CVM UNIVERSITY
FYBSc Molecular Biology Core Paper I
4 credits(4 lecture/wk)
COURSE CODE:UG01CMOB01
(Semester---I)
(Paper-I- Principles of Biophysical chemistry)

UNIT-I-- Thermodynamics and Bioenergetics. Laws of thermodynamics , concept of free energy, unavailable energy & Entropy, Negative entropy change in living system, heat content of food. High energy compounds in biological system, ATP and phosphoryl group transfers. Couple reactions, Redox potential in biological system

UNIT-II- Acid & Bases, mole concept, Molarity & Normality, weak acids, Ampholyte, pH, Calculations of pH from H & OH concentrations , measurements of pH , Henderson – Haselbatch equation , Titration curve & pK values, Buffers & Stability of their pH , numerical problems.

UNIT -III--Centrifugation --Basic principle of sedimentation – Relative centrifugal force (RCF), Sedimentation rate, Svedberg unit or Sedimentation coefficient, Types of Centrifugation: Analytical and Preparative, Differential, Density gradient, Types of Centrifuge & rotors.

UNIT--IV-- Chromatography--Principles of Chromatography, Types of Chromatography: Principles, Instrumentation and applications of - Thin Layer Chromatography (TLC), Column Chromatography, Ion-Exchange Chromatography, Affinity Chromatography, Gel permeation Chromatography, GLC, High Performance Liquid Chromatography (HPLC)

REFERENCES:

1. Handbook of Analytical Instruments - Khandpur, R. S. 2nd Ed, Tata McGraw Hill Publication.
2. Bioinstrumentation.- L. Veerkumari, MJP Publishers
3. Principles and Techniques of Biochemistry and Molecular Biology- Wilson, K., & Walker, J. Cambridge University Press
4. Biophysical Chemistry - Upadhyay & Upadhyay, Himalaya Publishers.
5. Introduction to biophysics - Pranab Kumar Banerjee, S. Chand & Company Ltd.
6. Modern Experimental Biochemistry - Rodney Boyer, Benjamin &Cummings.

CVM UNIVERSITY
FYBSc Molecular Biology Core Paper -I practical
2 credits(4 hrs/wk)Practical
COURSE CODE:UG01CMOBP1
(Semester---I)

1. Preparation of the buffers & reagents(V/V,W/V, Molar, normal and molal).

2. Acid – Base titration, and Determine the pKa values(Strong acid Vs Strong base, Weak acid Vs Strong base, Mixture of Strong and Weak acid Vs Strong base)

3. Principle & operation of Centrifuge.

4. Separation of amino acids by TLC.

CVM UNIVERSITY
FYBSc Molecular Biology Core Paper II
4 credits(4 lecture/wk)
COURSE CODE:UG01CMOB02
(Semester---I)
(Paper-II- Basics of Cell Biology)

Unit-I--Discovery of cell and Cell Theory; Comparison between prokaryotic and eukaryotic(plant and animal cells); Cell wall (bacterial & plant); Ultra structure & functions of nucleus, nuclear envelope, nucleolus, mitochondria, Endoplasmic reticulum, Ribosomes, Golgi apparatus, lysosomes, vacuoles, hloroplast, microfilaments, microtubules, intermediate filaments, centrioles, cilia and flagella.

Unit-II--Plasma membrane and membrane transport--Ultra structure of plasma membrane (Danielli-Davson model, Robertson model and fluid mosaic model). Fluidity of the membranes. Membrane lipids, membrane proteins and carbohydrates. Membrane transport by active and passive transport (Simple diffusion, Facilitated diffusion).

Unit--III-Cell recognition, cell adhesion and cell junction in Eukaryotic membrane, Tyes of Cellular junctions. structure and function of Cytoskeleton (actin, microtubule and intermediate filaments and their associated proteins),and motor proteins(kinesin and dynein).

Unit-IV--Cell cycle - An overview of cell cycle; Components of cell cycle control system; Intracellular and Extra-cellular control of cell division, Programmed cell death (Apoptosis), intrinsic & extrinsic pathways of cell death, Apoptosis in relation with Cancer, Viral disease (AIDS) & Introduction to organ transplantation.

References:

1. Cell Biology, Genetics, Molecular Biology, Evolution & Ecology - Verma & Agarwal, S. Chand & Company Ltd.
2. Molecular Biology of the cell - Bruce Alberts 5th Ed. G.S. Garland Science- Taylor & Francis Inc.
3. Cell biology - Satyeshchandra Roy and K. K. De

CVM UNIVERSITY
FYBSc Molecular Biology Core Paper II practical
2 credits(4 hrs/wk)Practical
COURSE CODE:UG01CMOBP2
(Semester---I)

1.Study of different kinds of cells from leaf peels, flower stamens, petals, staining with nuclear stain to show cytoplasm & nucleus.
2.Study of bacterial cell by simple staining(monochrome).
3.Osmosis, plasmolysis & deplasmolysis demonstration with leaf peels.
4.Study of cell divisions, identification of different stages of mitosis

CVM UNIVERSITY
FYBSc Molecular Biology Core Paper III
4 credits(4 lecture/wk)
COURSE CODE:UG01CMOB03
(Semester---I)
(Paper-III- Biochemistry of Biomolecules-I)

Unit 1:Origin of life Living matter, early history, Chemical evolution, Origin of living systems (molecules to first cell), RNA world, development of metabolic pathways, central dogma of life, mutation and evolution.

Unit-II--Water: Water molecule structure, liquid water and ice, water activity, Phase transition of water molecule, WLF equation. Dispersed System: surface chemistry, colloidal interaction, creaming foams and emulsion

Unit-III--Carbohydrates : Structural aspects – Introduction & Occurrence, Classification of Mono-, Di- and Polysaccharides, Reducing & Non-reducing Sugars, Constitution of Glucose & Fructose, Osazone formation, Pyranose & Furanose forms, Determination of ring size, Inter-conversion of mono-saccharides.

Unit-IV--Nucleic acid : Structural aspects – Components of DNA and RNA, Nucleosides & Nucleotides (introduction, structure & bonding), Double helical structure of DNA (Watson-Crick model), various forms of DNA. Chemical and Physical properties of nucleic acid.

References:

1. Biochemistry – J. M. Berg, John L. Tymoczko, Lubert Stryer W. H. Freeman & Co.
2. Essentials of Biochemistry- David Lee Nelson, Albert L. Lehninger, Michael M. Cox . W. H. Freeman & Co.
3. Outlines of biochemistry-Conn & Stumpf 5th Ed, John Wiley & Sons,
4. Biochemistry - U. Satyanarayana. 2nd Ed, New Central Book Agency (p) Ltd.
5. Medical Biochemistry - Chhaterjee and Ranashinde.7th Ed, Jaypee Publishers
6. Fundamentals of Biochemistry: Life at the Molecular level- Voet Donald , John Wiley & Sons.

CVM UNIVERSITY
FYBSc Molecular Biology Core Paper III- Practical
2credits(4 hrs/wk)Practical
COURSE CODE:UG01CMOBP3
(Semester---I)

1. Estimation of DNA by DPA method

2. Estimation of RNA by orcinol method

3. Estimation of reducing sugars by DNS method.

4.Qualitative tests for Glucose, Fructose, Ribose, Starch and Sucrose.

CVM UNIVERSITY
FYBSc Molecular Biology
Ability enhancement--2 credits(2 lecture/wk)
COURSE CODE: UG01AENG01 (Semester---I)

Course objectives:

The objectives of this course are to enable students to…

a) Introduce themselves, describe person, place or situation,
b) Use subject-verb agreement appropriate
c) Read for information news features, articles, newspapers and texts
d) Read to get the overall idea, and comprehend the passage.
e) Use tenses correctly for communicative purpose
f) Make correct use of Concord or Subject-Verb Agreement
g) Write leave application, apology and request letters
h) Write paragraphs by developing points
i) listen and understand short lectures, descriptions, and narrations

Topics to be covered in journal

1. Self-Introduction
2. Parts of Speech
3. Types of Tenses
4. Concord or Subject-Verb Agreement
5. Punctuation Marks
6. Wh- Questions
7. Expansion of Idea (based on given points)
8. Reading Comprehension
9. Writing Leave Application, Apology and Request Letters
10. Listening Comprehension 'On We Go' (BBC Audio-visual Course)

❖ **Books / Audio-Visual Courses recommended**

1. *Corridors to Communication* by- Ranu Vanikar (Orient Longman)
2. Champa Tickoo and Jaya Sasikumar (2000). '*Writing with a Purpose'* ,Chennai, OUP
3. David Jolly (1988). *Writing Tasks: An Authentic Task Approach to Individual Writing Needs* (Cambridge University Press)
4. *On We Go* – (Audio-Visual BBC Course)
5. *Spoken English*—D Sasikumar and PV Dhamija. (Tata Mcgraw Hill Publication Ltd, New Delhi) (Units 1-13)
6. Grant Taylor. *English Conversation Practice*. (Tata McGraw Hill, New Delhi)
7. R P Bhatnagar and R T Bell (1999) *Communication in English***,** (Orient Longman, Hyderabad)

CVM UNIVERSITY
FYBSc Molecular Biology
Elective--2 credits(2 lecture/wk)
COURSE CODE:UG01ECHE01
(Semester---I)
(Paper-Basics concepts of Chemistry--I)

UNIT-I Classification of Elements and Periodicity in Properties-- Significance of classification, brief history of the development of periodic table, modern periodic law and the present form of periodic table, periodic trends in properties of elements -atomic radii, ionic radii, inert gas radii Ionization enthalpy, electron gain enthalpy, electronegativity, valency. Nomenclature of elements with atomic number greater than 100.

UNIT-II Chemical Bonding and Molecular Structure-- Valence electrons, ionic bond, covalent bond; bond parameters, Lewis structure, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridization, involving s,p and d orbitals and shapes of some simple molecules, molecular orbital theory of homonuclear diatomic molecules (qualitative idea only), hydrogen bond.

UNIT-III Chemical Thermodynamics-- Concepts of System and types of systems, surroundings, work, heat, energy, extensive and intensive properties, state functions.

First law of thermodynamics - internal energy and enthalpy, heat capacity and specific heat, measurement of ΔU and ΔH, Hess's law of constant heat summation, enthalpy of bond dissociation, combustion, formation, atomization, sublimation, phase transition, ionization, solution and dilution.

Second law of Thermodynamics (brief introduction) -- Introduction of entropy as a state function, Gibb's energy change for spontaneous and non-spontaneous processes, criteria for equilibrium.
Third law of thermodynamics (brief introduction).

UNIT-IV Equilibrium-- Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium - Le Chatelier's principle, ionic equilibrium-ionization of acids and bases, strong and weak electrolytes, degree of ionization, ionization of poly basic acids, acid strength, concept of pH, Henderson Equation, hydrolysis of salts (elementary idea), buffer solution, solubility product, common ion effect (with illustrative examples).

Reference Books:

1. Graham Solomon, T.W., Fryhle, C.B. & Dnyder, S.A. Organic Chemistry, John Wiley & Sons (2014).
2. McMurry, J.E. Fundamentals of Organic Chemistry, 7th Ed. Cengage Learning India Edition, 2013.

3. Sykes, P. A Guidebook to Mechanism in Organic Chemistry, Orient Longman, New Delhi (1988).
4. Eliel, E.L. Stereochemistry of Carbon Compounds, Tata McGraw Hill education, 2000.
5. Finar, I.L. Organic Chemistry (Vol. I & II), E.L.B.S.
6. Morrison, R.T. & Boyd, R.N. Organic Chemistry, Pearson, 2010.
7. Bahl, A. & Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010.
8. Samuel Glasstone, Thermodynamics for Chemists, Affiliated East West Private Limited.
9. B S Bahl, G D Tuli, Arun Bahl, Essentials of Physical Chemistry
10. Peter Atkins and Julio de Paula, Elements of Physical Chemistry, Sixth edition (2013), Oxford press
11. Ball D. W., Physical Chemistry, Thomson Press , India (2007)
12. Castellan, G.W. Physical Chemistry 4th Ed. Narosa (2004).
13. Atkins' Physical Chemistry –Thermodynamics and Kinetics, 11th Edition, Oxford Press
14. Thomas Engel, Philip Reid; Physical Chemistry, Pearson Education (2006)
15. J. N. Gurtu, A. Gurtu; Advanced Physical Chemistry, Pragati Edition
16. Mortimer R. G., Physical Chemistry, 3rd Edition, Elsevier, Noida (UP)
17. Samuel H. Maron and Carl F. Prutton, Principal of physical Chemistry, 4th Edition, Collier Macmillan Ltd.

CVM UNIVERSITY
FYBSc Molecular Biology
Elective--2 credits(2 lecture/wk)
COURSE CODE: UG01EICT01
Paper: Information & Communication Technology---I
(Semester---I)
(Syllabus Effective from June 2020)

Unit--I **Hardware and Software**

Definition, Difference between hardware and software, Main components of a general-purpose computer: CPU, main internal memory (Including RAM and ROM), input devices, output devices and secondary/backing storage.

Characteristics of: personal/desktop, laptop computer, tablet computer, smartphone, advantages and disadvantages of each

Operating System: Overview, what is Command Line Interface (CLI) and Graphical User Interface (GUI), advantages and disadvantages of CLI and GUI

UNIT-II **Input and Output devices**

Input Devices: keyboards, numeric keypad, Pointing devices (mouse, touchpad, trackball), remote control, joysticks, touch screen, scanners, digital cameras, microphones, sensor, webcam, video camera etc.

Direct data entry and associated devices: magnetic stripe readers, chip and PIN readers, Radio Frequency Identification (RFID) readers, Magnetic Ink Character Recognition/Reader (MICR), Optical Mark Recognition/Reader (OMR), Optical Character Recognition/Reader (OCR), barcode reader

Output Devices: Monitors (CRT, TFT, LCD), projectors, printers (laser, desk jet, dot matrix, wide format printer, 3D printer), plotters, speakers.

Uses of output devices stating the advantage and disadvantage of each.

UNIT-III **Storage Devices and Media**

Magnetic backing storage media: fixed hard disks and drives, portable and removable hard disks, portable and removable hard drives, magnetic tape drives and magnetic tapes, memory cards

Optical backing storage media: CD ROM/DVD ROM, CD R/DVD R, CD RW/DVD RW, DVD RAM, Blu-ray discs

Solid State backing storage: solid state drives (SSDs), flash drives (pen drive/memory stick/USB stick)

UNIT-IV **Effective use of the internet**

Define internet and intranet, differentiate between the internet, an intranet and the World Wide Web (WWW), concept of storage in the cloud

Define and understand the terms: HyperText Transfer Protocol (HTTP), HyperText Transfer Protocol secure variant (HTTPS), Uniform Resource Locator (URL), hyperlink, Internet Service Provider (ISP), File Transfer Protocol (FTP), structure of a web address, Define and use of: web browser, search engine, blog, wiki, social networking.Advantages and disadvantages of Internet

CVM UNIVERSITY
FYBSc Molecular Biology Core Paper I
4 credits(4 lecture/wk)
COURSE CODE:UG02CMOB01
(Semester---II)
Paper-I- Principles of Classical genetics

UNIT-I--Model systems in Genetic Analysis: Bacteriophage, E. coli, Neurospora crassa, yeast, Arabidopsis, maize, Drosophila, C. elegans, Zebra fish, Homo sapiens - General outline of life cycle and their importance in Genetic analysis.

UNIT- II: History of genetics, Mendel's Experimental Design, Rediscovery of Mendel's Laws of inheritance with reference to mono-, di-and tri-hybrid crosses. Interaction of genes- epistasis, supplementary genes, inhibitory genes, complimentary genes, lethal genes, modifying genes, multiple alleles, Pleiotropy, Co-dominance.

UNIT - III Extra chromosomal inheritance – Mechanism, coiling of shell in snail, and plastid inheritance in plants. Heredity pattern of organelles in plants & animals.

UNIT – IV: Linkage and crossing over: Chromosome theory of linkage, kinds of linkage with examples, linkage groups, significance of linkage. Crossing over- mitotic and meiotic synapsis, significance of crossing over.

References:

1. Fundamentals of Genetics - B.D. Singh, Kalyani Publishers
2. Principles of Genetics – D. Peter Snustad & Michael J. Simmons, John Wiley & Sons. Inc.
3. Genetics - Strickberger 3rd Ed. Prentice Hall of India Pvt. Ltd.
4. Cell Biology, Genetics, Molecular Biology, Evolution & Ecology - Verma & Agarwal, S. Chand & Company
5. Genetics - Peter J. Russel 5th Ed. Benjamin Cummings Publishing Company.
6. Genetics - P.K. Gupta 3rd Ed. Rastogi Publications.

CVM UNIVERSITY
FYBSc Molecular Biology Core Paper I--practical
2credits(4 hrs/wk) Practical
COURSE CODE:UG02CMOBP1
(Semester---II)
Practical

. 1. Seed exercise to calculate segregation ratio for mono- and di-hybrid crosses
2. Karyotypic studies of chromosomes and banding.
3. Methods of emasculation and crossing.
4. t – test and F – test.

CVM UNIVERSITY
FYBSc Molecular Biology Core Paper II
4 credits(4 lecture/wk)
COURSE CODE:UG02CMOB02
(Semester---II)
Paper-II- Elementary microbiology.

Unit-I--Overview of history of Microbiology - Biogenesis and abiogenesis Contributions of Redi, Spallanzani, Needham, Pasteur, Tyndal, Joseph Lister, Koch [Germ Theory], Edward Jenner and Flemming [Penicillin], Scope of Microbiology. Concept and definition of Sterilization.

Unit-II--Classification of Microbes - Criteria for classification, Methods of classification (Phenetic classification, Numerical taxonomy,Molecular based classification), Taxonomic rank, Bergey's manual of systematic bacteriology. Rules for Nomenclature and classification. Basic concepts of Virology - General characteristics of viruses, differences between bacteria and viruses. Classification of viruses Physical and chemical Structures of different Viruses on the basis.

Unit-III--Cultivation of bacteria-Nutritional requirements, types of media, common ingredients of media, physical condition required for growth (Temp, pH,oxygen, Miscellaneous requirements) Nutritional types of bacteria. Isolation and growth of bacteria (pure culture techniques, maintainance and preservation. Mathematical expression of growth, growth curve of bacteria, synchronous growth, continuous culture, diauxic growth. Methods to measure microbial growth.

Unit-IV

Microbes in Extreme Environment – Nature, special features of the thermophilic, methanogenic and halophilic Archaea; photosynthetic bacteria, Cyanobacteria some Archaea who live in extreme conditions like cold, and space. Pathogenic Microorganisms – List of common bacterial, fungal and viral diseases of human beings [Name of the disease, causative pathogen, parts affected]

References:

1.General Microbiology Vol I and II : Powar and Daginawala
2. Microbiology – Pelczar
3. Microbiology : Prescott

CVM UNIVERSITY
FYBSc Molecular Biology Core Paper II--practical
4 credits(6 hrs/wk)Practical
COURSE CODE:UG02CMOBP2
(Semester---II)

1.Sampling and quantification of microorganisms in air, soil and water.

2. Isolation and Enumeration of bacteria [Streak plate, spread plate, pour plate, serial dilution]

3. Identification of microorganisms from the habitats Gram's staining, capsule staining, spore staining and motility]

4. To observe growth of Microorganism on selective media (Mac Conkey's agar)

CVM UNIVERSITY
FYBSc Molecular Biology Core Paper III
4 credits(4 lecture/wk)
COURSE CODE:UG02CMOB03
(Semester---II)
Paper-III- Biochemistry of Biomolecules--II

Unit-I--Amino acids: structure of twenty amino acids, classification, titration curve of amino acids, concept of zwitterionic structure, physical and chemical properties.

Unit-II--Proteins: classification of proteins on the basis of composition, conformation and function, different level of structural organization of proteins(primary, secondary, tertiary & quaternary), forces stabilizing protein structure and shape, physical and chemical properties. Domains and Motifs, Role of weak forces in biology.

UNIT-III: Lipids : Lipids: Definition, Importance, Nomenclature, General Structure and nomenclature of Fatty acids (Saturated, Unsaturated, Hydroxy and Cyclic), Biological Roles of Lipids and characterizations of lipids(iodine number, saponification number,acid number,Reichert Meissl number and rancidity).

Unit --IV-- Nutritional significance of dietary calcium, phosphorus, magnesium, iron, iodine, zinc and copper. Vitamins – Dietary sources, biochemical functions, requirements and deficiency diseases associated with water soluble and fat soluble vitamins.

References:

1. Lehninger's principles of Biochemistry by David L. Nelson & M.M. Cox(4^{th} Edition)
2. Biochemistry bySatyanarayan
3. Fundamentals of Biochemistry by Donald Voet, Judith Voet & W. Pratt
4. Enzymes by Palmer
5. Principles of Biochemistry by Horton, Moran, Scimgeour, Prey & Rawn
6. Harper's Illusrated Book of Bichemistry by Robbert Murray

CVM UNIVERSITY
FYBSc Molecular Biology Core Paper 3
2credits(4 hrs/wk)Practical
COURSE CODE:UG02CMOBP3
(Semester---II)
. **Paper Name : Practical**

1. Extraction of proteins by TCA methods
2. Estimation of protein by Lowry/ Biurate.
3.Determination of absorption spectra of DNA and protein.
4 . Determination of Iodine number and saponification number of fat.

CVM UNIVERSITY
FYBSc Molecular Biology
Ability enhancement--2 credits(2 lecture/wk)
COURSE CODE: UG02AENG01
(Semester---II)
(Paper- English)

Course objectives:

The objectives of this course are to enable students to…
Read to skim and scan through a passage
Read to get the over all idea, and comprehend the passage
Cultivate habit of newspaper reading
Write paragraphs on given topics
Develop points / ideas into longer composition
Use various types of adverbs in written communication
Write letters of invitation / accepting the invitation / declining the invitation
listen to and understand narrations, dialogues, talks
Use phrasal verbs in communication
Ask questions / make inquiry for variety of purposes
Identify language functions.

Topics to be covered in journal

Modal Auxiliaries
Active and Passive Voice
Connectives
Phrasal Verbs
Notions and Functions of Language
Adverbs of Time, Place and Frequency
Adverbs of Manner, Degree, Affirmation or Negation
Report Writing & Press Note
Letter of Invitation, Accepting the invitation, Declining the invitation

1. Listening Comprehension from 'Look Ahead' (Audio-visual BBC Course)

❖ **Books / Audio-Visual Courses recommended**

- *Corridors to Communication* --By Ranu Vanikar (Orient Longman)
- Champa Tickoo and Jaya Sasikumar (2000) *Writing with a purpose*, Chennai, OUP.
- David Jolly (1988). *Writing Tasks: An Authentic Task Approach to Individual Writing Needs* (Cambridge University Press)
- *Look Ahead* (An Audio-Visual BBC Course)
- Grant Taylor. *English Conversation Practice* (Tata McGraw Hill, New Delhi)
- R. P. Bhatnagar and R T Bell (1999) *Communication in English***,** (Orient Longman, Hyderabad)

CVM UNIVERSITY
FYBSc Molecular Biology
Elective--2 credits(2 lecture/wk)
COURSE CODE:UG02ECHE01
(Semester---II)
(Paper--Basic concept of chemistry--II)

UNIT-I Organic Chemistry - General introduction, methods of purification, qualitative and quantitative analysis, classification and IUPAC nomenclature of organic compounds. Electronic displacements in a covalent bond: inductive effect, electromeric effect, resonance and hyper conjugation. Homolytic and heterolytic fission of a covalent bond: free radicals, carbocations, carbanions, electrophiles and nucleophiles, types of organic reactions.

UNIT-II Hydrocarbons--Classification of Hydrocarbons. Aliphatic Hydrocarbons
Alkanes - Nomenclature, isomerism, conformation (ethane only), physical properties, chemical reactions including free radical mechanism of halogenation, combustion and pyrolysis.
Alkenes - Nomenclature, structure of double bond (ethene), geometrical isomerism, physical properties, methods of preparation, chemical reactions: addition of hydrogen, halogen, water, hydrogen halides (Markownikov's addition and peroxide effect), ozonolysis, oxidation, mechanism of electrophilic addition.
Alkynes Nomenclature, structure of triple bond (ethyne), physical properties, methods of preparation, chemical reactions: acidic character of alkynes, addition reaction of - hydrogen, halogens, hydrogen halides and water.

UNIT-III Electrochemistry -- Redox reactions, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells, Relation between Gibbs energy change and EMF of a cell, conductance in electrolytic solutions, specific and molar conductivity, variations of conductivity with concentration, Kohlrausch's Law, electrolysis and law of electrolysis (elementary idea), dry cell-electrolytic cells and Galvanic cells, lead accumulator, fuel cells, corrosion.

UNIT-IV Coordination Compounds-- Coordination compounds - Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds. Bonding, Werner's theory, VBT, and CFT; structure and stereoisomerism, importance of coordination compounds (in qualitative analysis, extraction of metals and biological system).

Reference Books:

1. Graham Solomon, T.W., Fryhle, C.B. & Dnyder, S.A. Organic Chemistry, John Wiley & Sons (2014).
2. McMurry, J.E. Fundamentals of Organic Chemistry, 7th Ed. Cengage Learning India Edition, 2013.
3. Sykes, P. A Guidebook to Mechanism in Organic Chemistry, Orient Longman, New Delhi (1988).
4. Eliel, E.L. Stereochemistry of Carbon Compounds, Tata McGraw Hill education, 2000.

5. Finar, I.L. Organic Chemistry (Vol. I & II), E.L.B.S.
6. Morrison, R.T. & Boyd, R.N. Organic Chemistry, Pearson, 2010.
7. Bahl, A. & Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010.
8. Samuel Glasstone, Thermodynamics for Chemists, Affiliated East West Private Limited.
9. B S Bahl, G D Tuli, Arun Bahl, Essentials of Physical Chemistry
10. Peter Atkins and Julio de Paula, Elements of Physical Chemistry, Sixth edition (2013), Oxford press
11. Ball D. W., Physical Chemistry, Thomson Press , India (2007)
12. Castellan, G.W. Physical Chemistry 4th Ed. Narosa (2004).
13. Atkins' Physical Chemistry –Thermodynamics and Kinetics, 11th Edition, Oxford Press
14. Thomas Engel, Philip Reid; Physical Chemistry, Pearson Education (2006)
15. J. N. Gurtu, A. Gurtu; Advanced Physical Chemistry, Pragati Edition
16. Mortimer R. G., Physical Chemistry, 3rd Edition, Elsevier, Noida (UP)
17. Samuel H. Maron and Carl F. Prutton, Principal of physical Chemistry, 4th Edition, Collier Macmillan Ltd.

CVM UNIVERSITY
FYBSc Molecular Biology
Elective--2 credits(2 lecture/wk)
COURSE CODE:UG02EICT01
Paper: Information & Communication Technology--II
(Semester---II) (Paper- ICT---II)

UNIT-I Computer Networks and Issues

Common network devices: network interface cards, hubs, bridges, switches, modems, routers, Use of WiFi and Bluetooth in networks, Difference between Local Area Network (LAN), Wireless Local Area Network (WLAN) and Wide Area Network (WAN)

Network issues and communication: security issues regarding data transfer, authentication techniques (such as biometric methods, magnetic stripes, id cards, passports, other physical tokens, retina scans, iris scans, face scans), use of anti-virus software

UNIT-II Communication using e-mail and Security of data

E-mail: Writing e-mails to single and multiple users, attaching a file, Marking CC and BCC, creating exclusive communication groups, define the term spam, why to prevent spam, methods used to help prevent spam

Effective security of data: define and its effects hacking, measures to protect data, what is user id, password, biometric data

Security of data online: digital certificate, Secure Socket Layer (SSL), define the terms: phishing, pharming, smishing, define the term computer virus and describe its effects, concept of a firewall

UNIT-III Impact of emerging technologies

describe how emerging technologies are having an impact on everyday life

Emerging technologies: artificial intelligence, biometrics, vision enhancement, robotics, quantum cryptography, computer-assisted translation, 3D and holographic imaging, virtual reality, IoT, GIS

UNIT-IV The effects of using IT

Effects of IT on un-employment in offices vs employment as website designers, computer programmers, delivery drivers in retail stores

Effects of IT on working patterns: part-time working, flexible hours, job sharing, compressed hours

Effect of microprocessor-controlled devices: in the home including their effects on leisure time, social interaction

Potential health problems: repetitive strain injury (RSI), neck and back problems, eye problems and some simple strategies for preventing these problems.