advanced Organic Chemistry*", Sulthan Chand and Company Limited, New Delhi.
3. Jain P.C, (1976), "*Engineering Chemistry*", Dhanpat Rai Publishing Company Private Limited.

Course Title**:** Perfume Chemistry

Semester : 1

Course Code: 17UCHS12 Part : IV Contact Hours /Week :2 Credits : 2

Objectives

To understand the various Process involved in the Perfume Chemistry and the Chemical Composition of Perfume

Unit I **6 Hours**

Introduction – Esters – Esters of benzyl alcohol, Esters of cinnamic acid, Methyl Cinnamate and Ethyl Cinnamate.

Unit II **6 Hours**

Alcohols – Citronellol –Terpineols, Linalool,Geraniol,Citral and Nerol – Ketones – Civetone-Muscone-Ionones-α,β and γ ionones –Nitromusks.

Unit III **6 Hours**

Aldehydes – Vanillin –Cinnamic Aldehyde-Anisaldehyde – Diphenyl Methane-Heliotropin.

Unit IV **6 Hours**

Production of natural Perfumes - Flower perfumes - Jasmine – Lily - Orange blossom – Rose.

Unit V **6 Hours**

Artificial flavours - -Banana Compounds – Grape Compounds, Apple compounds and Pine apple compounds.

Text Book

1. Sharma B.K., (2016), "*Industrial Chemistry (Including Chemical Engineering)*", Goel Publishing House, 16th Revised and Enlarged Edition.

Reference Books

1. Sharma B.K., (2016), "*Industrial Chemistry (Including Chemical Engineering)*", 16th Revised and Enlarged Edition, Goel Publishing House, Meerut
2. Bhal Arun, (2016), "*Advanced Organic Chemistry*", Sulthan Chand and Company Limited, New Delhi.
3. Jain P.C., (1976), "*Engineering Chemistry*", Dhanpat Rai Publishing Company Private Limited.

Course Title**:** English For Better Life -I

Semester : 1

Course Code : 17UENN11 Part : III Contact Hours /Week :2 Credit : 2

Objectives

To enable the students to converse freely in English and deliver public speech effectively
and to facilitate the students to be placed in suitable jobs

Unit I **6 Hours**

Self Introduction
Questioning and Answering

Unit II **6 Hours**

Speak for a minute
Extempore
Turn Coat
Debate

Unit III **6 Hours**

Dialogue in Formal Situations
Narrating Stories

Unit IV **6 Hours**

Conversation in Informal Situations
Narrating experiences

Unit V **6 Hours**

Group Discussion, Argument

Text Book

1. Anushya, K. *English for Better Life I* (For Private Circulation)

Reference Books

1. Mohan, Krishna and N.P Singh (2015):*Speaking English Effectively*. Chennai:Laxmi Publications.
2. Jones, Leo(1992). *Activities for Intermediate Students Book*. London: Cambridge University
3. Pillai, G.Radhakrishnan and K. Rajeevan(2002): *Spoken English for You*. Chennai: Emerald Publishers.

Course Title**:** Socio-Religious Reform Movements In Modern India
Semester : 1
Course Code : 17UHIN11 Part : IV Contact Hours /Week :2 Credit : 2

Objectives

To provide historical background of the reform movements, missionaries and depressed class movements in modern India and to enable students to underst and the role played by different social groups and leaders in modern India and the different facets of the Women Liberation movement.

Unit I **6 Hours**

Socio and Cultural awakening in India – Brahmo Samaj- Arya Samaj – Prarthana Samaj – Ramakrishna Misson – Thesophical Society.

Unit II **6 Hours**

Christian Missionaries and their activities – Muslim Reform Movements – Aligarh Movement – Ahamadian Movement.

Unit III **6 Hours**

The Depressed Class Movement – Dr.B.R.Ambedkar – E.V.Ramasamy and Self Respect Movement- Narayana Guru and Ezhava Movement VeerasalingamBandhalu – Jyotirao Phule.

Unit IV **6 Hours**

Emancipation of Indian Women- Rise of Women‘s Organisations – Women Liberation Movements - Dr. Muthulakshmi Reddi – Abolition of Devadasi System.

Unit V **6 Hours**

Social injustice against Women : Dowry System –Female infanticide – Child Marriage – Widows Remarriage – Sexual Harassment.

Text Books

1. Kenneth W Jones, Socio-Religious Reform Movements in British India, Cambridge University Press,1990
2. J.N.Farquhar, Modern Religious Movements in India, Munshiram Manoharlal Publishers Pvt Ltd, 1998

Reference Books

1. Pruthi R.K., Social & Religious Reform Movements in Modern India, Commonwealth Publishers, 2014
2. Rajaraman P.,Glimpses of Social Movements in Peninsular India,Poompozhil Publishers ,2013
3. Bakshi S.R., SocialReformers in India ,Deep and Deep Publications,2002

Course Title**:** Business Accounting
Semester : 1
Course Code : 17UCON11/17UCCN1 Part : IV Contact Hours /Week :2
Credit : 2

Objectives

To familiarize the non-commerce students about the basics of accounting concepts, principles and conventions and to make the students to know about the preparation of Journal, Ledger, Trial Balance and Balance Sheet

Unit I **6 Hours**

Introduction – Book Keeping – Accountancy – Differences – Double Entry System – Merits and Limitations – Differences between Single Entry and Double Entry System – Classification of Accounts – Rules – Users of Accounting information.

Unit II **6 Hours**

Books of Prime Entry – Accounting Equation – Journal – Advantages – Ruling (Simple Problems) .

Unit III **6 Hours**

Subsidiary Books – Objectives – Advantages – Purchases Book – Sales Book – Returns Books – Cash Book – (Simple Problems) Difference between Trade Discount and Cash Discount.

Unit IV **6 Hours**

Books of Final Entry – Ledgers – Advantages – Ruling – (Simple Problems) – Trial Balance – Advantages – Difference between Trial Balance and Balance Sheet – Preparation of Trial Balance from given Ledger Balances.

Unit V **6 Hours**

Final Accounts of Sole Trading Concerns – Adjustments : Outstanding Expenses – Prepaid Expenses – Closing Stock – Depreciation – Bad debts – (Simple Problems) – Cost of Goods Sold.

Note:

40% Theory and 60% Problems

Text Book

1. Inbalakshmi, M, (2015) *"Business Accounting"*, Kalyani Publishers, Ludhiana.

Reference Books

1. Reddy, T.S.&, Murthy,A., (2016) *"Financial Accounting"*, Margham Publications,
Chennai.
2. Tulsian, P.C., (2015) *"Financial Accounting"*, Pearson Education, Ed.7. New Delhi.
3. Jain. S.P., Narang, K.L., (2016) *"Advanced Accountancy"*, Kalyani Publishers, Ludhiana.

Course Title**:** Basic Physics - I Semester : 1
Course Code: 17UPHN11 Part : IV Contact Hours /Week :2 Credit : 2

Objectives

To enable the learners to understand Basics of Units and Dimensions and uses of dimensions,
Types of matter, Change of state, Specific heat capacity and latent heat,Different types of energy with examples and law of conservation of energy,Renewable and nonrenewable energy sources and advantages of renewable energy sources,Basics of law of reflection and refraction and image formation in mirror and lens

Unit I **6 Hours**

S.I. units - measurement of length, mass, time and other physical quantities - Dimension formula for area, volume, density and force - Uses of dimensions

Unit II **6 Hours**

Matter - Solid, liquid, gas and plasma - Applications of plasma - Change of state - Specific heat capacity - Specific Latent heat of ice and steam

Unit III **6 Hours**

Kinds of energy - Mechanical energy, Thermal energy, Optical energy, Sound energy, Electrical energy, Atomic and nuclear energy - Examples - Conservation of energy.

Unit IV **6 Hours**

Renewable and non - renewable energy - Fossil fuel - Coal oil - Solar - Wind - Bio mass – OTEC

Unit V **6 Hours**

Mirror - Laws of reflection - Image formation (Concave and Convex Mirror) - Lens - Laws of refraction - Image formation (Concave and Convex Lens) - Defects of eye and rectification.

Text Book

1. B.V. Narayan Rao, (1998), "*First Year B.Sc., Physics*", New Age International
Private Limited.

Reference Books

1. D.S. Mathur, (2002), "*Mechanics*", Sulthan Chand & Co.
2. D.S. Mathur, (2002), "*Properties of matter*", Sulthan Chand & Co.
3. Brijlal Subramanian, (2006), "*Properties of matter*", Sulthan Chand & Co.

Course Title**:** Fundamentals of Mathematics -I Semester : 1

Course Code : 17UMAN11 Part : IV Contact Hours /Week :2 Credit : 2

Objectives

The aim of this course is to introduce the basic concepts in mathematics which are relevant for students of humanities and arts.

Unit I **6 Hours**

Theory of Matrices –types of matrices –operations on them - Addition, Multiplication of two matrices.

Unit II **6 Hours**

Theory of indices, properties-simple problems –theory of Surds-properties-simplification –simple problems.

Unit III **6 Hours**

Differential calculus –differentiating addition subtraction of two functions – product rule - (Simple problems)

Unit IV **6 Hours**

Logarithms - Logarithms functions – changing the base -simplification– common logarithms.

Unit V **6 Hours**

Set Language- Theory of sets – Venn diagrams – Demorgan ‘s laws-cardinality –power set-simple problems.

Text Book

1. Manoharan .M. Dr. Elango.C and Eswaran K.L, (2007), “*Business mathematics*”, Paramount publications – Bodi

Reference Books

1. Vittal R.R., (2014), “*Business Mathematics*”, Maragam Publications, Chennai.

2. Balakrishnan R., (2010), “*Quantitative Aptitude*”, Pavai Publications.

3. Ranganathan C., (2003), “*Business Mathematics*”, Himalayan publication.

Course Title**:** Human Biology Semester : 1

Course Code : 17UZON11 Part : IV Contact Hours /Week :2 Credit : 2

-------**Objectives**

To provide information regarding nutrition, their deficiency diseases, chromosomal abnormalities, human genome, physiology of vital organs, basic concepts in embryology and applied biology.

Unit I Health and Hygiene 6 hours

Composition of food, Digestion and absorption of food, Balanced diet, Vitamin deficiencies, Calorific value of food, Malnutrition and Obesity, protein deficiency.

Unit II Genetics 6 hours

Sex determination in Man -Chromosomal abnormalities (Down, Turner‘s, Klinefelter‘s syndromes) –Human Blood groups, Eugenics, Euthenics (brief account), Human genome project Objectives and application.

Unit III Physiology 6 hours

Respiration – Structure of lungs, Inspiration and expiration; Blood: Blood Composition; Structure and function of heart, Electrocardiogram (ECG), Blood pressure, Blood urea; Structure of kidney, Nephron and Formation of urine.

Unit IV Embryology 6 hours

Structure of Human sperm and ovum - Menstrual cycle – Menopause – Pregnancy – – Parturition–Twins.

Unit V Applied Biology 6 hours

Infertility, Sperm bank, IVF and types, Artificial insemination, Test tube baby, Birth control and Contraception.

Text Books :

1. Arumugam N., (2008), “*Developmenyal Biology*”, Saras Publications, Kottar – 629002.

2. Arumugam N., Maria Kuttikan, (2013), “*Animal Physiology*”, Saras Publications, Kottar –629002.

Reference Books:

1. Ambika Shanmugam, (2006), “*Biochemistry*”, 10, III Cross Street, West C. I. T. Nagar,
Chennai – 600 035.

2. Balinsky B.I., (2002), “*An Introduction to Embryology*”, W.B. Saunders Co. Philadelphia.

3. Gupta. P.K., (1999), “*Genetics*”, Rastogi Publication, Meerut, ISBN81–7133–413–X.

Course Title**:** Introduction to Physical Education – I

Semester : 1

Course Code : 17UPEN11 Part : IV Contact Hours /Week :2 Credit : 2

Objectives

To educate the History and Rules and regulations of Handball, Football, Volleyball, and Kabaddi.

Unit I **6 Hours**

History and Development of Games – Organization of Games

Unit II **6 Hours**

Handball – Measurements – Ground Marking – Major Rules of the Game

Unit III **6 Hours**

Football – Measurements – Ground Marking – Major Rules of the Game

Unit IV **6 Hours**

Volleyball – Measurements – Ground Marking – Major Rules of the Game

Unit V **6 Hours**

Kabaddi – Measurements – Ground Marking – Major Rules of the Game

Text Book

1. National Council of YMCA, (2011), "*Rules book of Games and Sports*", KK Jacob National Council of YMCA, New Delhi

Reference Books

1. American Sport Education Program, (2011), "*Coaching Volleyball Technical & Tactical Skills*", (Technical and Tactical Skills Series).
2. http://www.kabaddiikf.com/history.htm. Retrieved 2008-04-20, "Origin, History and Development of Kabaddi".
3. U.S. Soccer Federation, (2011), "*Official Rule Book of Soccer*".

SECOND SEMESTER

Course Title**:** ,ilf;fhy ,yf;fpaKk; GjpdKk; Semester : 2
Course Code : 17UTAL21 Part : I Contact Hours /Week :6
Credit : 3

Nehf;fk;

jkpopy; cs;s gf;jp ,yf;fpa tifikfisAk; rpw;wpyf;fpa tifikfisAk; mwpKfk; nra;jy;> Gjpd ,yf;fpaq;fis khzth;fs; mwpe;Jnfhs;sr; nra;jy;> nrhy; ,yf;fzj;ij czh;j;Jjy;

gad;;

.gf;jp rpw;wpyf;fpaq;fshy; fhzyhFk; ftpj;Jtj;ijAk;>r%fNkk;ghl;Lf; fUj;Jf;fisAk; mwpe;Jnfhs;sr; nra;jy;> .Gjpd,yf;fpaj;ijmwpe;Jnfhs;Sjy;> gilg;ghw;wy; jpwidtsh;j;jy;

$W 1 gf;jp ,yf;fpaq;fs; 25 kzp Neuk;

jpUQhdrk;ge;jh; Njthuk; ekr;rpthaj; jpUg;gjpfk; (1 – 5 ghly;fs;) **–** jpUehTf;furh; Njthuk; jpUtpilkUJhh; gjpfk; (Njh;e;njLf;fg;gl;l 5 ghly;fs;) **–** Re;juh; Njthuk; jpUr;Nrhw;Wj;Jiw gjpfk; (1 - 5 ghly;fs;) **–** khzpf;fthrfh; jpUr;rhoy; (1- 5 ghly;fs;) **–** jpUkq;ifMo;thh; nghpajpUnkhop (1 – 5 ghly;fs;) **–** Mz;lhs; ehr;rpahh; jpUnkhop jpUkzf;fdT (1 - 5 ghly;fs;) **–** jpU%yh; jpUke;jpuk; (Njh;e;njLf;fg;gl;l 5 ghly;fs; jhAkhdth; guhguf;fz;zp (1 - 5 ghly;fs;) **–** rptthf;fpahh; rptthf;fpahh; ghly;fs; (Njh;e;njLf;fg;gl;l 5 ghly;fs;).

$W 2 rpw;wpyf;fpaq;fs; 20 kzp Neuk;

jkpo;tpLJhJ gh.vz;. 35 - 44 tiu cs;s 10 ghly;fs; **–** fypq;fj;Jg;guzp fhLghbaJ (1 - 5 ghly;fs;) **–** jpUf;Fw;whyf; FwtQ;rp ehl;L tsk; $Wjy; (1- 5 ghly;fs;) **–** Kf;flw; gs;S gs;spah; Vry; (gh.vz;. 162 -166 5 ghly;fs;) **–** kJiukPdhl;rpak;ik gps;isj; jkpo; tUifg; gUtk; (gh.vz;. 61>63 2 ghly;fs;).

$W 3 Gjpdk; 15 kzp Neuk;

R+h;afhe;jd; - G+h;tPfG+kp

$W 4 ,yf;fzk; 15 kzp Neuk;

ehd;Ftifr; nrhw;fs; - Ntw;Wikfs; - njhifepiyj; njhlh; -njhfh epiyj; njhlh; - tpdhtpil tiffs;

$W : 5 - ,yf;fpatuyhWk; gad;ghl;Lj; jkpOk; 15 kzp Neuk;

gf;jp ,yf;fpa tuyhW **–** rpw;wpyf;fpatuyhW **–** Gjpdj;jpd; Njhw;wKk; tsh;r;rpAk; **–** fbjk; tiujy;

ghl E}y;

1. rhe;jpdp .fp (njh.M).> (2017)> *“,ilf;fhy ,yf;fpaKk; GjpdKk;”*> epA+nrQ;Rhp Gf; `T]; (gp) ypl;.> nrd;id.

ghh;it Ehy;fs;

1. fjph;KUF> (2007), “*Kf;$lw;gs;S*”> rhujhgjpg;gfk;> nrd;id.
2. R+hpafhe;jd;> (2013), “G+h;tPfG+kp”> epA+nrQ;RhpGf; `T];> nrd;id.
3. f.jz;lghzp Njrpfh;> (2008), “ed;Dhy; tpUj;jpAiu”> rhujhgjpg;gfk;> nrd;id.
4. eluhrd; gp.uh.> (2010), “jpUQhdrk;ge;jh; Rthkpfs; Njthuk”;> ckhgjpg;gfk;> GJjpy;yp

---

Course Title**:** English For Enrichment-II Semester : 2

Course Code : 17UENL21 Part : II Contact Hours /Week :6 Credit : 3

Objectives

To teach language through Literature and to enable students to learn and imbibe good values of life gained from Literature.

Unit I Poetry

18 Hours

1. Rupert Brooke - The Great Lover
2. Robert Frost - Stopping by Woods on a Snowy Evening
3. Emily Dickinson - Because I Couldn't Stop For Death
4. Alice Walker - Gift

Unit II Prose **18 Hours**

1. Mark Twain - Monday Morning
2. Jawaharlal Nehru - Our Universities
3. G.B.Shaw - How I Become A Public Speaker
4. Khushwant Singh - The Portrait of the Lady

Unit III One Act Play **18 Hours**

1. RabindranathTagore - Chitra
2. Saki - The Death Trap
3. Wole Soyinka - The Strong Breed
4. Ronald Gow - Sheriff's Kitchen

Unit IV Grammar **18 Hours**

1. Tense
2. Voice
3. Degrees of Comparison
4. Question Tag

UnitV Composition **18 Hours**

1. Expansion of Proverb
2. Dialogue Writing
3. Note Making
4. Writing Soft and Hard News

Text Book

1. Remya, I.P. and N.Lakshmi Priya (Eds.).*English for Enrichment II*, Chennai: New Century Book House, 2018.

Reference Books

1. Murphy, (1985) Raymond. *English Grammar in Use*. Cambridge: Cambridge University Press.
2. Green David, (2015), Contemporary English grammer structures and compositions,Maemillen India Ltd,Chennai.
3. Nesfield, J.C(2004), English grammer, composition and usage, Maemillen, Chennai.

Course Title**:** Organic Chemistry - I
Semester : 2
Course Code : 17UCHC21 Part : III Contact Hours /Week :4
Credit : 4

Objectives

To study the preparation, properties and applications of Polyhalogen derivatives, Organometallic compounds, Alcohols, Ethers, thio alcohols and thio ethers, the chemistry of geometrical and optical isomerism, the structure and reaction of carbohydrates, the preparation of dyes and their classifications.

Unit I **12 Hours**

a. Polyhalogen derivatives : Chlorofluoro carbons – westron and freon – preparation and applications. Preparation and properties of $CHCl_3$, CHI_3 and CCl_4.

b. Organometallic compounds : Grignard reagents – preparation, structure and synthetic applications, limitations, Organozinc, organocadmium and organolithium compounds.

Unit II **12 Hours**

a. **Alcohols:** Preparation by hydroboration, reduction of carbonyl compounds, acids and esters, by using Grignard reagents. Reaction with metals. Mechanism and reactivity towards HX, dehydration – rearrangement. Ascending and descending the alcohol series – estimation of no. of hydroxyl groups.
b. **Ethers:** mechanism of Williamson's synthesis, mechanism of cleavage by HX – estimation of methoxy group by Zeisel method. Application of crown ethers.
c. **Thioalcohols and thioethers** : Preparation and properties of sulphonal and mustard gas. Phosphorus ylides – Definition with examples, mechanism of Wittig reaction.

Unit III **12 Hours**

Stereoisomerisms

a. Geometrical isomerism : Definition – geometrical isomerism of maleic and fumaric acids – aldoximes and ketoximes – determination of configuration of geometrical isomers – E, Z notations – stereochemistry of addition of bromine to double bond.

b. Optical Isomerism :

(i) Optical activity – specific rotation and its polarimetric determination – definition of optical isomerism – elements of symmetry.
(ii) Optical isomerism of compounds containing asymmetric carbon atom – racemisation and resolution of racemic mixtures – Walden inversion – asymmetric synthesis. Chirality – specifications of absolute configuration by R and S notations.
(iii) Optical activity of compounds without asymmetric carbon atoms; allenes, spiranes and biphenyl compounds.
(iv) Optical activity of elements other than carbon atoms. Quaternary ammonium compounds and tertiary amine oxides.

Unit IV **12 Hours**

Carbohydrates

Disaccharides: Preparation, properties constitution and configuration of sucrose and maltose. Polysaccharides: A general study of starch and cellulose – uses of cellulose in industries.

Unit V **12 Hours**

Dyes

Definition – theory of colour and constitution – classification of dyes according to structure and applications.

(i) Azodyes – preparation of methylorange congo red and bismark brown

(ii) Triphenyl methane dyes: Preparation of malachite green, rosaniline and crystal violet.

(iii) Phthalein dyes: Phenolphthalein, fluorescein and eosin preparation and properties.

(iv) Vat dyes – preparation of Indigo.

Text Book

1. Arun Bahl and Bahl.B.S, (2016), "*Text Book for Organic Chemistry*", Sulthan Chand & Company Ltd, New Delhi

Reference Books

1. Morrison and Boyd, (2012), "*Organic Chemistry*", Pearson Education Asia.
2. Soni.P.L., (2013), "*Text book of Organic Chemistry*", Sultan Chand & Sons
3. Finar.I.L, (Volume 2 1998), "Organic Chemistry", Pearson.

Course Title**:** Inorganic Semi Micro Qualitative Analysis

Semester : 2

Course Code : 17UCHC2P Part : III Contact Hours /Week :2

Credit :2

Analysis of a mixture containing two anions of which one is an interfering ion-semi-micro method and two cations.

Anions : Carbonate, sulphate, nitrate, fluoride, chloride, bromide, iodide, oxalate, borate, phosphate, arsenite, arsenate and chromate.

Cations : Lead, bismuth, copper, cadmium, antimony, iron (II & III), aluminium, chromium, zinc, manganese, cobalt, nickel, barium, strontium, calcium, magnesium and ammonium.

Distribution of Marks (Max. marks – 100)

Int : 40

Performance in the class : 30 marks
Observation notebook : 10 marks

Total : 40 marks

Ext: 50

Viva code - 10 marks
Record Note book - 10 marks
Four radicals with correct procedures (4 x 10) - 40 marks

TOTAL- 60 marks

Course Title**:** Allied Mathematics - II
Semester : 2
Course Code : 17UMAA21 Part : III Contact Hours /Week :3
Credit :2

Objectives

This course is intended to offer the students to get mathematical skills to study higher physics and chemistry. The topic covers deals with vector differentiation, Integration, line integral, solution of simultaneous equation, eigen value and eigen vectors.

Unit I **9 Hours**

Vector-velocity-Acceleration, Vector differentiation- Gradient-Divergence-curl and their properties.

Unit II **9 Hours**

Directional derivatives, solenoidal - Irrotational vectors.

Unit III **9 Hours**

Line integrals.

Unit IV **9 Hours**

Matrices-consistency of equation

Unit V **9 Hours**

Eigen values and Eigen vectors.

Text Book

1. Arumugam.S, (2011), "*Ancillary Mathematics vol II*", New Gamma Publications,
Palayamkottai.

Reference Books

1. Manickavasagam Pillai.T.K. & Narayanan.T, (2002), "*Analytical Geometry of Three Dimensions and Vector Calculus*", Viswanathan Publishing Company, Chennai.
2. Venkatachalapathy.S.G, (2011), "*Modern Algebra*", Margham Publications, Chennai. 3. Vittal.P.R., (2011), "*Allied Mathematics*", Margham Publications, Chennai.

Course Title**:** Allied Mathematics - III
Semester : 2
Course Code : 17UMAA22 Part : III Contact Hours /Week :3
Credit :2

Objectives

The aim of this course is to enable the students to acquire the basic tools in statistical methods and numerical methods for solving real life problem in business, industry, agriculture and medicine. It enables the students to have understand of the mathematical pattern of physical phenomenon. This course includes correlation, regression ,curve fitting, Lagranges, Newtons and Fourier series.

Unit I **9 Hours**

Curve fitting – Straight lines, Parabola and Exponential curves Correlations – properties - simple problems.

Unit II **9 Hours**

Rank correlations-– properties - simple problems .Regression– properties - simple problems .

Unit III **9 Hours**

Interpolation methods Lagrange‘s - Newton‘s forward difference - Newton‘s backward difference.

Unit IV **9 Hours**

Attributes – Consistency of data- Index numbers-simple index number – weighted index number.

Unit V **9 Hours**

Fourier series-Trigonometric series-Even and odd functions-Half Range Fourier series.

Text Book

1. Dr. Arumugam. S., (2011), “*Ancillary Mathematics Vol II*”, New Gamma Publications, Palayamkottai.

Reference Books

1. Gupta S.C. and Kapoor V.K., (2000), “*Elements of Mathematical Statistics*”, Sultan Chand & sons, New Delhi.
2. Pillai .R.S.N, Bagavathi .V, (2005), “*Statistics*”, Sulthan Chand & Company LTD, New Delhi.
3. Arumugam .S, (2009), “*Statistics*”, New Gamma Publishing House, Palayamkottai.

Course Title**:** Chordata
Semester : 2
Course Code : 17UZOA21 Part : III Contact Hours /Week :4
Credit :4

Objectives:

To cater basic knowledge in animal diversity, classification, nomenclature, characteristics of different phyla and structure and functions organ systems in chordates.

Unit I Phylum Chordata and Prochrodates

12 Hours

1. General characters of Phylum Chordata and classification
2. General characters of prochordates- Salient features of Hemichordata / Urochordata / Cephalochordata with one example each.
3. **Amphioxus - Type Study -** External features, Digestive system, excretory system, Nervous system, Sense organs, and Reproductive system.
4. Balanoglossus is an invertebrate Chordate.

Unit II Pisces and Amphibia **12 Hours**

1. General characters of Class Pisces and Amphibia.
2. **Shark - Type study** - External features, Digestive system, Respiratory system, Brain, Lateral line Sense organs and Urino – genital system
3. Economic importance of fishes.
4. Parental care in amphibia.

Unit III Reptilia **12 Hours**

1. General characters of Class Reptilia. .
2. Identification of poisonous and non – poisonous snakes.
3. Biting mechanism of poisonous snake, Venoms of snake, first - aid and treatment for snake bite.
4. Decline of Dinosaurs.

Unit IV Aves **12 Hours**

1. General characters of Class Aves.
2. i) Birds as glorified reptiles.
   ii) Archaeopteryx –a connecting link.
3. Migration of birds.
4. Flight adaptation in Birds.

Unit V Mammalia **12 Hours.**

1. General characters of Class Mammalia.
2. Rabbit - Type study -Digestive system, Respiratory system, Brain.
3. Dentition in mammals.
4. Adaptations of aquatic mammals
5. Egg laying Mammals and Pouched mammals

Text Book

1. Arumugam.N., (2008), "*Text book of Chordata*", Saras Publiation, Kottar, Nagercoil.

Reference Books

1. Jordon E.L., Verma P.S., (2013), "*Chordate Zoology*", S. Chand & Co Ltd., NewDelhi.
2. Kotpal R.L., (2003), "*Modern textbook of Zoology – Vertebrates*",

Rastogi Pub, Meerut.
3. Saxena R. K., and Saxena S., (2008), "*Comparative anatomy of Vertebrates*", Viva books Private Limited, New Delhi.

Course Title**:** Invertebrata & Chordata Practical

Semester : 2

Course Code : 17UZOA2P Part : III Contact Hours /Week :2

Credit :1

Objectives

To develop the skill of the students to identify animals on their systematic position and also to differentiate invertebrates from chordates.

Dissections

Earth worm: Nervous system

Frog

1. Arterial system
2. Venous system.

Mounting

Earthworm- Body setae

Honey bee:

Mouth parts.

Invertebrata:

1. **Protozoa**: i) Amoeba, ii) Paramecium, iii) Euglena
2. **Coelenterata:** i) Hydra, ii) Obelia – Colony, iii) Obelia – Medusa, iv) Jelly fish, v) Sea anemone

3. **Helminthes**: i) Liver fluke, ii) Redia larva, iii) Cercaria larva iv) Ascaris male and female
4. **Annelida:** i) Nereis, ii) Earth worm
5. **Arthropoda**: i) Honey bee – Queen, Drone, and workers.
   ii) Silk worm – Moth, Larva and cocoon
6. **Mollusca**: i) Pila ii) Pearl oyster.
7. **Echinodermata**: i) Star fish – oral and aboral view.
8. **Chordata**

Prochordata.

i) Amphioxus, ii) Balanoglossus and iii) Sea ascidian.

Pisces:

i) Catla, ii) Mugil iii) Eel

Reptilia:

Poisonous Snakes: Cobra, Krait and Viper.

Non -Poisonous Snakes: Dryophis and Ptyas.

Osteology:

Rabbit: i) Pectoral girdle, ii) Pelvic girdle, iii) forelimb, iv) hindlimb

---

Course Title**:** Food And Nutrition Chemistry

Semester : 2

Course Code : 17UCHS21 Part : IV Contact Hours /Week :2

Credit :2

Objectives

To learn and evaluate the basic knowledge in food Chemistry, the nutritional values of food, the concept of food processing, food preservation, awareness on the food spoilage, adulteration and sanitation.

Unit I

Food, Nutrition and Health 6 Hours

a. Food – Classification of food – Malnutrition – Under nutrition – Over nutrition – Good nutrition - The nutrition composition of the body – Amount of nutrients in the body – Functions of food – Metabolism – Digestion.

b. Minerals and water – Water as a nutrient – Importance of consumption of water – Biological functions of water – Biological functions of iron, copper, iodine, zinc, calcium, phosphorous, magnesium, potassium and sulphur.

Unit II 6 Hours

Food Processing

a. Introduction – Cooking methods– Effect of cooking on nutrients – effect of cooloing on various food stuff

b. Food spoilage – Causes of food spoilage – Fermentation, rancidity, autolysis and putrefaction – food poisoning

c. Food preservation – Refrigeration and freezing – canning – dehydration-salting- pickling- pasteurizing-fermenting-carbonating-cheese making – irradiation – Preservation using chemical preservatives.

Unit III 6 Hours

Food additives

a. Chemistry of sweeteners - intense sweeteners – Bulk sweeteners.

b. Chemistry of food colour - – List of permitted colourants (natural colours and synthetic colours)

c. Flavouring agents – Antioxidants.

Unit IV 6 Hours

Food adulteration and testing : Common food adulterants – Analysis of Adulterants in edible oils, Ghee, Coffee powder, Chilly powder, Turmeric powder, milk – Harmful effects of the Adulterants

Unit V 6 Hours

Practical rules for good sanitation of food : Food laws and standards – Food Safety and Standards Authority of India (*fssai*) - Bureau of Indian Standards (BSI) –AGMARK – Consumer Protection act

Text Books

1. Alex .V. Ramani, (2009), "Food Chemistry", MJP Publications.
2. Jaya Shree Ghos.H.S, (2006), "*Fundamental concepts of applied chemistry*", S.Chand Company Private Limited, New Delhi

Reference Books

1. Alex .V. Ramani, (2009), "*Food Chemistry*", MJP Publications.
2. Jaya Shree Ghos.H.S., (2006), "*Fundamental concepts of applied chemistry*", Sulthan Chand Company Private Limited, New Delhi.

Course Title**:** Paper and Pulp Technology

Semester : 2

Course Code : 17UCHS22 Part : IV Contact Hours /Week :2

Credit :2

Objectives

To understand the various methods of pulp manufacture and to study the process involved in paper manufacture.

Unit I **6 Hours**

Introduction, Manufacture of Pulp, Various raw materials used for the preparation of Pulp.

Unit II **6 Hours**

Preparation of Sulphite Pulp, soda pulp, Rag Pulp

Unit III **6 Hours**

Various processes: Beating, Refining, Filling sizing and colouring.

Unit IV **6 Hours**

Manufacture of paper, calendaring, uses.

Unit V **6 Hours**

Various Paper industries in India.

Text Books

1. Sharma B.K., (2016), "*Industrial Chemistry (Including Chemical Engineering)*" Goel Publishing House, 16th Revised and Enlarged Edition.
2. Soni P.L, (2014), "*Organic Chemistry*". Sultan Chand & Sons.

Reference Books

1. Sharma.B.K., (2016), "*Industrial Chemistry (Including Chemical Engineering)*", Goel Publishing House, 16th Revised and Enlarged Edition
2. Soni P.L., (2014), "*Organic Chemistry*". Sultan Chand & Sons
3. Arun Bahl and Bahl.B.S., (2016), "*Text Book for Organic Chemistry*", Sulthan Chand & Company Limited, New Delhi.

Course Title**:** English For Better Life-II
Semester : 2
Course Code : 17UENN21 Part : IV Contact Hours /Week :2
Credit :2

Objectives

To make the students meet the challenges in the competitive professional world and to make them fix themselves in jobs

Unit I **6 Hours**

Writing application for a job
Preparing a Curriculum Vitae or a Resume

Unit II **6 Hours**

Group Discussion
Job interview

Unit III **6 Hours**

Business correspondence

Unit IV **6 Hours**

Preparing the minutes of a meeting
Presenting Data in verbal and Non- verbal modes

Unit V **6 Hours**

Body Language
Etiquettes
Stress Management

Text Book

1. Anushya, K. *English for Better Life I* (For Private Circulation)

Reference Book

1. Saraswathi, V and Maya K Mudbhatkal. *English for Competitive Examination.*Chennai:
Emerald Publishers,(2000).
2. Green David, Contemporary English grammer structures and compositions,Maemillen India Ltd,Chennai:(2015).
3.Nesfield, J.C English grammer, composition and usage, Maemillen, Chennai: (2004).

Course Title **:** History Of Modern Tamil Nadu From 1800 To 1947
Semester : 2
Course Code : 17UHIN21 Part : IV Contact Hours /Week :2
Credit :2

Objectives

To provide a survey of different facets of the Modern Tamil Nadu and to bring to limelight the role of Tamil Nadu in Indian Freedom Movement.

Unit I **6 Hours**

The South Indian Rebellion of 1800 -801- Causes – Course and Results - Vellore Mutiny of 1806 – Results.

Unit II **6 Hours**

The British Land Revenue Administration – Ryotwari System - Judiciary.

Unit III **6 Hours**

Introduction of Western Education – Temple Entry Movement – The Rise and Fall of Justice Party.

Unit IV **6 Hours**

Role of Tamil Nadu in Freedom Movement - TheEarly Phase : Tamilnadu and early Congress-Extremists-Moderates-Militant Nationalists- Chidamabaram Pillai – Subramaniya Bharathi- Vanchinathan – Subramaniya Siva.

Unit V **6 Hours**

The Later Phase : Justice Party - Neil Statue Satyagraha - Rajaji – Individual Satyagraha - Satyamoorthy – Kamaraj.

Text Books

1. Rajayyan K., History of Tamil Nadu , Past to Present, Ratna Publications, Madurai,(1995)
2. Subramaniyan N., History of Tamil Nadu (1565- 1982), Koodal Publications, Madurai , (1924)

Reference Books

1. Manoranjitha Mani C., - History of Tamilnadu, Create Space Independent Publishing Platform, (2015)
2. Mangala Murugaesan N.K, Self-Respect Movement,Koodal Publications,Madurai., (1979)
3. Sailendranath Sen, History of Freedom Movement in India, New Age International Pvt. Ltd., (2008)
4. Venkatesan G., Tharkala Tamilnattu Varalaru (History of Modern Tamilnadu1600-2011),V.C.Publications,(2011)
5. Pandian M.S.S, - Brahmin and Non-Brahmin, Permanent Black ,(2007)

Course Title**:** Advertising And Salesmanship
Semester: 2
Course Code : 17UCON21 Part : IV Contact Hours /Week :2
Credit :2

Objectives

To enable the students to know the fundamentals of advertising and salesmanship and to gain an insight on the nature of advertising and salesmanship

Unit I **6 Hours**

Meaning of advertising – Characteristic Features of Advertising – Nature and Scope of Advertising – Benefits or Advantages of Advertising – Criticisms of Advertising – Is Advertising an Economic Waste? – Difference between Advertising and Salesmanship.

Unit II **6 Hours**

Advertising Media – Indoor and Outdoor Advertising – Advertising agency – Role – Importance.

Unit III **6 Hours**

Personal Selling – Definition – Salesmanship – Definition – Features – Objectives – Benefits – Criticisms against Salesmanship.

Unit IV **6 Hours**

Qualities of a successful salesman; Physical, Mental, Social and Moral Qualities – Other Requisites of a Salesman .

Unit V **6 Hours**

Recruitment of Salesman – Sources – Remuneration of Salesman – Methods.

Text Book

1. Inbalakshmi, M, (2014) "*Advertising and Salesmanship*", Kalyani Publishers, Ludhiana,

Reference Books

1. Gupta, C.B, (2014) "*Advertising and Personal Selling*", Sultan Chand & Sons, New Delhi.
2. Chunawalla, S.A., Sethis, K.C., (2017), "*Foundation of Advertising-Theory and Practice*", Himalaya Publishing House, New Delhi.
3. Ken Kaser, (2013), "*Advertising and Sales Promotion*", South-Western Cencgage Learning.

Course Title**:** Basic Physics – II
Semester : 2
Course Code : 17UPHN21 Part : IV Contact Hours /Week :2
Credit :2

Objectives

To enable the learners to understand Definition of electric current, Ohm's law and Kirchoff's laws, Combination of resistances, different types of cells and Working principle of D.C generator, alternating current, its generation by various power stations and working principle of A.C generator, measurement of electric power by Wattmeter, Induction coil, Wattless current, Power factor, Simple electrical circuits , Relationship between e.m.f and current in each case , Diode and Bridge Rectifier.

Unit I **6 Hours**

Electric current - Voltage and resistance - Ohm's law and Kirchoff's law - Resistance in series and parallel

Unit II **6 Hours**

D.C source - Primary cells - Lechlanche and Daniel Cell - Secondary Cells - Lead Acid Accumulator - D.C generator.

Unit III **6 Hours**

Alternating current generating by hydro, thermal and atomic power stations - R.M.S value - Peak value - (Quantitative) - A.C. generator (No derivation) .

Unit IV **6 Hours**

Measurement of electric power by Wattmeter - Simple calculations - Induction coil - Wattless current - Power factor.

Unit V **6 Hours**

Simple electrical circuits - Resistors, Capacitors and Inductors connected to a.c source (independently) - Relationship between e.m.f and current in each case - Diode - Bridge Rectifier.

Text Book

1. Murugesan.R, (2004), "*Electricity and Magnetism*", Sulthan Chand & Co.,

Reference Books

1. Gupta S.L. and Kumar, (1973), "*Hand book of Electronics*", Pragati Prakashan.
2. Virendra Kumar, (1996), "*Digital technology Principles and practices*", NewAge International.
3. John D. Ryder, (1971), "*Electronic, fundamentals and applications*", Prentice Hall.
4. Malvino, (1995), "*Electronic principles*", Tata McGraw Hill, Edition.

Course Title**:** Fundamentals of Mathematics - II
Semester : 2
Course Code : 17UMAN21 Part : IV Contact Hours /Week :2
Credit :2

Objectives

The aim of this course is to enable the student to acquire basic tools in statistical methods for solving real life problems in business, industry, agriculture and medicine. This course includes measure of central tendency, dispersion, correlation, method of least square and curve fitting.

Unit I **6 Hours**

Statistics – Averages – Mean and Median

Unit II **6 Hours**

Dispersion – Range, Quartile deviation, Standard deviation

Unit III **6 Hours**

Correlation – Pearson‘s coefficient of correlation, rank correlation coefficient.

Unit IV **6 Hours**

Index numbers – Calculation of indices using simple aggregate method and average of price relative methods – Weighted index numbers – Laspeyre‘s, paasche‘s and Fisher‘s index numbers.

Unit V **6 Hours**

Curve fitting – Fitting of a straight line and parabola.

Text Book

1. Arumugam.S., (2009), “*Statistics*”, New Gamma Publishing House, Palayamkottai.

Reference Books

1. Saxena.H.C, Kapur.J.N, (2009), “*Mathematical Statistics*”, Sulthan Chand & Company Ltd, New Delhi.
2. Pillai.R.S.N., Bagavathi.V., (2008), “*Statistics*”, S. Chand & Company Ltd, New Delhi.
3. Vittal.P.R., (2013), “*Business Mathematics and Statists*”, Margham Publications, Chennai.

Course Title**:** Entrepreneurial Zoology
Semester : 2
Course Code : 17UZON21 Part : IV Contact Hours /Week :2
Credit :2

Objectives

To provide a comprehensive knowledge in various thrust areas to start profitable business and to develop a dynamic and successful entrepreneur skill which includes animal husbandry, poultry, aquaculture, apiculture and sericulture techniques.

Unit I Animal Husbandry & Dairy technology 6 Hours

Animal Husbandry: Introduction – Breeds of Cattle – cow and diseases – Mastitis, foot and mouth diseases – Dairy technology: Introduction – Scope of dairy farming, Pasteurization of milk, Standard composition of milk, food and nutritive value, grading of milk- Lactometer and dairy products.(Yohort, Cheese).

Unit II Poultry farming 6 Hours

Indian and Exotic breeds, construction of poultry house, Equipments - Brooder, Waterer and feeder - Rearing of broiler, layers and nutritive value of eggs - Lighting, Summer and winter management.

Unit III Aquaculture 6 Hours

Marine and freshwater fishes - Biological value of fish and Economy of ornamental fishes - Commercial values of shell fish, prawn, edible oyster, pearls, crab.

Unit IV Apiculture and Lac culture 6 Hours

Apiculture: Bees – queen, drones, worker, royal jelly, life history, hive types and nutritional value of Honey - Lac culture: Lac insect – host plant, collection and processing Lac –types– uses.

Unit V Sericulture 6 Hours

Mulberry sericulture: Silk Industry in India, Mulberry cultivation, Life history of *Bombyx mori.* Seed production, rearing appliances, rearing of silk worm, Silk reeling, reeling appliances and Commercial value of silk - Non mulberry sericulture: Tasar, Muga, Erisilk and commercial value.

Text Book

1. Jayasurya.R., Arumugam.N., Leelavathy.S., Soundara Pandian.N., Murugan.T., Thangamani.A., Prasannakumar.S., Narayanan.L.M., Johnson Rajeshwar.J., Nair.N.C. (2013), "*Economic Zoology*", Saras Publication, Nagercoil.

Reference Books

1. Ganga.G., Sulochana chetty.J. (1977), "*An Introduction of Sericulture*". Oxford, New Delhi.
2. Gnanamani.R. (2003), "*Modern aspects of commercial poultry keeping*", Giri Pub, Madurai.
3. Gupta. C. B., Srinivasan N. P., (1997), "*Entrepreneurship development in India*", Sultan Chand and Sons, Educational Publishers, New Delhi.

Course Title**:** Introduction to Physical Education- II
Semester : 2
Course Code : 17UPEN21 Part : IV Contact Hours /Week :2
Credit :2

Objectives

To educate the History and Rules and regulations of Basketball, Hockey, Cricket, and Kho-Kho.

Unit I **6 Hours**

History and Development of Games – Organization of Games

Unit II **6 Hours**

Basketball – Measurements – Ground Marking – Major Rules of the Game

Unit III **6 Hours**

Hockey – Measurements – Ground Marking – Major Rules of the Game

Unit IV **6 Hours**

Cricket – Measurements – Ground Marking – Major Rules of the Game

Unit V **6 Hours**

Kho - Kho – Measurements – Ground Marking – Major Rules of the Game

Text Book

1. National Council of YMCA, (2011), "*Rules book of Games and Sports*", KK Jacob National Council of YMCA, New Delhi

Reference Books

1. Gale Reference, (2006), "*Team Coaches corner.(Basketball competitions)*", An article from, Coach and Athletic Director.
2. "Tripura KHO-KHO Association, (2011) @ Tripura4u". http://www.kho-kho.tripurasports.com/.
3. Ralph Dellor, (2010) *"Cricket Steps to Success"* Human Kinetics Publication.
4. Elizabeth Andrers with Sue Myers, (2008), 2nd Ed *"Field Hockey steps to Success"*. USA.

THIRD SEMESTER

Course Title**:** fhg;gpa ,yf;fpaKk; ehlfKk; Semester : 3

Course Code : 17UTAL31 Part : I Contact Hours /Week :6 Credit :3

Nehf;fk;

jkpopy; cs;s fhg;gpaq;fspd; rpwg;Gf;fis vLj;Jiuj;jy; - ehlff;fiyia khzth;fSf;F czh;j;Jjy; - ahg;G> mzp ,yf;fzq;fis khzth;fs; mwpAk;gbr; nra;jy;.

gad;

khzth;fsplk; jk; jha; nkhopahd jkpo; nkhopapd; ,yf;fpak; ,yf;fzj; jpwid Nkk;ghL milar; nra;jy; - ehlfg; gilg;ghf;fg; gapw;rpia cUthf;Fjy; -fhg;gpaq;fspd; cs;shh;e;j fUj;Jf;fis mwpe;J nfhs;Sjy;.

$W 1 fhg;gpaq;fs; 30 kzp Neuk;

rpyg;gjpfhuk; tof;Fiu fhij (KOtJk;) – kzpNkfiy Mjpiu gpr;irapl;l fhij (KOtJk;) - fk;guhkhazk; thyp tijg;glyk; (gh.vz;-322-365 tiu cs;s 44 ghly;fs;) - nghpaGuhzk; mg;G+jpabfs; ehadhh; Guhzk; (KOtJk;)

$W 2 jw;fhy fhg;gpaq;fs; 15 kzp Neuk;

,NaRfhtpak; kiyg;nghopT (10 ghly;fs;) - egpfs;ehaff; fhtpak; kjPdhf;fhz;lk; (11 ghly;fs;)

$W 3 ehlfk; 15 kzp Neuk;

,uhkRthkp K.> nusj;jpuk; goF – NrJgjp itifapy; nts;sk; tUk; - NrJgjp nksdj;jpd; Funyhd;W - NrJgjp md;gpd; nka; - rptf;fz;zd; FUNrj;jpuq;fs; Xa;tjpy;iy.

$W 4 ,yf;fzk; 15 kzp Neuk;

gh tiffs; ntz;gh> Mrphpag;gh> tQ;rpg;gh> fypg;gh – mzpfs; ctik cUtfk;- jw;Fwpg;Ngw;wk;- Ntw;Wik- gpwpJnkhopjy;- tQ;rg;Gfo;r;rp- rpNyil

$W 5 ,yf;fpa tuyhWk;> gad;ghl;Lj;jkpOk; 15 kzp Neuk;

Ik;ngUq;fhg;gpaq;fs; – IQ;rpWfhg;gpaq;fs; – ehlfj;jpd; Njhw;wKk; tsh;r;rpAk; – ehlfj;jpd; tiffs; – ehlfk; gilj;jy;.

ghl E}y;

1. khrpyhNjtp .r., (njh.M).> (2018)> “fhg;gpa ,yf;fpaKk; ehlfKk;”> epA+ nrQ;Rhp Gf; `T]; (gp) ypl;.> nrd;id.

ghh;it E}y;fs;

1) ,uhkRthkp.K.> (2015), “nusj;jpuk; goF”> epA+ nrQ;Rhp Gf; `T];> nrd;id
2) rptf;fz;zd;.m.> (2007), “MW ehlfq;fs”> ghit gg;spNf\d;];> nrd;id
3) Rg;gpukzpa Njrpfh;.c.M.,., (1996)> “jz;bayq;fhuk; fof ntspaPL”> jpUney;Ntyp
4) NrJgjp, (2007)> “itifapy; nts;sk; tUk;”> ghit gg;spNf\d;];> nrd;id
5) tujuhrd;.K.> (2007), “jkpo; ,yf;fpa tuyhW”> rhfpj;a mfhnjkp> GJnly;yp
6) Ntq;flrhkp ehl;lhh; e.K., (2006)> (c.M)> “ahg;ngUq;fyf;fhhpif”> rhujh gjpg;gfk;> nrd;id.

Course Title**:** English For Enrichment III

Semester : 3

Course Code : 17UENL31 Part : II Contact Hours /Week :6 Credit :3

Objectives

To teach language through Literature and to enable students to learn and imbibe good values of life gained from Literature.

Unit I Romantic Plays **18 Hours**

1. As you like it : Cartons of love Act IV – Scene I
2. Merchant of Venice : Trial for a pound of flesh Act IV – Scene I

Unit II Roman Plays **18 Hours**

3. Antony and Cleopatra : Terrifying moments of Titanic Love Act V Scene II
4. Julius Caesar : Funeral oration Act III Scene II & III

Unit III Tragedy plays **18 Hours**

5. Macbeth : He kills sleep Act I, Scene VII & Act II Scene II
6. Othello : When the moor kills so good a wife:ActV Scene II

Unit IV Grammar **18 Hours**

1. Sentence Improvement
2. Sentence Arrangement
3. Sentence Completion

Unit V – Composition **18 Hours**

1. E-Mail & Fax
2. Filling a bank challan
3. Attending Interview

Text book

1. Moorthy.N and V.Amardeep ((Eds.). *English for Enrichment III*. Chennai: New Century Book House, 2018.

Reference Books

1. Nesfield. J.C. *Manual of English Grammar and Composition*. Delhi: Surjeet Publications, 2010.
2. Shakespeare, William. *Greatest Collections of William Shakespeare*. Delhi: Black Rose Publications, 2005.
3.Green David, Contemporary English grammer structures and compositions,Maemillen India Ltd,Chennai:2015.
4.Nesfield, J.C English grammer, composition and usage, Maemillen, Chennai: 2004.

Course Title**:** Physical Chemistry– I
Semester : 3
Course Code : 17UCHC31 Part : III Contact Hours /Week :6
Credit :3

Objectives

To study the crystallography, X-ray diffraction and conductors, the liquid State, the adsorption, theory of adsorption, the catalysis, theory of catalysis, the kinetic theory and order of reactions

Unit I

Solid State 14 Hours

a. Laws of crystallography – law of constancy of interfacial angle, law of symmetry, law of rational indices – Miller indices – symmetry elements in a crystal.
b. X-ray diffraction – Bragg's equation – experimental method of determination of interplanar spacing – X ray specrophotometer – the Debye – Scherrer method.
c. Types of crystals – ionic, molecular, covalent and metallic crystals.
   Ionic crystals Structure of NaCl, KCl. CsCl.
   Molecular crystals – Water and ammonia.
   Covalent crystals – Diamond and graphite.
   Metallic crystals – Metallic bond in metals.
d. Frankel and Schottky defects.

Unit II

Liquid State 12 Hours

Nature of cohesive forces in liquids – Trouton's rule and its significance.

Physical properties and chemical constitution

Molar volume and its application.

Surface tension – influence of temperature on surface tension – Parachor – atomic and structural Parachors – applications.

Viscosity – influence of temperature on viscosity – relation to chemical constitution - molecular viscosity – atomic and structural viscosity – Rheochor.

Refraction – refractive index – specific refractive index – molar, atomic and structural refraction – applications – liquid crystal – their applications.

Unit III 10 Hours

Adsorption

Definition of various terms – adsorption of gases on solids – characteristics of adsorption of gases on solids – physical adsorption and chemisorptions – factors influencing adsorption – adsorption isotherm – BET theory (Elementary idea only) – applications of adsorption.

Unit IV 10 Hours

Catalysis

Definition – characteristics – theories of catalysis – promoters and poisons – enzyme catalysis – mechanism – Michaleis – Menten equation acid – base catalysis and autocatalysis – application of catalysis.

Unit- V 14 Hours

Chemical Kinetics

a. Introduction – rate of reaction – rate law and rate constant – order and molecularity of a reaction. Reaction of first and pseudo unimolecular

reactions. Catalytic decomposition of hydrogen peroxide – Decomposition of dinitrogen pentoxide. Inversion of can sugar and hydrolysis of ester by acid.

b. Second, third and zero order reactions – examples – rate equation – half life period (no derivation required).
c. Influence of temperature on the rate of reaction – Arrhenius rate equation and its significance. Theory of reaction rates: Bimolecular collision theory – unimolecular theory – Lindemann's hypothesis – Absolute Reaction Rate theory.
d. Influence of ionic strength on reaction rate – primary and secondary salt effect – kinetics of fast reactions – relaxation method.

Text Books

1. Soni.P.L., (2013), "*Principles of Physical Chemistry*", S.Chand and Sons.
2. Bahl.B.S., Arun Bahl (2005), "*Essentials of Physical chemistry*", Sulthan Chand and company Ltd.

Reference Books

1. Puri, Sharma and Pathania, (2015), "*Principles of Physical Chemistry*", Vishal Publishing Co.
2. Peter .W.Atkins, (2010), "*Physical Chemistry*", Oxford University Press, 9th edition.
3. Adamson.A.W., (1982), "*Physical chemistry of Surfaces*", Wiley publications.
4. Laidler.K.L., (2014), "*Chemical Kinetic*", Pearson Publishing, 3rd edition.

Course Title**:** Allied mathematics–IV
Semester : 3
Course Code : 17UMAA32 Part : III Contact Hours /Week :6
Credit :5

Objectives

The objective of this course is to enable the student to model real life problems in business into optimization models and to solve those using methods in linear programming and other related quantitative techniques such as transportation problems and assignment problems.

Unit I **6 Hours**

Definition of a standard linear programming problem - Solution of LPP - Definition of feasible solution – optimal solution – basic feasible solution – Degenerate solution of LPP- Graphical solution of a LPP.

Unit II **6 Hours**

Mathematical Formulation of a LPP-Slack and surplus variables-Simplex method of solving LPP.

Unit III **6 Hours**

Charnes and method of penalty -concept of Duality-Formation of Dual LPP-the dual of the dual is the primal (only problems).

Unit IV **6 Hours**

Transportation problem - Finding Initial basic feasible solution by North West corner method and Vogel's Approximation method - Optimal solution of Transportation problem. (Except Degenerate problems)

Unit V **6 Hours**

Assignment problem - solution of Assignment problems - Travelling salesman problem.

Text Book

1.Arumugam.S, Prof. Thangapandi Issac.A.,(2010), "*Topics in Operations Research Linear Programming"*, New Gamma Publishing House, Palayamkottai.

Reference Books

1. KantiSwarup, Gupta. P. K., Man Mohan, (2006), "*Operations Research"*, Sultan Chand & Sons Publications, New Delhi.
2. Vittal.P.R., (2011), "*Introduction to Operations Research*", Margham Publications, Chennai.
3. Paneerselvam.R, (2006), "*Operations Research"*, PHI Learning Private Lmited, New Delhi.

Course Title**:** Microbiology, Cell Biology, Genetics, Molecular Biology And Biotechnology

Semester : 3

Course Code : 17UZOA31 Part : III Contact Hours /Week :4

Credit :4

Objectives

To enable the students about ultra structure and function of prokaryotic cell and morphology of bacteria, structure and functions of the cell organelles, Genetics laws and hereditary disorders, structure and function of genetic materials and its biotechnological applications.

Unit I Microbiology **12 Hours**

Structure of a prokaryotic cell (*E.coli*) - Structure of T_4 Phage - Bacteria- Salient features, classification based on shape and nutrition - Viral disease - AIDS (Pathogenesis, Symptoms, Prevention and Control).

Unit II Cell biology **12 Hours**

Structure and functions of the following cell organelles: Cell membrane – Mitochondria – Nucleus - Ribosome

Unit III: **Genetics** **12 Hours**

Mendel's Laws – Mono and Dihybrid crosses - Multiple Allele (ABO & Rh blood grouping) - Sex linked inheritance in Man.

Unit IV Molecular biology. **12 Hours**

Structure and functions of DNA - Structure and functions of RNAs (t RNA, m RNA, and r RNA) - DNA replication.

Unit V Biotechnology. **12 Hours**

Enzymes and Vectors - Recombinant DNA -Construction and applications - Transgenic animals – Dolly – Methods and Applications DNA finger printing – Methods and Applications.

Text Books

1. Arumugam. N., (2014), "*Cell Biology and Molecular Biology"*, Saras Publications.

   Dulsy Fatima, Arumugam.N., (2009), "*Microbiology and Immunology*", Saras Publication,
2. Kumerasan.V., (2015), "*Text Book of Biotechnology"*, Saras Publications.
3. Meyyan.R. P., (2013), "*Genetics"*, Saras Publications.

Reference Books

1. Black.J., (1999), "*Microbiology – Principles and explorations*", Printice Hall International Inc, New Jersey,
2. De Robertis and De Robertis, (2006), "*Cell and Molecular biology*", WB Saunders Co, Philadelphia, 3rd Edition.
3. Dubey.R.C., (1995), "*Text book of Biotechnology*", Sulthan Chand & co., New Delhi.
4. Gupta.P.K., (2006), "*Genetics*", Rastogi Publications, Meerut, 3rd Edition.

   Verma. P.S. and Agarwal.V.K., (2005), "*Genetics*", Sulthan Chand & Co, New Delhi.

Course Title**:** Mechanics Properties of Matter & Sound

Semester : 3

Course Code : 17UPHA11 Part : III Contact Hours /Week :4

Credit :4

Objectives

To enable the learners to understand fundamental forces in nature, basic ideas of friction and expressions for kinetic and potential energies, angular velocity, angular momentum, definition of Moment of inertia and expression for moment of inertias of various objects, Kepler's laws of planetery motion, Law of Gravitation, Boys method to determine G, variation of g and satellites, elasticity, determination of elastic modulii and I- section griders, simple Harmonic motion, Stationary waves, Melde's string apparatus, Ultrasonic and its applications.

Unit I **12 Hours**

Forces in nature - Central forces - Gravitational and electromagnetic - Conservative and Non-Conservative forces - Examples - Nuclear force - Friction- Angle of friction - Motion of bodies along an inclined plane - Work done by a force - Work done by a varying force - Expression for Kinetic energy - Expression for potential energy - Power.

Unit II **12 Hours**

Angular velocity - Normal acceleration (no derivation) - Centrifugal and centripetal forces - Torque and angular acceleration - Work and power in rotational motion - Angular momentum - K.E. of rotation - Moment of Inertia - Laws of parallel and perpendicular axes theorems- M.I. of circular ring, Solid sphere, hollow sphere and cylinder.

Unit III **12 Hours**

Kepler's laws of planetary motion - Laws of Gravitation - Boy's method for G - Compound pendulum - Expression for period - Experiment to find g - Variation of g with latitude , altitude and depth - Artificial Satellites

Unit IV **12 Hours**

Elastic moduli - Poisson's ratio - beams - Expression for bending moment - Determination of Young's modulus by uniform and non-uniform bending - I section girders, torsion - Expression for couple per unit twist - Work done in twisting - Torsional pendulum - Derivation Poiseuille's formula (analytical method) - Bernoulli's theorem -Proof Application - Venturimeter - Pitot tube.

Unit V **12 Hours**

Simple harmonic motions - Progressive Waves properties - Composition of two S.H.M. and beats Stationary Waves - Properties - Melde's experiment for the frequency of electrically maintained tuning fork - Transverse and longitudinal modes - Acoustics - Ulrasonics - Properties and Applications .

Text Book

1. Murugesan.R,(2007), "*Mechanics,Properties of Matter & Sound*", Vivekananda Press, Madurai.

Reference Books

1. Mathur.D.S., (31 October 2000), "*Mechanics*", Sulthan Chand; New edition edition

2. Subrahmanyam and Brijlal.N., (2002), "*Properties of Matter*", Sulthan Chand & Co.

3. Mathur.D.S.,(2010), "*Mechanics*", Elements of Properties of Matter, Sulthan Chand &
Company.

Course Title**:** goe;jkp;o; ,yf;fpaKk; ciueilAk; Semester : 4

Course Code : 17UTAL11 Part : I Contact Hours /Week :6 Credit :3

Nehf;fk;

goikf;Fg; goikaha; GJikf;Fg; GJikaha; ,d;wsTk; nrk;khe;J epw;Fk; rq;f ,yf;fpaj;ij mwpKfk; nra;jy;> jkpo; nkhopapd; rpwg;Gf;fis czh;j;Jk; ,yf;fpaf; fl;Liufis vLj;Jiuj;jy;> goe;jkpo; kf;fspd; tho;f;ifg; ngl;lfkhd nghUs; ,yf;fzj;ijczh;j;Jjy.;

gad;

nrt;tpay; nkhopahd jkpo;nkhopapd; njhd;ikapid mwpe;J nfhs;Sjy;> ePjp ,yf;fpaq;fspd; top khzth;fSf;F mwf;fUj;Jf;fis czh;j;Jjy;> rq;ffhy kf;fspd; tho;f;if Vw;wq;fSk;> cahpa gz;ghLfSk;> md;gpd; mbg;gilapy; mike;j kdpj cwTnewpKiwfspd; topAk; khzth;fSf;Fg; goe;jkpo; gz;ghl;bd; Nkd;ikia czur;nra;jy;> gilg;ghw;wy; jpwid tsh;j;jy;

$W 1 30 kzp Neuk;

FwpQ;rpg;ghl;L KOtJk; – ew;wpiz Ky;iyj;jpizg; ghly;fs; (gh.vz;. 21> 89> 99> 139> 364) – FWe;njhif kUjj;jpizg; ghly;fs; (gh.vz;. 8> 31> 46> 61> 113) Iq;FWE}W jha;f;F ciuj;j gj;J (nea;jy;) mk;%tdhh; – fypj;njhif ghiyf;fyp (gh.vz;. 9> 11) - mfehD}W (gh.vz;. 8>122) - GwehD}W (gh.vz;. 8> 86> 182> 192> 312)

$W 2 15 kzp Neuk;

jpUf;Fws; xg;GwT mwpjy; (mwj;Jg;ghy;) – ehybahh; <if (mwj;Jg;ghy;) – gonkhop ehD}W – fy;tp .

$W 3 ciueil (fl;Liuj; njhFg;G) 15 kzp Neuk;

gj;kgphpah .kh rq;f ,yf;fpaq;fspy; Rw;Wr;#oy; ghJfhg;G – Kj;ijah .M jkpo;ehl;Lf; fhis tpisahl;Lk; Nky;ehl;Lf; fhisg; NghUk; – Kj;Jf;fpUl;bd ehl;lhh; rp. mwnewp toq;fpa mwpQh; tpj;Jthd; jkpo; – jpyftjp. ,yf;fpaj;jpy; ngz; – =jud; vd;. mwpT mw;wq; fhf;Fk; fUtp – Kj;Jyl;Rkp tP. ,yf;fpaKk; $j;Jk;.

$W 4 ,yf;fzk; 15 kzp Neuk;

mfg;nghUs; mfj;jpizfs; - Gwg;nghUs; Gwj;jpizfs;

$W 5 ,yf;fpa tuyhWk;> gad;ghl;Lj; jkpOk; 15 kzp Neuk; ,yf;fpa tuyhW vl;Lj;njhif -gj;Jg;ghl;L - gjpndd;fPo;fzf;F E}y;fs; - gad;ghl;Lj; jkpo; - nghJf;fl;Liu vOJtjw;Fg; gapw;rp mspj;jy;.

ghl E}y;

1. ftpjh.t.P (njh.M).> (2018)> “goe;jkpo; ,yf;fpaKk; ciueilAk”;> epA+ nrQ;Rhp Gf; `T]; (gp) ypl;.> nrd;id.

ghh;it E}y;fs;

1. milf;fyrhkp .vk;khh;> (2011)> “jkpo; ,yf;fpa tuyhW> uhrp gjpg;gfk”;> nrd;id-73.
2. Nfhtpe;juhr Kjypahh;.fh.u., (c.M).> (1966)> “ek;gpafg;nghUs;”> jpUney;Ntypj; njd;dpe;jpa irtrpj;jhe;j E}w;gjpg;Gf;fofk; ypkpnll;> jpUney;Ntyp-6.
3. nfskhhP];thp.v];., (njh.M).> (2017)> “gjpndz; fPo;fzf;F E}y;fs; %yKk; KiwAk”;> rhujh gjpg;gfk;> [p-4> rhe;jp mLf;ffk;> 3 = fpU\;zhGuk; njU> uhag;Ngl;il> nrd;id-14.
4. rhkpehja;ah;.c.Nt., (njh.M).> (1986)> “gj;Jg;ghl;L %yKk; er;rpdhh;f;;fpdpaUiuAk”;> jkpo; gy;fiyf;fof kWNjhd;wp mr;rfk;> jQ;rhT+h;.

Course Title: English For Enrichment IV

Semester : 4

Course Code : 17UENL41 Part : II Contact Hours /Week :6

Credit :3

Objectives

To teach language through Literature and to enable students to learn and imbibe good values of life gained from Literature.

Unit I

R.K. Narayan: Swami and Friends

18 Hours

Unit II1

George Bernard Shaw: Arms and the Man

18 Hours **Unit III** Word Power(18hrs)

1. Vocabulary

18 Hours

2. Choice of Words
3. Analogy Questions

Unit IV Art of Public speaking

18 Hours

1. Welcome Address
2. Presidential Address
3. Vote of Thanks

Unit V Writing Skills

18 Hours

1. Resume Writing
2. Group Discussion
3. Translation.

Text Book

1. Narayan, R .K. Swami and Friends. Mysore: Indian Thought Publications, 2008

Shaw, George Bernard. Arms and the Man. Delhi : UBS Publishers, 2004

For units III, IV, V: Study material would be supplied by the Department.

Refrence Books

1. Green David , Contemporary English grammer structures and compositions,Maemillen India Ltd,Chennai, 2015
2. Nesfield, J.C English grammer, composition and usage, Maemillen, Chennai, 2004

Course Title: Inorganic Chemistry – II
Semester : 4
Course Code : 17UCHC41 Part : III Contact Hours /Week :4
Credit :4

Objectives

To understand the Metallurgy occurrence and extraction of metals, the preparation, properties and uses of some oxides compounds, the Group IV and V elements, the nomenclature and theories of coordination chemistry and the lanthanide series and actinide series

Unit I **14 Hours**

Metallurgy

Metallurgy – occurrence of metals – minerals and ores – mineral wealth of India – refining of metals – zone refining – electrolytic refining – van Arkel – de Boer process – important ores and extraction of the following metals – titanium, thorium, molybdenum, cobalt and platinum – their important alloys and applications.

Unit II **10 Hours**

Chemistry of Oxides

Preparation, properties and uses of some important compounds – titanium oxide, thorium oxide, ammonium molybdate – vanadium pentoxide, sodium cobalti nitrate, chloroplatinic acid.

Unit III **12 Hours**

Chemistry of Group IV And V Elements

General discussion of group IV elements – comparison between carbon and silicon – hydrides of silicon and silicates – structure, carbonyl chloride – lead monoxide – red lead – white lead. General discussion of group V elements – active nitrogen – preparation and properties of hydrazine, hydrazoic acid and hydroxylamine – test for arsenic.

Unit IV **12 Hours**

Coordination Compounds

Introduction – Nomenclature – isomerism in complexes – geometrical and optical – Werner's theory – Sidgwick theory – EAN rule – Valence bond theory – low spin and high spin complexes – magnetic properties – Limitations of VB theory – Crystal field theory – Octahedral and square planar complexes – Color of coordination complexes – Modified CFT – ligand field theory.

Unit V **12 Hours**

Inner Transition Elements

a. The lanthanide series – Occurrence – Properties – electronic configuration, oxidation states, ionic radii-lanthanide contraction-consequences-causes, color, magnetic properties, oxidation potential, basic character, solubility of compounds, double salts, complexes – Extraction of lanthanides from monazite sand.
b. The actinide series – Sources – Transuranic elements – Preparation – Electronic configuration – Properties – Oxidation states – Ionic radii – Color of ions – Comparison of actinides with lanthanides.

Text Books

1. Puri, Sharma and Kalia(2015), Basic Principles of Inorganic Chemistry, Milestone Publication, Revised Edition.

2. Soni P.L. (Latest Edition 2013), Text book of Inorganic chemistry, S.Chand and Sons.

Reference Books

1. Madan.R.D., (2012), "*Modern Inorganic Chemistry*", S.Chand and Sons.
2. Lee.J.D., (2014), "*Concise Inorganic chemistry*", Oxford Publications.
3. Cotton.Wilkinson., (2007), "*Advanced Inorganic Chemistry*", Willey Publication.
4. Malik, Tuli and Madan., (2013), "*Selected Topics in Inorganic Chemistry*", Sulthan Chand & Company Ltd.

Course Title: Volumetric Analysis
Semester : 4
Course Code : 17UCHC4P Part : III Contact Hours /Week :2
Credit : 2

Volumetric Analysis

A double titration involving the making up of the solution to be estimated and the preparation of a primary standard.

List Of Experiments

I. Acidimetry and Alkalimetry

1. Estimation of Na_2CO_3
2. Estimation of NaOH / KOH
3. Estimation of oxalic acid

II. Redox Titrations

a. Permanganimetry

1) Estimation of ferrous ion
2) Estimation of oxalic acid
3) Estimation of calcium (direct method)

b. Dichrometry

1) Estimation of ferrous ion by external indicator method

III. Iodometry and Iodimetry (Demo only)

1) Estimation of potassium dichromate
2) Estimation of potassium permanganate
3) Estimation of copper

IV. EDTA Titration

1) Estimation of Hardness of water using EDTA
2) Estimation of Calcium using EDTA
3) Estimation of Magnesium using EDTA

Distribution of Marks (Max. marks – 100)
Duration of examination: 3 hrs

Int: 40

Regular Test in the Class : 30 Marks
Observation note book : 10 marks
Total : 40 marks

Ext: 60

Viva voce - 10 marks
Record Notebook - 10 marks
Procedure writing - 10 marks
Volumetric estimation - 30 marks
TOTAL - 60 marks

For Volumetric Estimation if the student have

Less than 2% Error - 30 marks
2-3% Error - 25 marks
3-4% Error - 20 marks
3-5% Error - 15 marks
Greater than 5% - 10 marks

Course Title: Allied Mathematics - V

Semester : 4

Course Code : 17UMAA42 Part : III Contact Hours /Week :3

Credit :2

Objectives

The objective of this course is to enable the students to solve various types of differential equations and to apply them in various fields. the topics covered includes formations of differential equation, solving various types of ordinary and partial differential equations and laplace transform as tool for solving differential equations.

Unit I **9 Hours**

Exact Differential equations – Integrating factors.

Unit II **9 Hours**

Linear equation with constant coefficients – Methods of finding complementary function – Second order differential equations with RHS in the form x^n, e^{ax}, sinax, cosbx, e^{ax}sinax,e^{ax}cosbx, $e^{ax}x^n$.

Unit III **9 Hours**

Laplace Transform – Inverse Laplace Transform -Solution of differential equation using Laplace Transform.

Unit IV **9 Hours**

Partial Differential equations –Formation of Partial Differential Equations – Lagrange's equation – Some standard form - Pp+Qq=R.

Unit V **9 Hours**

Orthogonal Trajectories-Growth-Decay-Simple Electric circuits & Planetary Motion.

Text Book

1. Arumugam.S & Prof. Thangapandi Issac.A., (2012), "*Allied Mathematics Paper III*", New Gamma Publications, Palayamkottai.

Reference Books

1. Kandasamy.P., Thilagavathy.K., (2013), "*Allied mathematics - Paper II*", Sulthan Chand Publications, Chennai.
2. ManickaVasagam PillaiT.K. and Narayanan, (2001), "*Differential equations and its Applications*", S.Viswanathan Publications.
3. Venkatachalapathy.S. G., (2007), "*Allied Mathematics*", Margham publications, Chennai.
4. Vittal.P.R., (2011), "*Allied Mathematics*", Margham publications, Chennai

---

Course Title: Allied Mathematics - VI

Semester : 4

Course Code : 17UMAA43 Part : III Contact Hours /Week :3

Credit :2

Objectives

Providing basic concepts of complex analysis and group theory to physics and chemistry students which applied in space physics and chemical bondings in their PG courses.

Unit I **9 Hours**

BilinearTransformations-rotation-inversion-magnification or contraction-Translation of complex functions - Cross Ratio.

Unit II **9 Hours**

Analytic Functions-Properties- C-R equations-Cartician form and polar form of C-R equations – Harmonic functions

Unit III **9 Hours**

Groups- Binary operation – In group Identity element is unique- inverse is unique –left cancelation law and right cancelation law - Abelian Groups-Sub Groups

Unit IV **9 Hours**

Permutation Groups – Cycles and transpositions in permutation including theorems.

Unit V **9 Hours**

Fundamental theorem of group Homomorphisms-Isomorphisms-Cyclic Groups.

Text Book

1. Dr.Arumugam. S & Prof. Thangapandi Issac.A., (2012), "*Allied Mathematics Paper III*", New Gamma Publications, Palayamkottai.

Reference Books

1. Dr.Arumugam.S., Prof. Thangapandi Isacc.A. and Somasundaram, (2003), "*Complex Analysis*", Sci tech Publications, Chennai.

2. Venkatachalapathy.S.G. (2011), "*Modern Algebra*", Maragham Publications, Chennai,

3. Dr. Pillai.T.K.M, Rajagopalan, (2007), "*Complex analysis*", S V Publications, Chennai.

4. Duraipandian, (2011), "*Complex analysis*", Sulthan Chand Publications, Chennai

---

Course Title: Developmental Biology, Biochemistry, Physiology, Immunology And Evolution

Semester : 4

Course Code : 17UZOA41 Part : III Contact Hours /Week :4 Credit :4

Objectives

To enable the students to know about the structure of gametes, fertilization & cleavage, classification and structure of carbohydrates, proteins and lipids, mechanism of physiological systems, the lymphoid organs and also about evolutionary theory and fossil structures.

Unit I Developmental biology **12 Hours**

Structure of sperm and ovum in Frog - Fertilization, Blastulation and Gastrulation in Frog - Test tube baby methods

Unit II Biochemistry. **12 Hours**

Classification and structure of Carbohydrates.(Mono, Di, Polysaccharides with one example each) - Classification and structure of proteins with examples (primary, secondary, tertiary, and quaternary structure) - Classification and Structure of Lipids with examples.

Unit III Physiology (Human) **12 Hours**

Digestion of Carbohydrates, Protein, and Lipids - Mechanism of respiration and Transport of gases - Structure of Nephron and Formation of urine

Unit IV Immunology. **12 Hours**

Lymphoid organs Primary (Thymus, Bone marrow) and secondary (Spleen, lymph nodes) - Immunoglobulin: IgG – structure & functions - Antigen – antibody reaction

Unit V Evolution **12 Hours**

Lamarckism - Darwinism and Modern synthetic theory - Human Evolution – Fossils.

Text Books

1. Ambika Shanmugam, (2007), "*Biochemistry*", 10, III Cross Street, West C.I.T. Nagar, Chennai – 600 035.
2. Arumugam.N., (2012), "*Developmental Zoology*", Animal Physiology, Ecology and Evolution Saras Publications.
3. Dulsy Fatima & N. Arumugam (2009). "*Immunology*", Saras Publication.

Reference Books

1. Balinsky.B.I., (2001), "*An Introduction to Embryology*", W.B. Saunders Company, Philadelphia.
2. Gordon.S. Maleon, et al. (2000), "*Animal Function – Principles and Adaptations*", The Macmillan Company.
3. Kuby.J., W.H. (1999). "*Immunology*", Freeman and Company, New York.
4. Moody, P.A. (1997), "*An introduction to Evolution*", Kalyani Publishers, Ludhiana.
5. Robert. K. Murray., Daryl. K. Granner., Peter.Mayes.A, & Victor. W. Rodwell (2004), "Harper's Biochemistry", Prentice Hall International.

Course Title: Microbiology, Cell Biology, Genetics, Molecular Biology And Biotechnology, Developmental Biology, Biochemistry, Physiology, Immunology and Evolution Practical

Semester : 4

Course Code : 17UZOA4P Part : III Contact Hours /Week :2 Credit :1

List of Practicals

1. Preparation of Onion root tip and observe the Mitotic stages.
2. Mendelian Monohybrid ratio with coins.
3. Self observation and recording of some common Mendelian traits.
4. Qualitative test for ammonia, urea, and uric acid.
5. Qualitative test for Carbohydrates, protein and lipid.
6. Antigen – antibody reaction (in blood grouping).

List of Spotters

1. Different morphological appearance of Bacteria.
2. Mitochondria, Golgi body, Endoplasmic reticulum, Lysosome and Ribosome.
3. Mitotic stages identification.
4. Meiotic stages identification.
5. Mendelian traits in Human population.
6. DNA – Model
7. tRNA – Model
8. Following stages of Frog embryo: i) Egg ii) Sperm iii) Blastula iv) Gastrula.
9. Frog embryo
10. Sheep placenta.

Course Title: Thermal Physics
Semester : 4
Course Code: 17UPHA21 Part : III Contact Hours /Week :4
Credit :4

Objectives

To enable the learners to understand Expansion of crystals, C_v and C_p of a gas and their determination, Lee's Disc method for conductivity of bad conductor, Lapse rate and Green house effect, Determination of Stefan's constant, Solar spectrum and Energy distribution in black body spectrum,Transport phenomena and Degrees of freedom,Carnot's theorem ,Entropy and Joule Kelvin effect

Unit I **12 Hours**

Expansion of crystals - determination of alpha by air wedge method - Expansion of anisotropic solids - solids of low expansivity and their uses - anomalous expansion of water - thermostats - isothermal and adiabatic changes - derivation of equation of both C_v and C_p of a gas - relation between them - experimental determination of C_v by Joly's method - Determination of C_p by Regnault's method .

Unit II **12 Hours**

Lee's Disc method for conductivity of bad conductor - Air and cardboard / ebonite - analogy between heat flow and electric current - Widemann - Franz law - Convection in atmosphere - Lapse rate - stability of atmosphere - Green house effect - Atmospheric pollution .

Unit III **12 Hours**

Radiation - Stefan's law - Determination of Stefan's constant by filament heating method - Solar constant measurement - Water flow pyrheliometer - temperature of the Sun - Solar spectrum - Energy distribution in black body spectrum - Planck's law (No derivation) - Derivation of Wien's and Rayleigh Jeans laws from Planck's law .

Unit IV **12 Hours**

Kinetic theory of gases - Mean free path - transport phenomena - Diffusion , viscosity and thermal conductivity - Maxwell's law of distribution of molecular speed - Experimental verification - Degrees of freedom - Boltzmann's law of equipartition of energy - Calculation of Cp for mono atomic and diatomic gases

Unit V **12 Hours**

Thermodynamics - Carnot's theorem - Derivation of efficiency - Second law of thermodynamics - Entropy - Change of entropy in Carnot cycle - Change of entropy in conversion of ice into steam - Joule Kelvin effect - Simple theory of Porous plug experiment - Adiabatic - Diamagnetism - Curie's law - Giauque's method of superconductivity.

Text Book

1. Murugesan.R., (2010), "*Thermal Physics*", Sulthan Chand Publications.

Reference Books

1. Brijlal & Subramanyam.N., (2004), "*Heat and Thermodynamics*", Sulthan Chand & Co
2. Ubald Raj & Jose Robin.A, (2002), "*Ancillary Physics Vol. II*", Indian Publications.

3. Murugesan.R., (2004), "*Heat and Thermodynamics*", Sulthan Chand & Co.

Course Title: Ancillary Physics Practicals - I
Semester : 4
Course Code : 17UPHA2P Part : III Contact Hours /Week :2
Credit :1

List Of Practicals

1. Non-Uniform Bending - Optic Lever & Telescope
2. Torsion Pendulum - Determination of M.I & G
3. Comparison of EMF's - B.G
4. Calibration of Ammeter – Potentiometer
5. Sonometer - Verification of Laws
6. Melde's String - Frequency of Fork
7. Uniform Bending - Optic Lever & Telescope
8. Compound Pendulum- determination of ‘g’
9. Calibration of Voltmeter
10. Spectrometer μ of prism
11. Resistance and resistivity – Potentiometer
12. Thermal conductivity of card board – Lee’s Disc method
13. Coefficient of viscosity –Stoke’s method

Course Title: Organic Chemistry- II
Semester: 5
Course Code: 17UCHC51 Part: III Contact Hours /Week :4
Credit :4

Objectives

To study and understand the chemistry of Aromaticity, reactions and properties of Aromatic compounds and to learn the importance of Natural products.

Unit I 12 Hours

Homocyclic Hydrocarbons, Aromatic substitution and Orientation

a. Aromaticity – Definition, criteria for aromaticity and Huckel's rule
b. Mechanism of aromatic eletrophilic substitution (Halogenation, Nitration, Sulphonation and Friedel-Crafts reactions)
c. Mechanism of aromatic nucleophilic substitution, unimolecular, bimolecular and benzyne mechanisms.
d. Disubsititution reactions of aromatic compounds, orientation and reactivity.
e. Trisubstituted benzenes – steric hindrance and rules for trisubstitution in benzene.

Unit II 12 Hours

Aromatic Compounds

a. **Aromatic Hydrocarbons:** Preparation, properties and uses of toluene xylene and mesitylene.
b. **Aromatic halogen compounds:** Reactivity of aryl halides, distinction between nuclear and side chain halogenated derivatives - preparation, properties and uses of chlorobenzene and benzyl chloride.
c. **Aromatic amino compounds:** Preparation of primary, secondary and tertiary amines - Effect of substituents on the basic character of aromatic amines - Comparison between aliphatic and aromatic amines.
d. **Doazoniumsalts:** Preparation and synthetic applications of benzene diazonium chloride.

Unit III 12 Hours

Aromatic aldehydes and Aromatic phenols

a. **Aromatic aldehydes** : Benzaldehyde – mechanism of cannizzaro, perkins, claisen, knoevenagal reaction and benzion condensation.
b. Preparation and properties of Cinnamaldehyde & Vannilin
c. **Phenols:** Acidity of phenols – effect of substituents on the acidity of phenol mechanism of Kolbe's reaction, Reimer Tiemann reaction and Gatterman synthesis

Unit IV 12 Hours

Aromatic Acids and Poly Nuclear Hydrocarbons

a. **Aromatic carboxylic acids**: Effect of substituents on acidic character - preparation, properties of salicylic acid, anthranilic acid, phthalic acid and cinnamic acid.
b. **Aromatic sulphonic acids**: preparation, properties and uses of benzene sulphonic acid, saccharin, chloramine – T.
c. **Poly Nuclear Hydrocarbons**: Preparation properties, uses and structure of Naphthalene, anthracene and phenanthrene.

Unit V **12 Hours**

Natural Products – Alkaloids and Terpenoids

a. **Alkaloids:** Definition – occurrence and extraction of alkaloids-general methods for determining the structure of alkaloids – classification of alkaloids – structure and synthesis of following alkaloids – conine, piperine, nicotine and papavarine.
b. **Terpenoids :**Introduction, classification, occurrence and isolation – general properties – isoprene rule – general methods of determining structure – synthesis. Properties and structure of citral, geranial, terpeniol, menthol and camphor.

Text Books

1. Soni.P.L., (2013), "*Text book of Organic Chemistry*", Sulthan Chand & Sons
2. Arun Bahl and Bahl.B.S., (2012), "*A text book of Organic chemistry*", Sulthan Chand.
3. Jain.B.K. and Sharma.S.C., (2013), "*Modern Organic Chemistry*", Vishal Publishing Co.

Reference Books

1. Finar.I.L., (2010), "*Organic Chemistry Vol.I*", (Sixth Edition), Pearson
2. Finar.I.L., (2002),"*Organic Chemistry Vol.I*", (Fifth Edition), Pearson
3. Morrison.R.T. and Boyd R.W., (2011), "*Organic Chemistry*", (Sixth Edition)
4. Jerry March, (2007), "*Reaction Mechanism of Organic compounds*", (Sixth Edition) a John Wiley & Sons.
5. Soni.P.L., (2014), "*Organic Chemistry*". Sultan Chand & Sons
6. Bahl.S., Arul Bahl, (2012), "*Advanced Organic Chemistry*", Sulthan Chand, Publishing
7. Eliel.E.L., (2010), "*Stereochemistry of carbon compounds*", Tata McGraw Hill Edition.
8. Pine.S.H., Hendrickson.J.B., Cram.D.J. and Hammond.G.S., (2011), "*Organic chemistry*", Routledge, London.

Course Title: Physical Chemistry- II
Semester : 5
Course Code : 17UCHC52 Part : III Contact Hours /Week :4
Credit :4

Objectives

To study and understand the importance of first law of thermodynamic and its applications, entropy changes in predicting the feasibility of reactions and physical transformation, the importance of phase rule and its application to one- and two-component systems, the theory of spectroscopic techniques- IR, NMR, Raman, EPR Spectra.

Unit I **10 Hours**

First Law of Thermodynamics

a. **First Law**- statement – mathematical formulation – internal energy – enthalpy or heat content – heat changes at constant volume and at constant pressure conditions – relationship between C_p and C_v – work done, heat change and enthalpy change for reversible isothermal expansion and compression of an ideal gas – calculation of q, w, ΔE, ΔH for reversible adiabatic expansion of an ideal gas – relation between T, V and P of an ideal gas undergoing adiabatic reversible expansion comparison of work done in isothermal and adiabatic reversible expansion of an ideal gas.
b. Joule effect – Joule Thomson effect – Joule Thomson coefficient in the case of ideal and real gases – inversion temperature – Hess' law of heat summation – Kirchoff's equation

Unit II **14 Hours**

Second Law of Thermodynamics

a. Limitations of I law of thermodynamics – spontaneous process – statement of II law – conversion of heat into work – thermodynamic efficiency – Carnot cycle – refrigeration cycle – Carnot theorem – Kelvin scale of temperature
b. **Entropy** – definition and significance – derivation of the concept of entropy – entropy changes in reversible and irreversible (spontaneous) processes. Entropy as a thermodynamic function – entropy of mixing of gases - $\Delta S$for physical transformation in chemical reactions – entropy and probability.
c. **Free energy function** – Helmholtz free energy (A) – definition and its temperature dependence – Gibbs free energy (G) – definition, variation of Gibbs free energy with temperature and pressure. Gibbs – Helmholz equation and its applications – Maxwell's relationships – criteria for reversible and irreversible processes in terms of entropy and free energy changes.
d. **Partial molar quantities** – Definition and significance of chemical potential – Gibbs – Duhem equation .

Unit III **10 Hours**

Chemical Equilibrium & Third law of Thermodynamics

a. **Application of thermodynamics** to various type of equilibria – equilibrium constant and free energy changes – Van't hoff reaction isotherm and Van't Hoff isochore – thermodynamic interpretation of law of mass action and Lechatelier principle.

b. Thermodynamics III – Nernst heat theorem and its applications third law of Thermodynamics.

Unit IV **12 Hours**

Phase Rule

a. Definitions of terms – Gibb's phase rule – one component system – water, carbon dioxide and sulphur – polymorphism – two component system – reduced phase rule – simple eutectic system – Ph-Ag system – KI-water system.
b. Partially miscible liquid system – CST – completely immiscible liquid system.
c. Distribution law: Mathematical formulation – experimental verification – condition under which the law is obeyed.

Unit V

14Hours

Spectroscopy

a. **Introduction** – electromagnetic radiation – different regions – absorption spectroscopy – molecular spectra – types of molecular spectra.
b. **Rotational spectra of diatomic molecules** – rigid rotator – selection rule – determination of moment of inertia and bond length – intensities of spectral lines.
c. **Vibrational spectra** –Modes of vibration in polyatomic molecules – vibrational spectra of H_2O and CO_2.
d. **Raman spectra** – Raman effect – stokes and anti stokes lines – quantum theory of Raman effect – experimental study – comparison between IR and Raman spectra – applications of Raman spectra.
e. **Electronic spectra** – Franck – Condon principle.
f. **Nuclear magnetic resonance spectroscopy** – principle, instrumentation – interpretation of nmr spectra – spectra of ethanol.
g. **Electron spin resonance spectroscopy** – principle – difference between nmr and esr – hyperfine structure in esr spectrum – selection rule, hydrogen atom esr spectrum.

Text Books

1. Soni.P.L., (2013), "*Principles of Physical Chemistry*", Sulthan Chand & Sons.
2. Puri and Sharma, (2013), "*Principles of Physical Chemistry*", Vishal Publishing Co

Reference Books

1. Daniels.F. and Alberty.R.A., (1961), "*Physical Chemistry*", John Wiley and sons, Inc. (Second Edition)
2. Barrow.G.M., (1961), "*Physical Chemistry*", McGraw Hill, Gordon (sixth Edition), New Delhi.
3. Glasstone.S., (2007), "*Introduction to Electrochemistry*", R.R Publihsing.
4. Chandra.A.K., (2017), "*Introduction to Quantum Chemistry*", Mc Graw Hill.
5. Banwell.C.N., (2017), "*Molecular Spectroscopy*", Mc Graw Hill.
6. Chang.R., (2012), "*Basic Principles of Spectroscopy*", Berlin Heidelberg ,New York
7. Kaidler.K.J, (2013), "*Chemical Kinetics*". Graw Hill Education.
8. Rohatgi-Mukherji.K.K, (2006), "*Fundamentals of Photochemistry*", New age International Publishers.
9. Gowriker.V.R, (2009), "*Viswanathan and Sridhar 'Polymer Science'*", PHI Eastern Economy Edition.

Course Title: Inorganic, Analytical and Applications of Computers in Chemistry
Semester : 5
Course Code : 17UCHC53 Part : III Contact Hours /Week :4
Credits:4

Objectives

To study the chemistry of acid and bases, the role of metal complexes in biological system and to understand the structure of atomic nucleus, nuclear reactions followed by fission, fusion, radioactivity and its applications, to study the chemical calculations with the simple C programme.

Unit I **10 Hours**

Acids and Bases

a. Acids and bases – Arrehenius concept – Lowry - Bronsted concept:- conjugate acid – base pairs, relative strengths of acids and bases - Lux – Flood concept – limitations – Lewis concept – Levelling effect – Usanovich concept – hard and soft acids.
b. Non aqueous solvents : Classification of solvents – Chemical reaction in liquid ammonia – Precipitation reaction – Acid – base reactions in liquid ammonia – Protolysis – Ammonolysis.

Unit II **12 Hours**

Bio Inorganic Chemistry

a. Metallo porphyrins – Porphyrins – Chlorophyll – Vitamin B_{12}.
b. Myoglobin and Hemoglobin – Structure – Their role in biological systems – Hill constant, cooperativity effect, Bohr effect – Explanation for cooperativity effect in hemoglobin.
c. Role of alkali and alkaline earth metal ions in biological systems – Role of Na^+ and K^+ ions-sodium pump – Role of Mg^{2+} and Ca^{2+} ions.
d. Biological functions and toxicity of elements – Cr, Cu, As and radioactive elements.

Unit III **14 Hours**

Nuclear Chemistry

Introduction - Constitution of the nucleus- Radioactivity Properties of □, □ and □-rays. Stable and unstable nuclei and their relationship to n|p ratio- Magic number- Mass defect and binding energy- Packing fraction- Mass-energy relationships. Theories of radioactivity Soddy's group displacement law Radioactive equilibrium- Rate of radioactive disintegration-Half-life period -Average life -Radioactive series -Artificial radioactivity and nuclear reactions -Nuclear Reactors and Nuclear energy -Nuclear fission and fusion-Stellar energy Applications of radioactivity in medicine, agriculture and industry -As tracer elements in the elucidation of structure and in the investigation of reaction- mechanisms -Radiocarbon dating.

Unit IV **14Hours**

Analysis of Experimental Results

a. Precision - Accuracy - Absolute and relative error - Classification of error - Confidence Limit - Students Q – test - Rejection of experimental data - Sources and elimination of error - Significant figures and computation.

b. Instrumental Methods of Analysis

Beer-Lamberts Law – Principles of Colorimetric Analysis – Visual Colorimeter – Standard Series method – Balancing method – Estimation of Ni^{2+}, Fe^{2+}.

Basic principles of common types of Chromatography – Column Chromatography – Thin layer Chromatography – Paper Chromatography – Ion exchange Chromatography Applications of each technique.

Unit V **10 Hours**

Applications of Computers in Chemistry

Application of 'C' language in Chemistry – Introduction of 'C' language – Character set – 'C' tokens – Keywords and Identifiers – Constants, variables, Data types and operators – Computation of some simple problems in Chemistry such as 1) Half life period, 2) Normality, Molality and Molarity of a solution. 3) Root mean square velocity, 4) Ionic strength of an electrolyte, 5) Lambert's Beer's Law.

Text Books

1. Puri and Sharma, (2013), "*Text book of Inorganic Chemistry*", Vishal Pub, Delhi
2. Soni.P.L., (2013), "*Text book of Inorganic Chemistry*", Sultan Chand Company,Delhi
3. Madan,R.D., (2013), "*Modern Inorganic chemistry*", Sultan Chand Company,Delhi
4. Puri, Sharma and Kalia, (2013), "*Principles of Inorganic Chemistry*", S.Chand & Co,Delhi

Reference Books

1. Gopalan. R., Subramanian.P.S. and Rengarajan.K., (2008), "*Elements of Analytical Chemistry",* Sultan Company.
2. Puri, Sharma and Kalia, (2009), "*Principles of Inorganic Chemistry*", Sulthan Chand.
3. Arthur.I., Vogel, (2008), "*A text book of quantitative inorganic analysis*", Latest Edition.
4. Cotton.F.A. and Wilkinson, (2006), "*Basic inorganic chemistry*", Latest Edition.
5. Madan.R.D., (2006), "*Advanced inorganic chemistry*" Latest Edition.
6. Sisler.S., (2006), "*Non aqueous solvents*", Latest Edition.
7. Douglas.A., Skoog and Donald, West.M.,(2006), "*Principles of Instrumental analysis*", Latest Edition.
8. Lee.J.D., (2006), "*Concise inorganic chemistry*", Latest Edition.
9. Gilreath, (2006), "*Fundamentals of inorganic chemistry*", Latest Edition.
10. James.E., Huheey, (2006), "*Inorganic chemistry*", Latest Edition.
11. Sharma.B.K., (2006), Goel Publishing House Latest Edition.

Course Title: Electricity & Electronics

Semester : 5

Course Code : 17UPHA31 Part : III Contact Hours /Week :4

Credit :4

Objectives

To enable the learners to understand Gauss' law in electrostatics, Electric field and electric potential, Principle of Capacitor and types of capacitors,Kirchhoff's laws in electricity, Whetstone's bridge and its application, potentiometer and its applications,Mirror galvanometer, dead beat , ballistic galvanometer, LCR series and parallel circuits,PN junction diode, transistor, single stage amplifier, oscillators and OP-AMP characteristics,Number system, basic logic gates, De Morgans' theorems, Boolean algebra

Unit I **12 Hours**

Gauss law - proof- Applications - Field due to a charged sphere and an infinite plane sheet - Field near a charged conducting cylinder - Coloumb's theorem - Electronic potential - Relation between potential and field - Capacitors - Expression for C of parallel plate spherical (outer sphere earthed) and cylindrical capacitors - Energy of charged capacitor - Loss of energy due to sharing of charges.

Unit II **12 Hours**

Kirchhoff's laws'- application of Wheatstone's network - sensitiveness of bridge - Carey Foster Bridge -.Measurement of resistance and temperature Coefficient of resistance – principle of potentiometer - Calibration of ammeter and voltmeter - low and high range - measurement of resistance using potentiometer.

Unit III **12 Hours**

Torque on a current loop - mirror galvanometer, dead beat and ballistic - current sensitiveness - voltage sensitiveness - B.G theory - damping correction - experiments for charge sensitiveness - comparison of emfs and comparison of capacitors. Electro motive force generated in a coil rotating in a coil rotating in a uniform magnetic field - R.M.S and mean values - L.C.R circuit -impedances - Series and Parallel resonant circuits - Power factor - Wattless current – Choke

Unit IV **12 Hours**

Junction diodes - Forward and Reverse bias - Diode characteristics - Types of diodes - (LED and Zener) Bridge rectifier using junction - II filter - Transistors - Characteristics (CE modes only) - Biasing and action of a single transistor (CE) amplifier - frequency response - Hartley oscillator - Modulation (qualitative study) - OP AMP and its characteristics - virtual earth - voltage amplifier in inverting mode - Op Amp as adder and Subtracter.

Unit V **12 Hours**

Binary number system - reason for using binary numbers - binary to decimal and decimal to binary conversions - addition and subtraction of binary numbers - Logic circuits - Boolean algebra - De Morgan's theorem - OR, AND ,NOT, NOR and NAND Gates - NOR and NAND gates as universal building blocks - Ex-OR gates.

Text Book

1. Murugesan.R., (2008), "*Electricity and Electronics*", Shantha Publications, Madurai.

Reference Books

1. Gupta S.L. and Kumar, (1973), "*Hand book of Electronics*", Pragati Prakashan.
2. Virendra Kumar, (1996), "*Digital technology Principles and practices*", New Age International.
3. John D. Ryder., (1971), "*Electronic, fundamentals and applications*", Prentice Hall
4. Malvino, (1995), "*Electronic principles*", Tata McGraw Hill, Ed.,

---

Course Title: Pharmaceutical And Medicinal Chemistry

Semester : 5

Course Code : 17UCHE51 Part : III Contact Hours /Week :2

Credit :2

Objectives

To know the different systems of medicine and Analgesics and Antipyretics drugs Chemotherapy and application of a few drugs. the definition and classification of Hormones and vitamins to importance of Anesthetics, Synthetic drugs and its therapeutic functions.

Unit I **8 Hours**

Medicine - Analgesics and Antipyretics

a. Introduction to the different systems of medicine

Ayurveda, Siddha, Homeopathy and Allopathy – History of medicinal chemistry – Discovery of drugs – an introduction.

b. Analgesics and Antipyretics

(i) Narcotic analgesics – Morphine and derivaties. synthetic analgesics – pethidine and methadones.

(ii) Antipyretic analgesics – salicyclic acid derivatives, indol derivatives and p-amino phenol derivatives (Medicinal uses and structure only)

Unit II **7 Hours**

Chemotherapy and application of a few drugs (Elementary study)

a. Sulpha drugs – Sulphadiazine, prontosil and prontosil-S.

b. Antimalarials – quinine and its derivatives

c. Arsenical drugs – salvarasan – 606 – Neosalvarsan

d. Antibiotics: Definition, Penicillin – Tetracycline (Auromycine and Tetramycin) – Streptomycin and Chloromyceitin – drug action and uses.

Unit III **4 Hours**

Hormones and Vitamins

Definition and Classification-Testosterone-Progesterone-Thyroxine-Vitamin C-Structure only (Structural elucidation not necessary)

Unit IV **5 Hours**

Anaesthetics

Definition and Classification of Anaesthectics-Gaseous anaesthetics – Vinyl ether – Cyclopropane – Halohydrocarbons – Chloroform – Haloethane – Trichloro ethylene – Intravenous anaesthetics – Thiopentone – Local anaesthetics – Cocaine and its derivatives.

Note: Therapeutic use only.

Unit V **6 Hours**

Synthetic drugs and its therapeutic functions

Synthetic drugs and its therapeutic function of paracetamol – aspirin – naproxen – amoxyllin – ciprofloxacin – Ibuprofen.

Visit to a Industry and submission of Report. For industrial visit / Assignment = 5 marks (Internal). Contact District Industrial Centre. (DIC for visits).

Text Book

1. Jayashree Ghosh, (2008), "*Text book of Phrama Chemistry*", Sulthan Chand Company Latest Edition.

Reference Books

1. Sharma.B.K., (2010), "*Industrial Chemistry including Chemical Engineering*", Goel Publishing House,13th Revised and Enlarged Edition.
2. David A. Williams and Thomas L. Foy's, (2002), "*Principles of Medicinal Chemistry*", Lemke Edn.

3. Jayashree Ghosh, (1997), "*A text book of Pharmaceutical Chemistry*", Sulthan Chand & Company Limited.
4. Lakshmi.S., (2004), "*Pharmaceutical Chemistry*", Sultan Chand & Sons.

Course Title: Nano Science And Technology

Semester : 5

Course Code : 17UCHE52 Part : III Contact Hours /Week :2

Credit :2

Objectives

To introduce the basics of nanotechnology, to learn the instrumental techniques used in characterization of nano materials.

Unit I **6 Hours**

Introduction to Nanoscience

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

Unit II **6 Hours**

Types of Nano Particles

Introduction – types of nanoparticles – preparation, properties and uses of gold, silver, zinc oxide and titania nanoparticles.

Unit III **6 Hours**

Synthetic Techniques and Approaches

Techniques to synthesize nanoparticles – top down and bottom up approaches – characterization of nanoparticles – applications and toxic effects of nanomaterials.

Unit IV **6 Hours**

Nano Materials

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

Unit V **6 Hours**

Instrumental Methods

Electron microscopes – scanning electron microscopes (SEM) – transmission electron microscopes (TEM) –basic principles only.

Text Books

1. Shanmugam.S., (2010), "*Nanotechnology*", MJP Publishers, Chennai.
2. Patrick Salomon., "*A Handbook on Nanochemistry*", Dominant Publishers and Distributers, New Delhi.
3. Balaji.S, (2010), "*Nanobiotechnology*", MJP Publishers, Chennai.
4. Pradeep.T., (2007), "*Nano*, *The Essentials*",Tata Mc-Graw Hill, New Delhi.

Reference Books

1. Rao.CNR, (2006), "*The Chemistry of Nanomaterial: Synthesis*, *Properties and Applications*", Vol. I and II, Springer.
2. Mick Wilson, Kamali Kannangara, Geoff Smith, Michelle Simmons, Burkhard Raguse, (2005), "*Nanotechnology: Basic Science and Emerging Technologies*", Overseas Press.
3. Segreev.G.B.,(2006), "*Nanochemistry*", Elsevier, New York.

Course Title: Environmental Studies
Semester : 5
Course Code : 17UESV51 Part :IV Contact Hours /Week :2
Credit :2

Objectives

To understand and create the awareness of Earth and its Environment, Ecology and Ecosystem, Biodiversity, Pollution and Global Issues and Disaster Management.

Unit I **6 Hours**

Environment Education: Objectives, Nature and Scope – Environment Education in India, Components of Environment – Biosphere, Lithospheres, Hydrosphere, Atmosphere. Global Environment Issues - Global Warming, Ozone Layer Depletion, Acid Rain, Desertification, Loss of Bio-diversity, E-wastes and Cloud Bursting.

Unit II **6 Hours**

Ecosystems: Concept, Structure and Functions of an ecosystem – Producers, Consumers and Decomposers; Energy Flow in an Ecosystem - Food Chains, Food Webs and Ecological Pyramids.

UnitIII **6 Hours**

Energy Resources and Conservation: Definition, Classification – Conventional, Non-Conventional with examples; Solid, Liquid and gaseous Wastes, Conversion of Wastes into Wealth; Energy from Wastes.

Unit IV **6 Hours**

Natural Resources: Introduction, Types - Forest, Water, Mineral, Animal and Livestock, Land & Food; Resources Depletions - causes, consequences and remedies. Environmental Pollution – Noise, Air, Water, Soil - Causes, Consequences and Remedial Measures; Environment Laws, Acts Rules and Procedures in India – Social Issues – Sustainable Development.

Unit V **6 Hours**

Biodiversity and its Conservation: Introduction, Types of Biodiversity – Genetic, Species and Ecological Levels; Bio-diversity at Global, and National levels; Loss of Biodiversity – causes and consequences and remedial measures; Hot Spots and Cool Spots of Bio-diversity; Biodiversity Conservation and Strategies – In Situ and Ex Situ.

Text Book

1. Ravichandran.P., and Muthumari.M., (2019), "*Environmental Studies*", New Century Book House, Chennai.

Reference Books

1. Abhijit Mallick, (2014), "*Environmental Science and Management*", Viva Books Private Limited, New Delhi.
2. Kanagasabai.S., (2010), "*Textbook on Environmental Studies*", PHI Learning Private Limited, New Delhi.
3. Rajagopalan.R., (2005), "*Environmental Studies*", Oxford University Press, New Delhi.
4. Ulaganathan Sankar, (2001), "*Environmental Economics*", Oxford University Press, New Delhi.
5. Shukla.R.S. and Chandel. P.S., (2003), "*Plant Ecology*", Sulthan Chand & Company Ltd., New Delhi.
6. Ramakrishnan.P.S., (2013), "*Ecology and Sustainable Development*", National Book Trust, India.

Course Title: Organic Chemistry – III

Semester : 6

Course Code : 17UCHC61 Part : III Contact Hours /Week :4

Credit :4

Objectives

To understand the important concepts of Molecular rearrangements and Free radicals with their mechanisms, principles and applications of Organic spectroscopy, Heterocyclic compounds, Stereochemistry and Biomolecules

Unit I **12 Hours**

Molecular rearrangements

a. **Molecular rearrangements** - Classification -Detailed mechanisms of pinacol – pinacolone, Hofmann, curtius, benzil-benzilic acid, claisen, benzidine, Beckmann, Fries, Wagner-Meerwein rearrangements.
b. **Free radical reactions -** Chain reactions – Mechanism of Sand Meyer reaction, Gomberg reaction and Hofmann – Loeffler reaction.

Unit II **12 Hours**

Heterocyclic compounds

Classification - Five membered ring compounds - Preparation of Pyrrole and Furan- Reactions - Electrophilic substitutions, oxidation and reduction - Six membered ring - Preparation of Pyridine – Reactions - electrophilic and nucleophilic substitutions, oxidation and reduction - Condensed rings - Quinoline and Isoquinoline – Reactions - electrophilic and nucleophilic substitutions, oxidation and reduction.

Unit III **12 Hours**

Organic Spectroscopy :

a. **UV :** Introduction: Type of electronic transition – absorption laws – bathochromic shift and hypsochromic shift – hyperchromic and hypochromic effect – applications of UV to organic compounds – Woodward Fieser rule – calculation of λ_{max}.
b. **IR :** Introduction : Instrumentation – Mode of vibration – overtone and combination bands – applications of IR to organic compounds – finger print region – effect of hydrogen bond.
c. **NMR :** Introduction – chemical shift – shielding and deshielding effects – factors influencing chemical shift – solvent used – splitting of signals – coupling constants NMR spectra of ethanol and anisole.

Simple problems involving the application of UV, IR and PMR spectroscopy.

Unit IV **12 Hours**

Stereochemistry - II

a. **Conformational Analysis :** Difference between configuration and conformation. Fischer, Saw – horse and Newman projection formulae – Conformational analysis of ethane, n-butane 1,2 – dichloroethane, cyclohexane and monosubstituted cyclohexane.
b. Baeyer's strain theory and its modification.

Unit V **12 Hours**

Bio Molecules – Proteins & Nucleic Acids

a. **Proteins:** Definition – classification of proteins – colour reactions of proteins – primary, secondary, tertiary and quarternary structure of proteins (an elementary idea only).
b. **Nucleic acids:** Nucleic acids - nucleosides – nucleotides – RNA and DNA general structure.

Text Books

1. Soni.P.L., (2013), "*Text book of Organic Chemistry*", S.Chand & Sons
2. Arun Bahl and Bahl.B.S., (2012), "*A text book of Organic chemistry*", Sulthan Chand & Sons
3. Jain.B.K and Sharma.S.C, (2013), "*Modern Organic Chemistry*", Vishal Publishing Co.

Reference Books

1. Finar.I.L., (1998), "*Organic Chemistry Vol.I.*, Pearson
2. Finar.I.L, (1998), "*Organic Chemistry Vol.II*", Pearson
3. Morrison R.T. and Boyd R.W., (2016), "*Organic Chemistry*", Pearson, Edition: 6
4. Jerry March, (2015), "*Reaction Mechanism of Organic compounds*",Wiley India Edition 7th.
5. Soni P.L., (2007), "*Organic Chemistry*", Wiley Vch (Edition: 4 Volume)
6. Bahl S. and Arul Bahl, (2012), "*Advanced Organic Chemistry*", Sulthan Chand
7. Eliel E.L, (2001), "*Stereochemistry of carbon compounds*", TATA McGraw-Hell Edition.

Course Title: Physical Chemistry – III
Semester : 6
Course Code : 17UCHC62 Part : III Contact Hours /Week :4
Credit :4

Objectives

To understand the importance of law and theory of electrochemistry and its applications, the basics of electrodes, electrode potential and electrochemical cells, the cell representation and cell reactions and its applications, the laws, processes and reactions of photochemistry and the basic concepts of group theory.

Unit I **14 Hours**

Electrochemistry –I

a. Electrolytic conduction- Faradays laws of electrolysis- Specific- equivalent and molar conductance-Variation of conductance with dilution-strong and weak electrolytes-Ionic mobility-Determination of ionic mobilities-Transport number- Determination of transport number by Hittorf and moving boundary method-Kohlrausch's law-Applications of Kohlrausch's law-Applications of conductance measurements- conductometric titrations.
b. Ostwald's dilution law-Theory of strong electrolytes – Debye-Huckel theory-Onsager equation and its significance.

Unit II **12 Hours**

Electrochemistry -II

a. **Concepts of electrochemical cell** – cell diagram and terminology – conventions regardingh signs of cell e.m.f. – calculation of cell e.m.f. from single electrode potential – standard emf of the cell – Nernst equation.
b. **Reversible and irreversible cells** – thermodynamics and electromotive force – calculation of $\Delta G, \Delta H, \Delta S$ and k for cell reaction.
c. Single electrode potentials and cell emf measurement of single electrode potential – types of electrodes – reference electrodes – standard electrode potential – electrochemical series – experimental determination of cell emf – Westom cadmium cell.
d. **Types of electrochemical Cells**
   (i) Chemicals cells with and without transference – examples – liquid junction potential – salt bridge.
   (ii) Concentration cells – definition – types of concentration cells – examples.

Unit III **10Hours**

Electrochemistry -III

a. Commercial cells – primary and secondary cells – dry cell – lead storage cell – Ni-Cd cell – fuel cell – H_2O_2 cell.

b. Applications of emf measurements

(i) Determination of solubility and solubility products of sparingly soluble salt.
(ii) Determination of pH using hydrogen electrode, glass electrode and quinhydrone electrode.
(iii) Determination of transport number.
(iv) Potentiometric titrations.

Unit IV **12 Hours**

Photochemistry

a. **Definition of photochemical reactions** – comparative study of thermal and photochemical reactions – laws of photochemistry – Lambert and Beer law – Grothus – Draper law – Stark – Einstein law – quantum efficiency and its determination – consequence of light absorption by atoms and molecules – photophysical processes – fluorescence, phosphorescence and other deactivating processes – Jablonski diagram.
b. **Photochemical processes** – kinetics of photochemical reactions. **Gaseous reactions** : Hydrogen – halogen reactions (Formation of HCl and HBr and decomposition of HI).
c. **Photochemical equilibrium** – flash photolysis – photosensitization, chemiluminescence – bioluminescence.

Unit V **12 Hours**

Group Theory

a. Molecular symmetry elements and symmetry operations – operations – products of symmetry operations – properties of a group - classes and sub groups – groups multiplication table – $C_{2v.}$
b. Point groups – classification of molecules into point groups – $C_{2v,}$ $C_{3v,}$ C_{2h}, $D_{2h,}$ D_{3h}, D_{4h}, D_{6h}, T_d and O_h.
c. Vector and matrix algebra – symmetry operations and transformation matrices.

Text Books

1. Soni.P.L., (2013), "*Principles of Physical Chemistry*", Sulthan Chand.
2. Puri and Sharma, (2013), "*Principles of Physical Chemistry*", Vishal Publication

Reference books

1. Glasstone S., (2018), "*A Textbook of Physical Chemistry*", VPC's
2. Daniels.F. and Alberty.R.A., (2006), "*Physical Chemistry*", WILEY 4th Edition.
3. Puri and Sharma,(2013), "*Principles of Physical Chemistry*", Vishal Publication

---

Course Title: Applied Chemistry – III
Semester : 6
Course Code : 17UCHC63 Part : III Contact Hours /Week :4
Credit :4

Objectives

To understand and gain the knowledge in water quality parameters and water treatments, to find the chemical composition and preparation of various compounds such as Polymer, Insecticides and Pesticides, Explosives, Cement, Glass, Petrochemicals, Paints and Fertilizers in industrial level.

Unit I **12 Hours**

Water and Sewage Treatment

Water Quality Analysis – Chemical and Physical Analysis of water Quality Parameters – Standards prescribed for Water Quality by WHO and other Indian standards. Sea Water as a source of Drinking Water – Electro dialysis method and Reverse osmosis method for purifications of water.

Sewage Treatment

Municipal Waste Water – Sewage Treatment – Aerobic and Anaerobic process – Miscellaneous Method of Sewage Treatment.

Unit II **14 Hours**

a. Rubber

Natural and synthetic rubbers – composition of natural rubber, Neoprene, Styrene – Butadiene rubber (SBR).

b. Polymer Chemistry

Types of Polymerization – Addition and Condensation – Mechanism – Copolymer – Homopolymer – Definition of natural and synthetic fibres – natural and synthetic resins – Bakelite, Urea formaldehyde resins, Teflon, Nylon-66 and Dacron.

c. Insecticides and Pesticides

Definition – Classification – Inorganic pesticides: lead arsenate, Paris green, lime, sulphur, hydrocyanic acid – Organic pesticides, natural, synthetic (DDT, Gammaxene) – Fungicides – repellants.

d. Preparation of domestically useful chemical products

Washing powder – Cleaning powder – Phenoyls (White, Black and Coloured), Shampoo, Liquid Blue, Blue, Red and Green inks, Soap oil, Face powder, pain balm.

Unit III **12 Hours**

a. Match Industry

a. Pyrotechnics and explosives – Raw materials needed for match industry – Manufacturing process – Pyrotechniques – Coloured smokes.

b. Silicate Industry

a. Cement, Glass and Ceramics, Raw materials and manufacture of Cement, Glass and Ceramics.

Unit IV **12 Hours**

a. Petrochemicals

(i) Elementary study – Definition – Origin – Composition – Chemicals from natural gas, Petroleum, Light Naphtha and Kerosene – Synthetic Gasoline.

b. Paints and lacquers

(i) Pigments – Paints – Ingredients in Paints – Manufacture – Lacquers – Varnishes.

Unit V **10 Hours**

a. Fertilizers : Definition-nutrients for plants-role of various elements in plants growth – natural and chemical fertilizers-classification of chemical fertilizers – urea, super phosphate and potassium nitrate – mixed fertilizer – fertilizer industry in India.

Text Book

1. Sharma.B.K., (2012), "*Industrial Chemistry including Chemical Engineering*", Goel Publishing House, 13th Revised and Enlarged Edition.

References Books

1. Sharma.B.K., (2000), "*Polymer Chemistry*", Goel Publishing House,Meerut
2. Jayashree Ghosh, (2010), "*Fundamental Concepts of Applied Chemistry*", Sulthan Chand Publishing.
3. Sharma.B.K., (2012), Industrial Chemistry including Chemical Engineering, Goel Publishing House, 13th Revised and Enlarged Edition.

Course Title: Gravimetric Analysis And Organic Preparation
Semester : 6
Course Code : 17UCHC6P Part : III Contact Hours /Week :3
Credit :5

I. Graveimetric Analysis

1. Estimation of lead as lead chromate.
2. Estimation of barium as barium chromate
3. Estimation of calcium as calcium oxalate monohydrate
4. Estimation of copper as cuprous thiocyanate.
5. Estimation of nickel as Ni DMG.

II. Organic Preparation / Separation

1. Nitration
   a. m-dinitrobenzene from nitrobenzene
   b. Picric acid from phenol
2. Bromination: p-bromoacetanilide from acetanilide.
3. Hydrolysis: Aromatic acid from (a) an ester (b) an amide.
4. Oxidation : Benzonic acid from benzaldehyde.
5. Benzoylation: (a) Amine (b) phenols
6. Acetylation : (a) Amine (b) phenols

Separation of mixtures

A mixture containing an acid or a base and a neutral compound (Acid or alkali separation).

Distribution of Marks (Max. marks – 100)
Duration of examination: 6 hrs

Int: 40

Regular Test in the Class	:	30 Marks
Observation note book	:	10 marks
Total	:	40 marks

Ext: 60

Record Note book	-	10 marks	Viva voce	-	10 marks

Organic preparation (10 marks)	**Gravimetric Estimation (30 marks)**

Procedure - 2 marks	Procedure - 10 marks
Crude sample - 6 marks	Estimation - 20 marks
Recrystallised sample - 2 marks	Less than 2% Error – 20 marks
	2-3% Error - 18 marks
	3-4% Error - 16 marks
	3-5% Error - 14 marks
	Greater than 5% Error - 8 marks

Course Title: Organic Analysis And Estimations

Semester : 6

Course Code : 17UCHC6Q Part : III Contact Hours /Week :3

Credit :5

I. Organic Analysis

Analysis of an organic compound containing one or two functional groups and confirmation by the preparation of a solid derivative – acids, phenols, aldehydes, ketones, esters, nitrocompounds, amines (primary, secondary and tertiary), amides, anilides, aliphatic diamide, side chain and nuclear halogen compounds, aliphatic diamide containing sulphur and monosaccharides.

II. Organic Estimation

a. Estimation of phenol
b. Estimation of aniline
c. Estimation of glucose.

Distribution of Marks (Max. marks – 100)

Duration of examination: 6 hrs

Int: 40

Regular Test in the Class	:	30 Marks
Observation note book	:	10 marks
Total	:	40 marks

Ext: 60

Record Note book - 10 marks Viva voce - 10 marks

Organic estimation (20 marks)	**Organic analysis (20 marks)**
Procedure - 5 marks	Preliminary reaction - 2 marks
Estimation - 15 marks	Elements present - 4 marks
Less than 3% Error – 15 marks	Aliphatic or aromatic - 3 marks
3-4% Error - 13 marks	Saturated/Unsaturated - 3 marks
4-5% Error - 10 marks	Functional group - 6 marks
Greater than 5% Error - 8 marks	

Course Title: Physical Chemistry Experiments

Semester : 6

Course Code : 17UCHC6R Part : III Contact Hours /Week :3

Credits :5

---

1. Determination of molecular weight by

a. Transition temperature method – sodium thiosulphate pentahydrate, strontium chloride hexahydrate and sodium acetate trihydrate.

b. Cryoscopic method – Rast method – camphor and naphthalene.

2. Phase diagram involving

a. Simple eutectic and

b. Compound formation

3. Critical solution temperature

Determination of CST of phenol – water system and effect of impurity on CST – strength of sodium chloride.

4. Thermo chemistry

Heat of solution – potassium dichromate, ammonium oxalate and oxalic acid.

5. Viscosity

Determination of the composition of an unknown mixture.

6. Partition co-efficient experiments:

a. (i) Study of the equilibrium constant for the reaction

$$KI + I_2 \rightleftharpoons KI_3,$$

by determining the partition co-efficient of iodine between water and carbon tetrachloride.

(i) Determination of strength of given KI.

b. Determination of association factor of benzoic acid in benzene.

7. Kinetics

Determination of relative strength of acids by

i. Acid catalysed hydrolysis of ester.

ii. Inversion of cane sugar.

8. Electrochemistry

a) Conductivity

i) Determination of cell constant of the cell and equivalent conductance of solution.

ii) Conductivity titration between an acid and a base (HCl vs NaOH)

b) Potentiometric titrations

1. $KMnO_4$ vs $FeSO_4$
2. $K_2Cr_2O_7$ vs $FeSO_4$
3. HCl vs NaOH

9. Instrumental Methods Of Analysis (Demonstration only)

Colorimetry

i. Using Photo Electric Colorimeter Estimate Nickel, Ammonia and Iron.

ii. By Flame Photo metric method, Estimate Calcium, Sodium and Lithium

iii. Using pH meter, Determine pH of water.

iv. Using Dissolved oxygen meter determine Dissolved oxygen.

v. Using Abbes Refractometer determine Refractive Index of various oils.

vi. Using Spectrophotometer determine the concentration of Chromium Ions.

Distribution of Marks (Max. marks – 100)

Duration of examination: 6 hrs

Int: 40

Regular Test in the Class : 30 Marks

Observation note book : 10 marks

Total : 40 marks

Viva voce	-	10 marks
Record Notebook	-	10 marks
For completion of the experiment	-	20 marks
Graph	-	2 marks
Calculation	-	5 marks
Tabulation	-	3 marks
Result	-	10 marks

TOTAL	-	60 marks

Course Title: Optics Spectroscopy & Modern Physics

Semester : 6

Course Code : 17UPHA41 Part : III Contact Hours /Week :4

Credit :4

Objectives

To enable the learners to understand, Interference In Thin Films, Michelson's Interferometer And Its Application, Fabrey Perot Interferometer And Its Resolution And Holography, theory Of Zone Plate, Comparison With Convex Lens And Resolving Power Of Optical Instruments, polarisation, Hygene's Explanation, Wave Plates And Optical Activity, UV And IR Sources And Detectors And Its Applications, Raman Effect And Its Applications, Doppler Effect In Optics And Applications, basic Ideas of Types Of Molecular Spectra And Selection Rules.

Unit I **12 Hours**

Deviation produced by thin lens - Focal length of two thin lenses - In and out of contact - Cardinal points - Refraction through a thin prism - Dispersion - Dispersive power - Combination of thin prisms to produce (a) deviation without dispersion and (b) dispersion without deviation - Direct vision spectroscope - Chromatic aberration in lenses and its removal - Spherical aberration and its removal - Aplanatic surfaces - Oil immersion objective - Theory of primary and secondary rainbows .

Unit II **12 Hours**

Interference in thin films - Air wedge - Newton's rings (Reflected beam only) - Determination of wavelength - Jamin's interferometer , principle and use - Diffraction - theory of plane transmission grating (Normal incidence only) - Experiment to determine wavelengths .

Unit III **12 Hours**

Double refraction - Nicol prisms , construction ,action and uses - QWP and HWP - Optical activity (No theory) - Biot's laws - specific rotatory power - Half shade polarimeter - Determination of specific rotatory power - Fiber optics - Light propagation in fibers - Fiber optic communication system .

Unit IV **12 Hours**

Infra red radiations - production , properties and uses - Ultra violet radiations , sources , properties and uses - Quantum theory - Planck's quantum thoery - Raman effect - Simple theory experimental study (Wood's apparatus) - Application - Photoelectricity - Laws of photoelectricity - Einstein's equation - Photocells and their uses , photoemissive , photoconductive and photovoltaic cells .

Unit V **12 Hours**

De Broglie's theory - Electron diffraction - G.P. Thomson's experiment - Michelson Morely's experiment - Significance of negative result - Postulates of special theory of relativity - Lorentz transormations equations (No derivation) - Length contraction - Time dilation - Variation of mass with velocity and mass - energy relation (Simple derivation)

Text Book

1. Murugesan.R., (2004), "*Optics and Spectroscopy*", Vivekananda Press, Madurai.

Reference Books

1. Brijlal & Subramanyam .N., (2002), "*A text book of Optics*", Sulthan Chand & Co.

2. Sharma.B.K., (2006), "*Spectroscopy*", GOEL Publishing House, Meerut.
3. Kakani & Bhandari.S.I., (2005) , "*Optics & Spectroscopy*", Sulthan chand &
Sons, New Delhi.

Course Title: Allied Physics Practicals - II

Semester : 6

Course Code : 17UPHA4P Part : III Contact Hours /Week :2

Credit :1

List of Practicals

1. LCR - Parallel Resonance Circuit
2. Junction diode characteristics
3. Hartley Oscillator
4. Determination of R - Newton's Rings
5. AND , OR , NOT - Truth Table Verification - Logic Gates - Discrete Components
6. N and λ by Normal Incidence - Spectrometer
7. Thickness of a wire - Air wedge
8. Dispersive power of prism – Spectrometer
9. π Filter - Bridge Rectifier
10. LCR – Series Resonance Circuit
11. Comparison of Capacitances - De Sauty's Bridge
12. Zener diode characteristics & break down voltage .

Course Title: Medical Laboratory Technology And Clinical Bio-Chemistry
Semester : 6
Course Code : 17UCHE61 Part : III Contact Hours /Week :2
Credit :2

Objectives

To understand the types of Micro – Organisms and Collection and preparation of samples for various tests like Typhoid, HIV, RBC, WBC, Urine, etc. the Properties, Classifications and Determination of Carbohydrates and Lipids, the Basic Immunochemical Techniques.

Unit I **7 Hours**

Types of Micro – Organisms-General Characteristics of Bacteria-Fungi and Viruses-Sterilization and Disinfection. Types of Stains and Staining Procedures.

Blood collection-use of Anti coagulants-Transportations blood after collection-Rh and blood grouping.

Unit II **5 Hours**

Determination of Hemoglobin content-Total RBC-WBC and Platelet count-ESR Calculation of red blood cell examination for Malaria Parasites- Routine examination of Urine.

Unit III **6 Hours**

Carbohydrates: Properties and General Classifications-Test for Glucose and other reducing sugar from urine and blood- Interpretation of results-Glucose Tolerance Test.

Unit IV **6 Hours**

Lipids: General Properties-Functions and Classification of Lipids-Determination of total lipids-phospho lipids-triglycerides and cholesterol in blood.

Unit V **6 Hours**

Analytical BioChemistry: Principles of Colorimetry-FlamePhotometry-Chromatography-Electrophorosis and Basic Immunochemical Techniques-Use of Microscope-fundamentals of automation in clinical laboratories.

Visit to a Hospital Clinical Lab and submission of Report. For Report / Assignment = 5 marks (Internal). Contact Govt. Hospital for visit.

Text Books

1. Jayashree Ghosh, (2010), "*A Text book of Pharmaceutical Chemistry*", Sulthan Chand & company Limited, New Delhi.
2. Lakshmi.S., (2004), "*A Textbook of Pharmaceutical Chemistry*", Sulthan Chand & Company Ltd, New Delhi.
3. Muherji, (2006), "*Text Book of Medical Laboratory Technology*", Vol. I, Vol. II, Vol. III, Sulthan Chand & Sons

Reference Books

1. Varley, (2005), "*Clinical Bio-Chemistry*", Sulthan Chand & Sons.
2. Muherji, (2006), "*Text Book of Medical Laboratory Technology*", Vol. I, Vol. II, Vol. III, Sulthan Chand & Sons
3. Jayashree Ghosh, (2010), "*A Text book of Pharmaceutical Chemistry*", Sulthan Chand & company Limited, New Delhi.
4. Lakshmi.S., (2004), "*A Textbook of Pharmaceutical Chemistry*", Sulthan Chand & company Limited, New Delhi.

Course Title: Analytical Chemistry
Semester : 6
Course Code : 17UCHE62 Part : III Contact Hours /Week :2
Credit :2

Objectives

To know the analytical methods of practical chemistry, to study the methods of instrumental analysis and to understand different analytical techniques.

Unit I **6 Hours**

Practical Analytical Chemistry -I

Volumetric analysis: Principle, Preparation of standard solution of acid and base and estimations using double titration method. Redox titrations, Precipitation titrations, Acidimetry, Alkalimetry and Complexometry.

Unit II **6 Hours**

Practical Analytical Chemistry -II

Principles and methods to estimate glucose, phenol, aniline, ketone. Semi-micro analysis: Principles- Analysis of mixture- interfering radical and non-interfering radical.

Gravimetric analysis: Principle, steps in a gravimetric analysis: precipitation-digestion-filtrations-washing-drying-igniting and calculations, estimation of lead.

Unit III **6 Hours**

Method of Purification

Steam distillation, vacuum distillation, fractional distillation, solvent extraction, crystallization and sublimation.

Unit IV **6 Hours**

Instrumental Methods of Analysis

Principle, instrumentation, construction of standard graph, and applications of flame photometer. Estimation of calcium, sodium and lithium.

Principle, instrumentation and applications of spectrophotometer. Determination of chromium and iron ions using spectrophotometer.

Unit V **6 Hours**

Thermo-Analytical Methods

Principles involved in thermo gravimetric analysis and differential thermal analysis – instrumentation. Characteristics of TGA and DTA curves ($CaC_2O_4.H_2O$).

Analytical electrochemistry Potentiometry (redox titration), conductometry (acid-base titration).

Text Books

1. Gopalan.R., Subramanian.P.S., & Rengarajan.K., (1997), "*Elements of Analytical Chemistry*", Sultan Chand & Sons, New Delhi.
2. Sharma.B.K.,(1999), "*Instrumental Methods of Chemical Analysis*", Goel Publishing House, Meerut.

Reference Books

1. Douglas A Skoog, Donald.M., West. F, James Holler, Stanely. R, Crouch, (2004), "*Fundamentals of Analytical Chemistry*", Thompson Books, Bangalore.
2. Willard.H.H., Merrit.D. and John A Dean, (1966), "*Instrumental methods of Analysis*", D. Van Nostrand Company, New York.
3. Sharma.B.K., (1999), "*Instrumental Methods of Chemical Analysis*", Goel Publishing House, Meerut.

Course Title: Value Education
Semester : 6
Course Code : 17UVEV61 Part : III Contact Hours /Week :2
Credit :2

Objectives

To sensitize the students towards value formation, the understanding, motivate and take responsibility with regard to marking positive personal and social choices, individuals to choose their own personal, social, moral and spiritual values and be aware of practical methods for developing and deepening them.

Unit I **6 Hours**

Values and the Individual

Meaning of Value Education - Significance of Values – Classification of Values – Objectives of Value Education - Need for the Inclusion of Value Education – Values and the Individual; Self Discipline, Self Confidence, Self Initiative, Empathy, Compassion, Forgiveness, Honesty and Moral Courage.

Unit II **6 Hours**

Values and Religions / Faiths

Karma Yoga in Hinduism – Ahimsa in Jainism - Compassion in Buddhism - Love and Justice in Christianity – Universal Brotherhood in Islam- Selfless Service in Sikhism – Need for Inter Religious Dialogue and Communal Harmony.

Unit III **6 Hours**

Values and Society

Definition of Society – Democracy – Secularism – Socialism – Gender Justice – Human Duties/Rights – Socio-Political Awareness – Multi Culturalism and Social Integration – Social Justice.

Unit IV **6 Hours**

Professional Values

Definition – Accountability – Willigness to Learn – Team Spirit – Consensus – Honesty – Transparency – Mutual Respect – Democratic Functioning– Integrity and Commitment.

Unit V **6 Hours**

Role of Social Institutions in Value Formation

Role of Family – Peer Group – Society – Educational Institutions – Role Models – Swamy Vivekananda – Mahatma Gandhi – Martin Luther King Jr. – Mother Teresa Mass Media in Value Formation.

Text Book

1. Kannan.S., Sujatha.S., & Ramachandran.S., (2019), "*Values of Education*", The New Century Book House, Chennai.

Reference Books

1. Saravanan.P., & Andichamy.P., "*Value Education"*, Merit India Publications, Madurai.
2. Swami Chidbhavanandha, "*Indian National Education*"*,* Sri Ramakrishna Mutt, Thirupparaithurai, Trichy
3. *Complete Works of Swami. Vivekananda*, Sri Ramakrishna Mutt, Chennai
4. Gandhi.M.K.*, (*2014), "*An Autobiography or The Story of My Experiment with Truth*", Navajeevan Publication, Reprint 2019 Ahmadabad
5. Jeyapragasam.S., (2006), "*World Religions*", CEPCHIRA, Madurai.
6. *Encyclopedia of World Religiou,* Merriam Webster Publication, U.S.A, 1999.

Course Title: Certificate Course In Dairy Technology -I

Semester : 6

Course Code : 17CCHE51 Part : III Contact Hours /Week :2

Credit :1

Unit I **6 Hours**

Definition of Milk-Composition of Milk –Preservation of Milk- Grading of Milk

Unit II **6 Hours**

Physical and chemical properties of milk-Rancidity

Unit III **6 Hours**

Nutritive value of milk- Energy value - Effect of heat ,temperature and acidity on milk- Types of microbes in milk

Unit IV **6 Hours**

Carbohydrates of Milk-Lactose Structure -properties – browning Reaction

Unit V **6 Hours**

Proteins in milk- Physical and chemical properties of protein – Enzymes-Milk borne diseases

Text Book

1. Shukla.A.N., (2010), "*Textbook of Dairy chemistry*", DPH.

Reference Books

1. Alex.V. Ramani, (2010), "*Food Chemistry*", MJP Publishers.
2. Jayashree Ghose, (2013), "*Fundamental Concepts of Applied Chemistry*", S.Chand Publications.
3. Sharma B.K., (2016), "*Industrial Chemistry*", (Including Chemical Engineering), 16th Revised and Enlarged Edition, Goel Publishing House, Meerut.
4. Rubesh Nandan, (2011) , "*A Textbook of Dairy Chemistry*", Random Publications.

Course Title: Certificate Course In Dairy Technology -II

Semester : 6

Course Code : 17CCHE61 Part : III Contact Hours /Week :2

Credit :1

Unit I **6 Hours**

Milk Processing – Pasteurisation - Phosphatase enzyme- Homogenisation - Fat Separation – Standardisation of Milk

Unit II **6 Hours**

Mechanism of heat transfer - Plate heat Exchanger- Sterilisation – Difference between Pasteurisation and Sterilisation -Flow Diversion Valve- Refrigeration -Spray and Drum Drying -Mechanism

Unit III **6 Hours**

Milk products- Liquid milk, flavoured milk, Fermented products -Dahi, yoghurt -Ice cream, Koha-Butter, Ghee

Milk Powders-Skimmed milk Powder-Milk Protein Concentrate-Whey Protein Concentrate-Value added product- Vitamin D enriched whole milk powder, dairy whitener, Whey powder

Unit IV **6 Hours**

Vitamins and Minerals in milk -Evaporated milk -Physical and chemical properties of Dried Milk

Unit V **6 Hours**

Clean in Progress (CIP)- Quality and Food Safety System-HACCP – Microbiology- Bacteriological –Milk borne diseases

Text Book

1. Shukla.A.N., (2010), "*Textbook of Dairy chemistry*", DPH.

Reference Books

1. Alex.V. Ramani, (2010), "*Food Chemistry*", MJP Publishers.
2. Jayashree Ghose, (2013), "*Fundamental Concepts of Applied Chemistry*", Sulthan Chand Publications.
3. Sharma B.K., (2016), "*Industrial Chemistry (Including Chemical Engineering)*", 16th Revised and Enlarged Edition, Goel Publishing House, Meerut.
4. Rubesh Nandan, (2011), "*A Textbook of Dairy Chemistry*", Random Publications.