

Shivaji University, Kolhapur

Syllabus of Bachelor of Science (Bioinformatics) Entire Part - I (Sem.- I & II) To be implemented from the academic year 2010-11 (i.e. from June 2010) onwards.

Course Code	Title of the Course	Theory	Internal
BTE-101	Physical and Inorganic Chemistry	40	10
(Paper-I)			
BTE-102	Basics in Physics	40	10
(Paper-II)			
BTE-103	Plant Science	40	10
(Paper-III)			
BTE-104	Mathematical Methods	40	10
(Paper-IV)			
BIF-105	Computer Fundamentals	40	10
(Paper-V)			
BTE-106	Basics in Cell Biology	40	10
(Paper-VI)			
BTE-107	Basics in Microbiology	40	10
(Paper-VII)			
BIF-108	Introduction to Bioinformatics	40	10
(Paper-VIII)			
BTE-109	English for Communication-Paper-I	40	10
(Paper-IX)			
BIF-111	Practical on Botany and	*Practical	
	Microbiology		
BIF-112	Practical on Chemistry	*Practical	
BIF-113	Bioinformatics practical	*Practical	
BIF-114	Practical on Computer Science	*Practical	

[Note :- Practical Examination will be Annual]

<u>BTE 101- Paper-I</u> Physical and Inorganic Chemistry

Topic No.		Lectures 45
	Unit- I	13
1.	 Chemical Equilibrium 1.1 Colligative properties- Definition, osmosis, osmotic pressure and reverse osmosis. 1.2 Common ion effect 1.3 pH and pOH, buffer capacity. 1.4 pH of buffers- Henderson equation for acidic and basic 	06
2	buffers with derivation. 1.5 Numerical problems.	07
2.	 Reaction Kinetics 2.1 Introduction-Meaning and definitions of- rate constant, order and molecularity of reaction, activation energy. 2.2 Integrated rate expressions for zero, 1st and 2nd order reactions. 2.3 Characteristics of 1st order reactions. 2.4 Catalysis- Definition, types of catalysis with example, characteristics of catalysis. 2.5 Elementary enzyme catalyzed reactions- Meaning and examples. 2.6 Numerical problem 	07
3.	 Unit- II Thermodynamics 3.1 Introduction- Reversible and irreversible processes, internal energy. 3.2 Enthalpy, heat of reaction and its types, First Law- Statement and mathematical expression, Hess law. 3.3 Measurement of ΔH, Trouton's rule, Kirchoff's equation. 3.4 Second law- Statement, concept of entropy (Criteria for spontaneous and non-spontaneous processes). 3.5 Third law-Absolute entropies and their uses. 3.6 Gibbs and Helmholtz free energy functions-Criteria for thermodynamic equilibrium and spontaneity. 3.7 ΔG and K, ΔG and work function 3.8 Relation between ΔH and ΔG(Gibbs-Helmholtz equation). 3.9 Phase equillibria- Clapeyron-Clausis equation and its applications. 3.10 Numerical problems. 	11

	Unit- III		
4.	Electrochemistry (Reduction potentials to be used)		
	4.1 Introduction- Conductance- Definition and types.		
	4.2 Kohlrausch law- Statement and its applications.		
	4.3 Galvanic cells, half-cell potentials, emf meaning and		

	definition.	
	4.4 Thermodynamics of electrode potentials, Nernst equation	1
	and its derivation, K from cell emf, determination of ΔG ,	1
	ΔH and ΔS .	1
	4.5 Types of electrodes, construction and working of calomel	1
	and glass electrodes.	1
	4.6 Numerical Problems.	1
	Unit- IV	
5.	Structure and Bonding.	11
	5.1 Introduction- Definition and formation of ionic and covalent	1
	bond with examples, e.g. NaCl, KCl, HCl, CH ₄ , Cl ₂ , H ₂ .	1
	5.2 VBT- Postulates.	1
	5.3 Cocept of Hybridization, sp, sp^2 , sp^3 hybridization with	1
	respect to C_2H_2 , C_2H_4 , CH_4 (Along with consequences with	1
	respect to bond length, bond angle, bond energy and shape of	1
	the molecule.	1
	5.4 Dipole moment- Definition and significance.	1
	5.5 Hydrogen bonding- Definition, intra and intermolecular	1
	hydrogen bonding with suitable example (Proteins, alcohols,	1
	Hydroxy acids, phenols).	1
	5.6 Van der Waal's forces.	1
	5.7 Essential and trace elements in biological processes (Mg	1
	and Fe).	1
	5.8 Ionic solids- Definition and general characteristics,	1
	comparision between, ionic and covalent compounds.	1
	· · · 1	l

References-(Use recent Editions)

1) University general chemistry - C. N. R. Rao, Macmillan.

2) Physical chemistry - R. A. Alberty, Wiley Eastern Ltd.

3) Quantum chemistry including molecular spectroscopy- B. K. Sen.

4) Organic chemistry - D. J. Cram and G. S. Hammond (Mcgraw-Hill).

5) A Guide-book to mechanism of organic chemistry-Peter Sykes-6th Edition.

6) Theoretical principles of inorganic chemistry- G.S. Manku

7) Physical chemistry by Sharma and Puri

8) Instrumental methods of chemical analysis- Chatwal & Anand

9) Instrumental methods of chemical analysis- B. K. Sharma

10) Organic chemistry VOL-II 5th Edition- I. L. Finar

11) An introduction to electrochemistry- Samuel Glassstone

12) The elements of physical chemistry – P.W. Atkins.

13) Essential of physical chemistry- B .S. Bahel. & G. D. Tuli.

14) Principels of physical chemistry - S.H Maron & Pruton

15) Concisein inorganic chemistry – J.D. Lee

16) Organic chemistry – Morrison & Boyd.

(BTE 102 – Paper-II) Basics in Physics

Topic No		Lectures
110.	Unit I	43
1	UIIIt- I Flasticity:	7
_	Introduction definitions of stress and strain in solids types of strain	
	and stress. Hooks law, definition of Young's modulus (Y), bulk	
	modulus (K) and modulus of rigidity (\Box), relation between Y. \Box	
	and K (without derivation), stress strain curve, importance of	
	elasticity.	
	Unit- II	
		16
2	Viscosity and Surface Tension	
	Introduction, streamline and turbulent flows, concept of viscosity,	
	coefficient of viscosity, effect of temperature and pressure on	
	viscosity of liquids, concept of pressure energy and Bernoulli's	
	theorem (without proof), Application of Bernoulli's theorem-	
	venturimeter, Pitots tube (working only), review of surface tension,	
	surface energy, capillary action, angle of contact, wetability,	
	relation between surface tension, excess pressure and curvature	
	(without derivation), factors affecting surface tension, methods of	
	measurement of surface tension- Jaegers method	
	(formula and working only), applications of surface tension.	
	Unit- III	8
3	Sound waves: Introduction, machinical and electromegnetic waves, transverse and	0
5	longitudinal waves with characteristics, principle of superposition of	
	wayes (Statement only) phenomenon of heats and expression for	
	frequency of beats application of beats audible ultrasonic and	
	infrasonic waves properties of ultrasonic waves and their	
	applications. Doppler effect and its applications.	
	Unit- IV	
	Thermodynamics and Thermometry:	14
4	Introduction, various temperature scales (Kelvin, Celsius,	
	Fahrenheit, Reaumer and Rankin), thermal energy, platinum	
	resistance thermometer-principle, construction and working,	
	seebeck effect (Neutral temperature, inversion temperature, thermo	
	emf, thermo current), thermocouple, application of thermocouple as	
	thermometer, thermister- NTC, PTC, application of thermister as	
	thermometer. Thermodynamic system and thermodynamic variable	
	(P,V,I and S), thermodynamic equilibrium, heat and work, First	
	law of thermodynamics, discus thermodynamic process - isothermal	
	change, isochoric change, isobaric change, adiabatic change,	
	entropy Andrews experiment definition of critical isotherm critical	
	temperature (Tc) critical pressure (Pc) liquification of gases	
	temperature (1c), critical pressure (Pc), inquincation of gases.	

References:

- 1. Physics by Devid Hallday Roberet Resnik, (Vol-I and Vol-II) Wiley Eastern limited
- 2. Fundamental of mechanics, S. K. Saxena, Himalaya Publications
- 3. Perspectives of modern physics, Aurthur Beiser, McGrawHill Publication
- 4. Heat and thermodynamics, Zemansky, McGrawHill Publication
- 5. Fundamentals of optics, Jenkins white, McGrawHill Publication
- 6. Text book of optics, N. Subrahmanyan Brijlal, S. Chand and Company Limited
- 7. Optics by Ajoy Ghatak, Tata McGrawHill Publication
- 8. Properties of matter, D. S. Mathur, Sha, alal Charetible trust
- 9. Solar energy, Suhas Sukatme, Tata McGrawHill Publication
- 10. Principle of electronics, V. K. Mehta, S. Chand and Company Limited
- 11. Digital principles and application, Malvino and Leach, Tata McGrawHill Publication
- 12. Elements of spectroscopy, Gupta, Kumar, Sharma, Pragati Prakashan
- 13. Introduction to atomic spectra, H. E.White, McGrawHill Publication
- 14. Biophysics, Vastala Piramal, Dominent Publishers and Distributor

BTE 103, (Paper-III) Plant Science

Topic		Lectures
No.		45
	Unit- I	12
1.	Plant Diversity	
	1.1 General Classification of Plant Kingdom.	01
	1.2 Algae – General characters and economic importance	02
	1.3 Fungi – General characters and economic importance	02
	1.4 General account of Lichens and its importance	01
	1.5 Bryophytes – General characters and economic importance	02
	1.6 Pteridophytes – General characters and economic importance	02
	1.7 Gymnosperms – General characters and economic importance	01
	Angiosperms – General characters and economic importance	01
	Unit- II	10
2.	Plant Taxonomy	
	2.1 Aims, objectives and functions of taxonomy.	02
	2.2 Binomial nomenclature and its significance	03
	2.3 Principles of ICBN	02
	2.4 Study of outline of Bentham and Hooker's system of	03
	classification	
	Unit- III	10
3.	Organization Of Plant Body	
	3.1 Plant Tissues- Simple and complex	02
	3.2 Typical Flower – Floral whorls and functions.	01
	3.3 Development of male and female gametophyte.	02
	3.4 Pollination- types and advantages, fertilization	02
	3.5 Fruit- Formation, types:- Simple, aggregate, composite (one	02
	example of each), Parthenocarpy	
	3.6 Seed –Formation and structure.	01
	Unit- IV	13
4.	A) Internal Organization Of Dicot and Monocot	05
	4.1 Primary structure, normal secondary growth and annual rings	03

4.2 Periderm formation	02
B) Plant Physiology	08
4.3 Growth- Phases, growth curve	01
4.4 Phytohormones- Role and practical applications.	02
4.4 Photoperiodism	02
4.5 Vernalization	01
4.6 Dormancy, breaking of dormancy, germination, vigour and viability	02

Reference Books:

- 1. Devlin R.M. Fundamentals of plant physiology (MacMillan)
- 2. Malik C.P. Plant physiology, Kalyani publishers
- 3. Dube H.C. Text of fungi, bacteria and viruses.
- 4. Bold H.C. The Plant kingdom, Prentice Hall India
- 5. Chopra G.L. i. Class book of algae, ii. Class book of fungi
- 6. Dutta A.C. A Class book of botany, Oxford University Press
- 7. Kumar H.D. Biodiversity and sustainable development (Oxford & IBH)
- 8. Mukherji H. Plant groups (New central book depot)
- 9. Parihar N.S. An Introduction to embryophyta (Central book depot)
- 10. Vasishtha P.C. Botany for degree students-Gymnosperms
- 11. Naik V.N. Taxonomy of angiosperms
- 12. Lawrence G.H. Taxonomy of flowering plants
- 13. Chopra G.L. Angiosperms (Systematic and life cycle)
- 14. Shivarajan V.V. Introduction to principles of taxonomy.
- 15. Pandey B.P. Text book of angiosperms
- 16. Eames A.J. and An introduction of plant anatomy, Mac Daniels L.H.
- 17. Esau K. Anatomy of seed plants
- 18. Esau K. Plant anatomy
- 19. Fahn A. Plant anatomy
- 20. Mathur R.C. Systematic botany

<u>BTE104 – (Paper-IV)</u> <u>Mathematical Methods</u>

Topic No.			Lectures 45
1		Unit- I	10
	Complex Nu	imbers	
	1.1	Introduction	
	1.2	Operations on complex numbers.	
	1.3	Complex conjugate, Modules and argument of complex number and simple examples on it.	
	1.4	DE MOIVRE'S Theorem.	
	1.5	Simple examples on above theorem	
	1.6	n^{th} roots of a complex number and simple examples on it.	

		Unit- II	15
2	Matrices		
	2.1	Definition and types of Matrices	
	2.2	Algebra of Matrices (addition, subtraction, scalar	
		multiplication and multiplication of matrices)	
	2.3	Examples on operation of Matrices	
	2.4	Inverse of a matrix by a ad joint method	
	2.5	Rank of a Matrix (Definition) and examples.	
	2.6	System of Linear equation.	
		1) Non homogenean	
		11) Homogenean With avamplas	
	2.7	With examples	
	2.1	examples	
3		Unit-III	10
•	Differential	equation	20
	Differential	equation	
	3.1	Defination of ordinary differential equation and	
		degree, order of differential equation	
	3.2	Exact differential equation with simple examples.	
	3.3	Linear differential equation $\frac{dy}{dx} + py = Q$ method of	
		solution with simple examples	
	34	Bernoulli's differential equation with examples	
	3.5	Application of differential equation	
	0.0	i) Growth and decay problems	
		ii) Newton's law of cooling with examples.	
		T	10
4	Partial diffa	Unit-1V	10
	1 al tial unit	i cittation	
	4.1	Introduction	
	4.2	Simple examples on evaluation of partial derivatives	
	4.3	Composite function with examples	
	4.4	Homogenous function (Definition)	
	4.5	Euler's theorem for first and second order.	
	4.6	Simple examples on above theorems.	
	4.7	Extreme values with examples.	
	4.8	Lagrange's method of undetermined multipliers (with proof)	
	4.9	Examples on above method.	

Recommended book for mathematics:

1) Mathematics for biologists by Sujata Tapare (vision publication).

Reference books:

- 1) Algebra and geometry by G. V. Khumbojkar.
- 2) Calculus and differential equation (Phadake prakashan). Prof. L. G. Kulkarni, Dr. P. B. Jadhav

<u>BIF105 – (Paper-V)</u> <u>Computer Fundamentals</u>

Topic No		Lectures 45
	Unit- I	
	Introduction to computer: Definition of computer, characteristics,	
	limitations, concepts of h/w and s/w, capabilities of computers,	12
1	evaluation, generation, classification based on size an purpose,	
	applications of computers in various fields, computer language – high	
	level, low level, assembly level, compiler, interpreter.	
	Structure of computer :- Block diagram and functions of units,	
	Input Unit – ALU, Memory Unit, Control Unit, Introduction to	
	motherboard, SMPS, Expansion Slots, Serial and Parallel ports, USB.	
	Concept of Memory: Primary Memory – RAM, ROM, EPROM, DROM Secondary Storage devices: Magnetic disk Magnetic tene	
	Floppy disk Pendrive DVD/CD ROM Cache memory RAM ROM	
	PROM FPROM	
	Input/Output Devices: - Keyboard Mouse Light pen Joystick	
	Touch screen. Digitizer. Scanner. MICR. OMR. Barcode reader and	
	Mike. VDU, Printers – Dot-matrix, Inkjet, Laser, Line, Plotters.	
	Unit- II	
	Numbering System and Boolean Algebra:	
2	BCD, EBCDIC, ASCII, Gray Code, Excess 3- code, Bit, Byte, Word.	11
	Number System – Binary, Octal, Decimal, Hexadecimal Conversion	
	of Number System, Binary Arithmetic - addition, subtraction,	
	multiplication, division, ones and two's nine's and ten's compliment.	
	Boolean Algebra: Postulates of Boolean algebra, Laws of	
	absorption, DeMorgans Theorem, Karnaugh Map(for 4 variables).	
	Logic Gates and Memory: Logic Gates: AND, OK, NOR, NAND, NOT EX OB Universal gates Construction of aircuit using Lagia	
	NOT, EA- OK, Universal gates Construction of circuit using Logic	
	Butos.	
	Unit- III	
2		11
3	Introduction to Operating Systems: Definition and Functions of	11
	O.S. Types of O.S. –Single user, Multi-user, Graphical User interface.	
	Disk Operating System (DOS). Dos internal and external commands	

	Batch files commands, concept of directory and file, DOS Commands: Internal-DIR, CLS, TIME, DATE, VOL, VER, DATE, TYPE, REN, ERASE, COPY and External: CHKDSK, FORMAT, DISKCOMP, DISKCOPY. Introduction to Windows operating system.	
2	Unit- IV Microsoft office application: Word and Excel:- Creating letter (Using all options), Fonts, table, margins, page layout document, print preview, printing document, formatting document, header and footer, spell check, template, coloring effects, mail merge, auto text, inserting picture, word art. Introduction to Excel, Sorting, Queries, Graphs, and Functions (Frequently used mathematical and statistical functions).	11

References:-

- 1) Computer Today --Basundra
- 2) Fundamentals of computers --V. Rajaraman.
- 3) Computer Fundaments -- P.K. Sinha.
- 4) Computer Fundamentals (Architecture and Organization)- B. Ram
- 5) Microsoft Office 2000 Vipra Computers
- 6) Computers Today S. Basandra (Galgotia Pub)
- 7) Digital Fundamentals Floyd.
- 8) Digital Principles and Applications A. P. Malvino & D.P.Leach (TMH).
- 9) Modern digital Electronics (2nd Edn.) R. P. Jain.

<u>BTE 106-(Paper-VI)</u> <u>Basics in Cell Biology</u>

Topic No		Lectures 45
	Unit- I	
1	Cell structure	11
	1.1 Cell theory-Definition, discovery, three assumptions of cell	
	theory, exceptions, organismal theory, protoplasm theory	
	1.2 Prokaryotic and eukaryotic cell, general structures of	
	mycoplasma and blue green algae.	
	General structure of plant & animal cell.	
	1.3 Ultra structure & functions of cell organelles	
	Mitochondria	
	Chloroplast	
	E.R.	
	Golgi apparatus, complex	
	Lysosome	
	Peroxisome	
	Ribosomes	
	Proteosomes.	

	Unit- II	
	Nucleus	11
2	. 2.1 Ultra structure of nucleus	
	2.2 Nuclear membrane, nucleopore complex,	
	2.3 Chromosomes-organization, chromatin-euchromatin and	
	heterochromatin	
	2.4 Nucleosome- unit of chromatin	
	2.5 Giant chromosomes-polytene and lampbrush	
	Unit- III	
3	Cytoskeletal assembly	12
	3.1 Introduction	
	3.2 Cytoskeletal elements	
	3.3 Microtubules-ccurrence, structure, chemical composition,	
	microtubule associated proteins, HMW proteins, DAU proteins	
	MTOC, assembly and disassembly of microtubules, functions	
	3.4 Microfilaments- occurrence, structure, chemical composition,	
	functions	
	3.5 Intermediate filaments(IF)occurrence, structure, chemical	
	composition, types of IF, functions	
	3.6 Organization of cilia and flagella	
	Unit- IV	
4	Membrane transport	11
	4.1 Membrane structure(in brief)	
	4.2 Types of membrane transport	
	Passive transport-simple diffusion, facilitated diffusion, osmosis.	
	Active transport-primary and secondary transport	
	Bulk transport-endocytosis and exocytosis	

References:-

- 1) Molecular biology of cell-Albert
- 2) Molecular biology & cell biology Loddish etal
- 3) Cell biology De Robertis
- 4) Cell biology-Genetics, molecular biology-P.S. Warma & Agarwal
- 5) Genes Lewin
- 6) Cell biology –Geral karp
- 7) Practical biochemistry Keith, Wilson and Walker

<u>BTE 107- (Paper-VII)</u> <u>Basics in Microbiology</u>

Topic No		Lecturers 45
1	Unit- I	10
	History and scope of microbiology	
	Microscopy-Antony Van Leeuwenhock, Robert Hooke	
	Spontaneous generation theory	
	Important contributions of -Louis Pasteur, Robert Koch, Joseph	
	Lister, Alexzander Flemming, Edward Jenner, John Tyndall	
	Definition of microbiology and introdution to applied branches of	
	microbiology- air, soil, water, sewage, food, milk, industrial,	
	medical, biotechnology	
	Major microbiological institutes in India	
2	Unit- II	10
Z	Cytology of typical bacterial cell	12
	a] Morphology, size & arrangement of bacteria	
	b] strutures & functions of capsule & slime layer, flagella, pilli, cell	
	wall, cytoplasmic memorane, nuclear material, ribosomes,	
	mesosomes, reserve tood materials-volutin granules, PHB,	
	Differences between prokaryotic & eukaryotic cells	
3		13
5	General characteristics of viruses. Arachaebacteria Rickettsiae	10
	Actinomycetes Chalmydia Myconlasma	
	cultivation of viruses	
	life cycle of bacteriophages	
	lytic cycle of T4 phage	
	Unit_ IV	
4	Pure cultures techniques	10
	a) selective methods-chemical physical & biological methods of	
	selection	
	b] methods of isolating pure cultures-streak, pour& spread plate	
	Control of microorganisms	
	a] definition of sterilization, disinfectant, antiseptics, germicide,	
	antimicrobial agents	
	b] physical agents-temperature-dry heat, moist heat, desiccation,	
	osmotic pressure, radiations, filteration	
	c] Chemical agents-phenol & phenolic compounds, alcohols,	
	halogens, heavy metals & their compounds, gaseous agents	

References:

- 1) General microbiology-Stanier
- 2) Introduction to microbiology-Ingraham
- 3) Brock biology of microorganisms-Madigan et al
- 4) Fundamentals of microbiology-Frobisher
- 5) Microbiology-Pelczar
- 6) General microbiology Pawar & Daginawala
- 7) Text book of microbiology-Ananthanarayan

<u>BIF 108 – (Paper-VIII)</u> Introduction to Bioinformatics

Topic No.		Lectures 45
1	Unit- I History and Bioinformatics Applications: History, definition, bioinformatics introduction, information technology, biological data, biomolecules introduction; proteins, nucleic acids, carbohydrates, lipids. Importance and uses of bioinformatics, Database development, protein sequencing, nucleic acid sequencing, and genetics related applications, sequence analysis, protein structure prediction, nucleic acid structure prediction, sequence to structure relationship and drug discovery.	12
2	Unit- II Information network: Internet uses, communication protocol; WWW; web browsers, home page, servers, Netscape navigator, Internet explorer. HTML, HTTP, and URLs, Computer application; transmission control protocol/Internet protocol (TCP/IP); Internet facilities; domains, File transfer protocol (ftp), telnet protocol, E-mail, messenger, Chat, Searching of Information.	10
3	Unit- III Human Genome Project: History, Nucleic acids, Genes, Genomes; Contribution of various countries, Introduction about National Institutes of Health (NIH), National Library of Medicines (NLM), National centre for Biotechnology Information (NCBI): various databases developed by NCBI, European Bioinformatics Institutes, Swiss Institutes of Bioinformatics. National Institutes of Human Genome Project (NHGRI); Introduction and need of Human Genome Project, rough and final draft of the Human Genome Project, Goals of the HGP, uses and applications; Genomics and proteomics; drug discovery.	12
4	Unit- IV Nucleic Acid sequence Databases: Introduction, nucleosides and nucleotides, genes, discussion of various genomes; Genome databases; introduction to nucleic acid sequence databases; GenBank, European	11

/ Laboratory (EMBL), DNA Databank of Japan	
ge and gene annotations.	
ses : Data, biological data, literature data, collection	
databases, introduction to database management	
ntrez; Life sciences search engine; Entrez databases	
ion, PubMed; Introduction, and uses of PubMed,	
MIM, OMIA, Journal databases.	
	y Laboratory (EMBL), DNA Databank of Japan ge and gene annotations. ses: Data, biological data, literature data, collection databases, introduction to database management ntrez; Life sciences search engine; Entrez databases ion, PubMed; Introduction, and uses of PubMed, DMIM, OMIA, Journal databases.

Reference Books:

- 1) Bioinformatics Sequence and Genome analysis, II Edition by David W. Mount.
- 2) Introduction to Bioinforamtics by Attwood, T. K. and Parry-Smith, D. J.
- 3) Bioinforamtics Methods and Applications by Rastogi, S. C., Mendiratta and Rastogi, P.
- 4) Discovering, Genomics, Proteomics and Bioinformatics by A. Malcom Campbell and Laurie J. Heyer.
- 5) Bioinformatics by Shalini Suri.
- 6) NCBI web site http://www.ncbi.nlm.nih.gov

BTE 109

English for Communication

Section I :- Communication Skills

- Unit 1 : How to Express Your Views and Opinions.
- Unit 2 : Talking About Personal Experiences.
- Unit 3 : Preparing a C.V. and Writing a Letter of Application

Section II :- Reading Comprehension Skill

Unit 7	:	Forgetting	-Robert Lynd
Unit 8	:	Wife's Holiday	-R.K. Narayan
Unit 9	:	Man in the Future	-Bill Williams
Unit 10	:	Prafulla Chandra Ray	

		Pattern of Question Paper Sem- I	
Q.1)	A)	Complete the following by choosing the correct option (Set to	05
		be on Reading skill Units)	
	B)	Textual vocabulary Items	05
		Synonym – 1	
		Antonym – 1	
		Pairing the words (With meaning) -1	
		Change the Grammar class-1	
		Word-formation-Affixation-1	
Q.2	A)	Answer any Three of the following in 2 to 3 sentences (Out of 4)	06
		1	
		2.	
		3.	
		4.	
	B)	Write short notes on any ONE of the following (Out of 2)	04
Q.3	A)	Express your agreement or disagreement on the following	05
		topics.	
		(Unit no 1) B) Express your opinions or views on the	05
		following topic in 5 to 6 sentences.	
Q.4		(Unit no 2)A) Narration OR	
		Piece of conversation regarding personal problems /	05
		experiences	
		(Unit No.3) B) Write an application letter OR C.V.	05
		Note:- A question should be set either on writing an	
		application letter or C.V. only	

Sr. No.	Name of the Practical	Practical 10
1.	Use, care and study of Compound Microscope.	
2	Demonstration of Laboratory equipments	
2.	i) Autoclave	
	iii) Hot air oven	
	iv) Seitz's filter	
	v) pH meter	
	vi) Distilled water plant	
	vii) Laminer Air Flow	
3.	Microscopic examination of Bacteria	
	i) Monochrome staining ii) Negative staining	
	iii) Gram staining iv) Hanging drop technique of motility	
4.	Staining of –	
	1) Cell wall (Chance's method)	
	11) Capsule (Maneval's method)	
	Preparation of culture media –	
5.	i) Peptone water ii) Nutrient broth iii) Nutrient agar	
	iv) MacConkey's agar v) Starch agar	
6.	Isolation, Colony characteristics, Gram staining and motility	
	of –	
	1) <u>Escherichia coli</u>	
-	11) Bacillus species	
7.	Mitosis in Plants	
8.	Meiosis in Plants tissue	
9.	Study of tissue in Plants	
10	Extraction of DNA from Plant	

Books recommended for Practical:

- 1) Stains and Staining procedures by Desai and Desai.
- 2) Introduction to Practical Biochemistry by D. Plummer, J Wiley and Sons.
- 3) Bacteriological techniques by F. J. Baker.
- 4) Laboratory methods in Biochemistry by J. Jayaraman.
- 5) Experimental Microbiology Patel & Patel

BIF 112 - Practical on Chemistry

Sr. No.	Name of the Practical	Practicals 10
1.	 A) Organic preparation (Any Three Practicals) 1) Preparation of P - Nitro acetanulide from acetanilate 2) Preparation of m -dinitrobezene from nitrobenzene 3) Preparation of phthalimide from phthalir anhydride a) Preparation of methylsalicylicate and b) Preparation of nitro salicylic acid 	
2.	 B) Organic estimation (Any Three) Determination of specific rotation of sucrose sample and hence determination of unknown sucrose concentration from the sample Estimation of sap value of given oil sample Estimation of amount of sucrose from sample using fehling solution A&B Estimation of a vitamin - C tablet Analysis of commercial vinegar 	
3.	Preparation of solutions of given molarity and normality.	
4.	Chemical Kinetics a) To investigate the reaction between potassium presulphate and potassium iodide in solution with equal concentrations of the reactants. b) Acid catalyzed hydrolysis of methyl acetate.	
5.	 Conductomatry a) To determine the strength of the given strong acid solution by conductometric method by titrating against a strong alkali solution. b) Determination of degree of dissociation and dissociation constant of acetic acid at various concentrations and to verify Oswald's dilution law. 	
6.	Thermochemistry Determination of heat of ionization of a weak acid	
7.	Standardization of solutions. a) Preparation of standard potassium dichromate solution and determination of its normality using oxalic acid.	
8.	Preparation of dilute solution from given stock solution	

Practical Reference Books:

- Practical books of Physical Chemistry -Nadkarni, Kothari and Lawande. Experimental Physical Chemistry A. Findly 1)
- 2)

- 3) Systematic experimental Physical Chemistry S. W. Rajbhoj, Chondhekar (Anjali Publication)
- 4) Experiments in Physical Chemistry R. S. Das and B. Behra (Tata Mc. Graw Hill)
- 5) Advanced Practical Physical Chemistry S. B. Yadavs (Goel publishing house).
- 6) Text book of practical Organic chemistry (4th Edition, Longman) A. I. Vogel

BTE 113- Bioinformatics Practical

Sr. No.	Name of the Practical	Practicals 10
A)	Bioinformatics Practicals	
1.	Browsing and understanding NCBI web page.	
2.	Understanding Human Genome Project.	
3.	Introduction to literature database- PubMed	
4.	Introduction to journal database.	
5.	a) Getting protein sequences.b) Getting gene sequence	
B)	Practicals on Database management systems :- (DBMS, RDBMS)	
6.	Introduction to RDBMS.	
7.	Creation of: Client Master, Create table Product Master, Create table Salesman master, Create table sales order, Create table Sales order details, Create table Supply Master, Create table Employee, Create table Department Master.	
8.	Queries: Queries, Select Queries, Select Queries, Update Queries, Delete Queries, Create table Book title, Create table Book Author, Create table Author, Queries, Alter Queries, Select Queries on client Master Table, Select Queries, Delete and Drop Queries on Client, and product Master, to check Palindrom Number/String, Reverse given number	
9.	write a cursor to calculate area of circle.	
10	Write a PL-SQL Procedure to calculate 5% of salary of Employee from Employee table.	

Suggested readings

- 7) Bioinformatics Sequence and Genome analysis, II Edition by David W. Mount.
- 8) Introduction to Bioinforamtics by Attwood, T. K. and Parry-Smith, D. J.
- 9) Bioinforamtics Methods and Applications by Rastogi, S. C., Mendiratta and Rastogi, P.
- 10) NCBI web site (<u>http://www.ncbi.nlm.nih.gov</u>)

- 11) Discovering, Genomics, Proteomics and Bioinformatics by A. Malcom Campbell and Laurie J. Heyer.
- 12) Bioinformatics by Shalini Suri
- 7) Database System Concepts- Korth Silberschetz.
- 8) Commercial Application Development Using Developer 2000 by Ivan Bayross.
- 9) Structure Query Language- By Osborne.
- 10) Internet: An Introduction- Tata McGraw Hill Pub
- 11) SQL for Oracle 9i by P. S. Deshpande.

BTE 114 – Practical on Computer Science

Sr. No.	Name of the Practical	Practicals
		15
	Computer Practicals	
1	Demonstration of peripherals	
2	Linking of various peripherals	
3	Operation of all keys of keyboard	
4	DOS – external and internal commands, batch files commands	
5	Windows Operating System – Windows explorer, program manger,	
6	control panel, print manager, Creating folders, files, icons, shortcuts	
7	MS–WORD – Creating new documents, typing, deleting, selecting text, undo, redo, formatting text – auto format, formatting, insertion of table characters, drop caps, Paragraphs, line spacing, margins, page setup, headers and footers, Writer's tools – spelling checker, auto format, auto correct, find and replace, Mail merge – Data source, Main document, creating mail merge document.	
8	MS–EXCEL - Creating worksheet, Graphs, resizing graphs, formulas, if statement, types of functions, frequently used mathematical and statistical functions	
9	power point :-creating slides, insertion of text ,picture ,table, charts etc, custom animation, slide transaction.	
10	Internet :- browsing internet ,creating e-mail account,using mail, sending, receiving, attachment etc, browsing search engine like as Google, yahoo search ,download files using search engine	

Nature of question paper:

Annual Practical Examination

- A) Every candidate must produce a certificate from the Head of the Department in his college, stating that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Academic Council on the recommendations of the Board of Studies and that the laboratory Journal has been properly maintained. Every candidate must have recorded his/her observations in the Laboratory journal and written a report on each exercise performed. Every journal is to be signed periodically by a member of the teaching staff and certified by the Head of the Department at the end of the year. Candidates are to produce their journals at the practical examination and such journals will be taken into account by the examiners in assigning marks.
- B) The practical examination will be of 6 hours duration and will be conducted on two successive days (3 hours per day)

Distribution of Marks for Practical Examination:

1. Biochemical Techniques:	
One major experiment	10 marks
One minor experiment	05 marks
2. Microbiological Techniques:	
One major experiment	10 marks
One minor experiment	05 marks
3. Biophysics/Biostat/computer	10 marks
4. Oral on Practicals	05 marks
5. Journal	05 marks
Total Marks:	50 marks

Note: Experiments may be arranged as per convenience of the examiner.

B. Sc. Part - I (Semester- II)

BIOINFORMATICS

Course Code	Title of the Course	Theory	Internal
BTE-201	Organic and Inorganic Chemistry	40	10
(Paper-X)			
BTE-202	Applied Physics	40	10
(Paper-XI)			
BTE-203	Animal Science	40	10
(Paper-XII)			
BTE-204	Statistical Methods	40	10
(Paper-XIII)			
BTE-205	Proteins and Enzymes	40	10
(Paper-XIV)			
BIF-206	Database programming	40	10
(Paper-XV)	languages		
BTE-207	Techniques in Microbiology	40	10
(Paper-XVI)			
BIF-208	Programming concept and C-	40	10
(Paper-XVII)	language		
BTE-209	English for Communication-	40	10
(Paper-XVIII)	Paper-II		
BIF-211	Practical on Zoology and	*Practical	
	Microbiology		
BIF-212	Practical on Biochemistry.	*Practical	
BIF-213	Biostatistics practical	*Practical	
BIF-214	Practical on Mathematics	*Practical	

[Note :- Practical Examination will be Annual]

BTE 201- Paper-X Organic and Inorganic Chemistry

Topic No.		Lectures 45
	Unit- I	13
1.	Mechanistic Basis of Organic Reactions	
	1.1 SN ¹ and SN ² mechanisms (Hydrolysis of t-butyl halide and	
	primary alkyl halide) with energy profile diagram.	
	1.2 Elimination reactions- E1 and E2 mechanisms (Dehydration	
	of alcohol), Hoffman's and Saytzeff's rules- statements and	
	justifications.	
	1.3 Addition reactions- Electrophilic addition reactions in	
	alkenes (Markovnikoff and anti-Markovnikoff additions),	
	nucleophilic addition reactions of carbonyl compounds	
	(cyanohydrin formation).	
	1.4 Concept of an aromaticity.	
	1.5 Mechanism of SE reactions in benzene- Nitration,	

	sulphonation, halogenation, diazotization, Friedel-Craft's	
	alkylation and acylation reactions.	
	1.6 Orientation effects as exemplified by various functional	
	groups. (Nitro and –OH group)	
	1.7 Structure- reactivity correlation w.r.t. inductive, mesomeric,	
	and steric effects.	
	1.8 Tautomerism.	
	Unit-II	10
2.	Stereochemistry	
	2.1 Geometrical isomerism in alkenes.	
	2.2 Optical activity-Polarimeter, specific rotation.	
	2.3 Chirality- Chiral molecules, symmetry elements,	
	asymmetric carbon, compounds with one and two chiral	
	centers, diastereomers.	
	2.4 E-Z and R-S nomenclatures.	
	2.5 Stereospecific and stereoselective reactions with example of	
	an enzymatic reaction.	
	2.6 Numerical Problems	
	Unit- III	
3.	Chemistry of Natural Products	
		05
	3.1 Terpenoids -Isoprene rule, structure determinations of	
	citral.	
	3.2 Natural Pigments- Carotenoids and their functions in	
	Plants, structural details of chlorophyll.	
	3.3 Alkaloids- Basic structure, classification with suitable	
	examples.	
4.	Chromatography	06
	4.1 Introduction- Definition, classification.	
	4.2 Principle, Technique and application of paper	
	chromatography and TLC.	

	Unit- IV	
5.	UV-Visible Spectroscopy	11
	5.1 Introduction.	
	5.2 Electronic Transitions and designation of UV-bands.	
	5.3 General applications, spectrum, isolated double bonds,	
	conjugated dienes, carbonyl compounds, aromatics.	
	5.4 Analytical uses.	
	5.5 Lambert-Beer's law	
	5.6 Instrumentation with respect to colorimeter and single beam spectrophotometer.	
	5.7 Applications of UV and Visible spectroscopy.	

References-(Use recent Editions)

- University General Chemistry C. N. R. Rao, Macmillan.
 Physical Chemistry R. A. Alberty, Wiley Eastern Ltd.

3) Quantum Chemistry Including Molecular Spectroscopy- B. K. Sen.

4) Organic Chemistry - D. J. Cram and G. S. Hammond (Mcgraw-Hill).

5) A Guide-book to Mechanism of Organic Chemistry-Peter Sykes-6th Edition.

6) Theoretical Principles of Inorganic Chemistry- G.S. Manku

7) Physical Chemistry by Sharma and Puri

8) Instrumental methods of chemical analysis- Chatwal & Anand

9) Instrumental methods of chemical analysis- B. K. Sharma

10) Organic Chemistry VOL-II 5th Edition- I. L. Finar

11) An introduction to electrochemistry- Samuel Glassstone

12) The elements of physical chemistry – P.W. Atkins.

13) Essential of physical chemistry- B .S. Bahel. & G. D. Tuli.

14) Principels of Physical Chemistry - S.H Maron & Pruton

15) Concisein Inorganic chemistry – J.D. Lee

16) Organic Chemistry – Morrison & Boyd.

<u>BTE 202 – Paper-XI</u> <u>Applied Physics</u>

References:

Topic	SECTION-I	Lectures
INO.	Topics	45
1	Unit-I Optics correlated with microscopy:	10
	Concept of interference and diffraction, Diffraction gratin (Description only), concept of polarization and plane polarized light, production of polarized light by absorption, reflection, refraction and scattering, Nicol prism, definition of optical activity, LASER- LASER action (Energy level diagram), properties of	
	LASER, applications of LASER.	
	UNIT- 11 Bioelectricity	
2	Introduction, electricity observed in living systems-examples, origin of bioelectricity, resting potential and action potential, Nernst equation, conduction velocity, origin of compound action potential, Electrocardiogram (ECG), Electroencephalogram (EEG), Electromyogram (EMG), Electroculogram(EOG),	13
	Unit- III	10
3	Semiconductor Devices and Digital Electronics Light Emitting Diode (LED), seven segment display, photodiode, optocoupler, spectral distribution of solar energy, solar cell- construction, working efficiency and fill factor, applications of solar cell. Binary and BCD number system, Basic logic gates OR, NOR, AND, NANA and NOT, Demorgans theorem, various waveforms used in electronics- square wave, sine wave, triangular wave, saw tooth wave and stairs case.	10
	Unit- IV	12
4	Atomic structures and X-rays Introduction, J. J. Thomson atomic model, Rutheford atomic model and Bohr model, Limitations of Bohr atomic model, Energy level diagram of Hydrogen atom,, Quantum numbers, Nuclear models and forces (Liquid drop modem and shell model) production of x	12
	rays and its properties, Continuous and characteristics X-ray spectrum, Brags law, Applications of X-rays	
16. 17. 18. 19. 20.	Fundamental of Mechanics, S.K.Saxena, Himalaya Publications Perspectives of modern physics, Aurthur Beiser, McGrawHill Publicat Heat and Thermodynamics, Zemansky, McGrawHill Publication Fundamentals of optics, Jenkins white, McGrawHill Publication Text book of optics, N.Subrahmanyan Brijlal, S.chand and Company I	ion

15. Physics by Devid Hallday Roberet Resnik, (Vol-I and Vol-II) Wiley Eastern limited

21. Optics by Ajoy Ghatak ,Tata McGrawHill Publication 22. Properties of Matter, D.S.Mathur,Sha,alal Charetible trust

23. Solar Energy, Suhas Sukatme, Tata McGrawHill Publication

24. Principle of electronics, V.K.Mehta, S.chand and Company Limited

25. Digital Principles and application, Malvino and Leach, Tata McGrawHill Publication

26. Elements of Spectroscopy, Gupta, Kumar, Sharma, Pragati Prakashan

27. Introduction to Atomic spectra, H.E. White ,McGrawHill Publication

28. Biophysics, Vastala Piramal, Dominent Publishers and Distributor

<u>BTE 203 – Paper-XII</u> <u>Animal Science</u>

— •		Lectures
Topic		45
110.	Unit- I	12
1.	1.1. General classification of animal kingdom.	02
	1.2. Non-chordates – Study of phylum Porifera, Ceolenterata,	06
	Platyhelmenthes, Nemathelmenthes, Arthropoda, Mollusca &	
	Echinodermata – General characters with representative examples-	
	Sycon, Hydra, Liver fluke/ Taenia, Earthwarm / Nereis, Cockroach,	04
	Pearl oister / Pila, Starfish	
	1.3. Chordates:-	
	Study of class Pisces, Amphibia, Reptilia & Mammalia – General	
	characters with representative examples – Lebeo, Frog, Cobra,	
	Alligator, Fowl and Rat	
	Unit- II	11
2.	Host Parasite Relationship	
	2.1 Protozoan parasite- Plasmodium	02
	2.2 Nematode parasite- Ascaris	03
	2.3 Platehelminthes parasite- Liver fluke, & Tape worm- Teania	06
	solium	
	Unit- III	12
3.	3.1 Tissues	
	i) Epithelial ii) Muscular iii) Nervous iv) Connective tissue-	05
	Blood (Plasma, Serum, Clotting), Bone, Cartilage.	
	3.2. Histological Architecture	
	1) Skin 11) Tooth 111) Liver 1v) Kidney v) Uterus	~-
		07
	Unit- IV	10
4.	Applied zoology	
	8.1 Vermiculture	02
	8.2 Apiculture	02
	8.3 Sericulture	02
	8.4 Pearl culture	02
	8.5 Pisci culture	02

Reference Books :

1. Kotpal – Invertebrates

2. Kotpal – Chordates

3. Shukla and U. Pandey- Applied Zoology.

<u>BTE204 – Paper-XIII</u> <u>Statistical Methods</u>

		SECTION II	Lectures 45
		Unit- I	09
1	Introductio	n to statistics and collection of data.	
	1.1	Meaning of statistics	
	1.2	Scope of statistics in Biological and medical sciences	
	13	Primary and Secondary data	
	1 4	Classification of data Inclusive and Exclusive	
		methods, Discrete and Continuous frequency	
		distribution.	
	1.5	Cumulative frequencies	
	1.6	Graphical representation :- Histogram and ogive	
		curves	
		Unit- II	13
2	Measures	of central tendency and measures of dispersion	
	2.1	Concept of measures of central tendency	
	2.2	Definitions of A.M., Median, Mode, Quartiles,	
		Weighted mean, Examples on ungrouped and	
		grouped data.	
	2.3	Properties of A.M. (statement only)	
	2.4	Methods of obtaining mean & quartiles graphically	
	2.5	Concept of measures of dispersion. Absolute and	
		Relative measures of dispersion.	
	2.6	Definitions of Range, Q.D, S.D and variance,	
		coefficient of variation. Examples on grouped and	
		ungrouped data	
		Unit- III	10
3	Correlation	and Regression	
	3.1	Concept of correlation between two variables and	
		types of correlation.	
	3.2	Method of obtaining correlation (i) by scattar	
		diagram method	
		ii) By Karl Pearson Correlation coefficient	
		iii) By Spearman's Rank correlation	
		coefficient with and without tie.	
		Properties of correlation coefficient.	
	3.3	Examples on ungrouped data	
	3.4	Concept of regression, Lines of regression	
		Regression coefficients and properties without proof.	
	3.5	Examples on ungrouped data.	
	3.6	Idea of multiple and partial correlation	
1	1		

		Unit- IV	13
4	Probability a	and Sampling	
	4.1	Definition of sample space, Outcomes, events, exhaustive events, Mutually exclusive events, Equally likely events, certain events impossible events.	
	4.2	Definition of probability, Limits of probability. Probability of complementary event, Additive law of probability. Simple illustrative examples.	
	4.3	Definition of conditional probability, Multiplicative law of probability, Independent events. Simple illustrative examples	
	4.4	Idea of population and sample. Simple Random Sampling and Stratified Random sampling. Advantages and disadvantages of both the methods.	
	4.5	Testing of hypothesis Simple and composite hypothesis, Null and alternative hypothesis, types of errors, Critical region, Acceptance region, level of significance.	
	4.6	Tests of significance: Chi square tests, t tests and F test.	

Reference books:

- 1) Goon A. M., Gupta M. K. and Dasgupta B.: Fundamentals of mathematical statistics vol. I & II. World Press, Calcutta.
- 2) Gupta & Kapoor: Fundamental of mathematical statistics.
- 3) Thingale T. K. and Dixit P. G. (2003): A text book of paper- I for B.Sc. I, Nirali Publication, Pune.
- 4) Waiker and Lev: Elementary Statistical methods.
- 5) Rohatgi V. K. and Sauh A. K. Md E. (2002) An Introduction to probability and statistics (John Wiley & Sons-Asia).
- 6) Thigale T. K. and Dixit P. G. (2003): A text book Of paper II for B.Sc. I.
- 7) Meyer P. L. (1970): Introductoryto probability and statistical Application. Addision wesly.
- 8) Cochran, W.G.: Sampling Techiniques, Wiley Estern Ltd., New Delhi.
- 9) Des Raj : Sampling theory

BTE 205 – Paper-XIV Proteins and Enzymes

		Lectures 45
	Unit- I	
Pr ind ba of ch Ra Ou	Protein: Amino acid classification (Side chain, nature of R group, neorporation in proteins), structure & properties of amino acids, acid ase behavior and reactions, zwitterions, peptide bond, Determination f primary structure (Sanger's method, Edman's method, Dansyl hloride, Dabsyl chloride), Forces stabilizing secondary structure, camchandran plot, Tertiary structure (Describe different bonds) Duaternary structure Hb & antibody)	13
~~~	Unit- II	
Pr wi pa dia Pr	<b>Protein purification :</b> Method of cell disruption (Blenders, grinding vith abrasives, presses, enzymatic method, sonication); Salt articipation- Salting in, salting out, organic solvent precipitation, ialysis, ultra filtration, paper electrophoresis, centrifugation (Basics, Principal, Svedberg's constant)	10
	Unit- III	
En ac ind eq	<b>Cnzymes:</b> Introduction, IUB classification, active site, energy of ctivation, transition state hypothesis, lock and key hypothesis, nduced fit hypothesis, allosteric enzymes, enzyme inhibition, MM quation, Line weaver- Burk plot, Eadie-Hofstee plot.	12
	Unit- IV	
Colip (In	<b>Co-enzymes:</b> Thiamine, riboflavin, niacin, pyridoxol phosphate, poic acid, panthothenic acid, folic acid. Introduction, structure, chemistry, sources, daily requirement,	10
eq Co lip (Ir de	quation, Line weaver- Burk plot, Eadie-Hofstee plot.Unit- IVCo-enzymes: Thiamine, riboflavin, niacin, pyridoxol phosphate,poic acid, panthothenic acid, folic acid.Introduction, structure, chemistry, sources, daily requirement,eficiency, biological functions)	

### **References books:-**

- 1) Biochemistry Nelson & Cox
- 2) Biochemistry Stryer
- 3) Enzymes Trevor Palmer
- 4) Biochemistry Voiet & Voiet
- 5) Biochemistry J.L.Jain
- 6) Basic Biophysics- M. Daniel
- 7) Biochemistry Powar and Chatwal
- 8) Protein Purification- Harris and Angel
- 9) Practical biochemistry Keith Wilson And Walker
- 10) Principles of Biochemistry T. N. Pattabriraman.
  11) Biochemistry 3rd Edition Hames & Hopper.
- 12) General Biochemistry J. H. Well.
- 13) Biochemistry J. H. Ottaway & D. K. Apps

14) Biochemistry - Trchan

- 15) Text Book of Biochemistry- R.A. Joshi.
- 16) Biochemistry U. Satyanarayanan
- 17) Biochemistry a Functional Approach Robert W McGilvery & Goldstein
- 18) Text Book of Biochemistry A.V.S.S. Rama Rao
- 19) Clinical Biochemistry Praful B. Godkar.

# BIF 206- Paper-XV Database programming languages

		Lectures 45
1	UNIT -I	
	<ul> <li>Computer Networking</li> <li>1.1 Introduction to networking, Modem, Network topology concepts and types with advantage and drawbacks of each, Component of LAN, WAN, Medium concept of networking, modem, dial up access, leased line connections, browsers, domain and addresses, applications in databases.</li> <li>1.2 Database Management Need of Databses, RDBMS, definition of data and Information, Databases, Concept of DBMS, RDBMS, DBA and Responsibility of DBA, RDBMS Terminology. Relation. ii. Attributes. iii. Domain, tuple.</li> </ul>	12
2	UNIT –II	11
	Structured Query Language (SQL) 2.1 Introduction to SQL: Data Definition language, Data manipulation language, Query language, Data control language, Starting SQL plus, Retrieving data: retrieving data from a table and selected columns, write a query. Set Operations: union, intersect, minus, other set operations: the in clause and exists clause, Retrieving data from multiple tables by using Cartesian coordinates, self join.	
3	UNIT -III	12
	<ul> <li>3.1 SQL Operators</li> <li>3.1 Value operators, logical operators, query expression operators. Functions: Number functions, Character functions, Date functions. Pseudo columns, Defining variables, Aggregate function, Group by clause and having clause, Hierarchical and some advanced queries.</li> <li>3.2 Constraints in SQL Integrity constraints and its type: Domain constraints, Key constraints and its various types, Functional dependency, multivalued dependency, miscellaneous constraints</li> </ul>	
4	UNIT -IV	10
	<ul> <li>4.1 Different analytical functions and its applications in SQL, Use of Roll up and Cube in</li> <li>4.2 Joins used in SQL</li> <li>Introduction of joins and its importance in operating SQL, Natural</li> <li>joins, Cross joins, Outer and full outer joins.</li> </ul>	

### **References books:-**

1) Database System Concepts- Korth Silberschetz.

2) Commercial Application Development Using Developer 2000 by Ivan Bayross.

3) Structure Query Language- By Osborne.

- 4) Internet: An Introduction- Tata McGraw Hill Pub
- 5) SQL for Oracle 9i by P. S. Deshpande.

# **<u>BTE 207- Paper-XVI</u>** <u>Techniques in Microbiology</u>

Topic		Lectures
No.		45
1	Unit- I	11
	Microbial growth:	
	Definition of growth phases & growth curve	
	al Continuous culture	
	b] Synchronous growth	
	c] Diauxic growth	
	Effect of environmental factors on growth-temperature, pH.,	
	osmotic pressure, hydrostatic pressure, surface tension, heavy	
	metals, ultra violet light.	
2	Unit- II	
	Microscony	
	al general priciples of microscopy (concept of optics, resolving	12
	power of microscope working distance.)	
	b] study of compound microscope & electron microscope	
	Stains & staining procedures	
	a] definition of dye & stain	
	b] classification of stains- acidic, basic, neutral	
	c] theories, procedures & mechanism of simple staining, negative	
	staining, differential staining-Gram staining.	
	Microbial nutrition	
	a] nutritional requirements	
	b] classification on the basis of C & energy source	
	c] bacteriological media-natural, syenthetic, semisythetic,	
2		
3		
	Techniques in microbiology	11
	a) Leminer air flow	11
	a) Lammar an now b) Outline of lynholization technique	
	Techniques in microhial filtration vacuum filtration gravity	
	membrane, micro, nano, reverse osmosis	
4	Unit- IV	
	Soil microbiology	11
	Definition of soil, layers, Soil micro flora, humus formation	
	Milk microbiology	
	Definition and composition, sources of microbes	

### **References books:**

- 1) General microbiology-Stanier
- 2) Introduction to microbiology-Ingraham
- 3) Brock biology of microorganisms-Madigan etal
- 4) Fundamentals of microbiology-Frobisher
- 5) Microbiology-Pelczar
- 6) General microbiology -Pawar&Daginawala
- 7) Text book of microbiology-Ananthanarayan

# <u>BTE 208 – Paper-XVII</u> <u>Programming concept and C -language</u>

		Lectures 45
1	UNIT -I	
	<ul> <li>Introduction to Programming:</li> <li>Steps involving in problem solving, Problem definition, Algorithm, Characteristics, Notation of Algorithm, Flow-charts-Definition, Symbol, Features, Running and Debugging the program.</li> <li>Introduction to 'C' Language</li> <li>2.1 Historical background of 'C': Character set, Constants, Variables, Keywords and Comments, Instructions: Type declaration instruction, Arithmetic instruction, Integer and float conversion, Hierarchy of operations, Control instructions in C.</li> </ul>	10
2	UNIT -II	
	<ul> <li>Control structure</li> <li>3.1 Definition, Various types of control structure used in 'C' and its various applications Decision control structure: The <i>if</i> statement <i>if</i>-else statement, Nested <i>if-else</i> and forms of <i>if</i>.</li> <li>3.2 Operators: Arithmetic, Logical, Relational, Bitwise, Increment, Decrement, Conditional operators. Loop Control structure: The <i>while</i> loop, <i>for</i> loop: Nesting of loops and multiple initializations in <i>for</i> loop, Odd loop: <i>break</i> statement, <i>continue</i> statement, <i>do-while</i> loop. Case control structure: Decision using switch, Tips and Traps, The <i>goto</i> statement</li> </ul>	11
3	UNIT -III	
	<ul> <li>Functions and Pointers</li> <li>4.1 Introduction to function: Application of function, Passing Values, Scope and rule of functions, advanced features of function, Function declaration and prototype, call by values and call by reference, Pointer: Introduction, Pointer notation and Back to function call, Recursion.</li> </ul>	12

5	UNIT-IV	12
	Arrays and Strings	
	5.1 Importance of arrays in 'C', Array initialization, Bounds checking,	
	passing array element to a function, Pointer and arrays, More than	
	one dimension, three dimensional array.	
	5.2 Strings: Basic concept of strings, Standard library function of string:	
	strlen(), strcply(), srcat(), strcmp(), Two dimensional array of	
	characters, Array of pointer to	
	strings, Limitation of array of pointer to strings	

#### **Reference** books

- 1) Let us C-Y. C. Kanetkar
- 2) 'C' programming- Dennis Ritchie
- 3) Programming in C- Gottfried
- 4) C Application program and projects by Pramod Vasambekar.
- 5) Ansi C by Balgurusami.
- 6) Database System Concepts- Korth Silberschetz.
- 7) Commercial Application Development Using Developer 2000 by Ivan Bayross.
- 8) Structure Query Language- By Osborne.
- 9) Internet: An Introduction- Tata McGraw Hill Pub

# <u>BTE 209 – Paper-XVIII</u> <u>English for Communication-Paper-II</u>

### **SEMESTER: II**

### Section I :- Communication Skills

- Unit 4 : Telephonic and E-mail communication.
- Unit 5 : Making Notes.
- Unit 6 : Information Transfer.

Section II :- Reading Comprehension Skill

- Unit 11 : Public Attitude towards Science -Stephen Hawking
- Unit 12 : Smart Village : Hansdehar -Archana Binbusar
- Unit 13 : Entertainment
- Unit 14 : Parachute
- Unit 15 : Argument with God -Y. S. Chemba

		Pattern of Question Paper Sem- II	
Q.1)	A)	Complete the following by choosing the correct option	
		(Set to be on Reading skill Units)	
	B)	Textual vocabulary Items	05
		Synonym – 1	
		Antonym – 1	

-Nissim Ezekiel

-Lenrie Peters

		Pairing the words (With meaning) – 1 Change the Grammar class-1	
		Word-formation-Affixation-1	
Q.2	A)	Answer any Three of the following in 2 to 3 sentences (Out of 4)	06
	ĺ ĺ	1.	
		2.	
		3.	
		4.	
	B)	Write short notes on any <b>ONE</b> of the following (Out of 2)	04
Q.3	A)	(Unit no 4)Write apiece of Telephonic conversation based on a	05
-		particular situation.	
		B) Write an email or fax	05
Q.4	A)	Read the following passage and make notes out of it. Suggest	
		suitable title. OR	
		(Unit No.5) Study the following notes and expand them into a	05
		passage.	
		(Unit No.6) B) Study the following pie-	05
		diagram/table/flowcharts/tree diagram and write a paragraph	
		with the help of it.	

Sr. No.	Name of the Practical	Practicals (10)
1	Mitosis in Animals tissue	
2	Meiosis Animals tissue	
3	Study of tissue in Animals	
4	Study of Paramecia	
5	Study of Hydra, and Earthworm with respect to morphology and reproduction.	
6	Study of life cycle in Epiculture and their importance	
7	Study of life cycle in Sericulture, and their importance	
8	Extraction of DNA from Animal tissues.	
9.	Study of following biochemical tests - i) IMViC test ii) Sugar fermentation – glucose and lactose iii) H ₂ S production test	
10.	Detection of enzyme activity - i) Amylase ii) Catalase	
11.	Enumeration of bacterial numbers by - i) Serial dilution and plating of water ii) MPN of water.	
12.	Study of growth curve of bacteria	

### BIF 211 – Practical on Zoology and Microbiology

#### **References books:-**

- Stains and Staining procedures by Desai and Desai.
   Introduction to Practical Biochemistry by D. Plummer, J Wiley and Sons.
   Bacteriological techniques by F. J. Baker.
- 4) Laboratory methods in Biochemistry by J. Jayaraman.
- 5) Experimental Microbiology Patel & Patel

### **BIF 212** Practical on Biochemistry

Sr. No.	Name of the Practical	Practicals 10
1	Separation Identification & determination of Rf values of	
	Nitroamilines, Nitrophends (Any Two)	
2.	Spot test	
	a) Ni ⁺⁺ b) Co ⁺⁺ c) Cu ⁺⁺ d) Al ⁺⁺⁺ e) Zn ⁺⁺	
	f) Hg ⁺⁺ g) Mg ⁺⁺ h) Mn ⁺⁺ i) Fe ⁺⁺⁺	
3	a) Estimation of Glucose - DNSA and Benedict's method.	
4.	b) Detection of sugar and albumin in urine.	
5.	Qualitative assay - Alpha amylase	
6.	Extraction of lipids - Cholesterol and lecithin from egg yolk	
7.	Estimation of DNA.	
8	Separation and identification of amino acid by	
	chromatographic techniques- TLC & paper chromatography	
9.	Preparation of Buffers (Phosphate Buffer, Acetate Buffer)	
	and determination of pH with pH meter.	
10.	Preparation of solutions of given molarity and normality.	

#### **Practical Reference Books:**

- 1) An introduction to Practical Biochemistry David Plummer.
- 2) Laboratory manual in Biochemistry Jayraman.
   3) Practical Biochemistry Keith Wilson & Walker.
- 4) Laboratory methods in Biochemistry- J. Jayraman.

#### **BIF 213- Practical on Biostatistics**

Sr. No.	Name of the Practical	Practicals	
		10	
1	Preparation of Frequency distribution		
2	Graphical Representation		
3	Measures of central tendency – 1		
4	Measures of central tendency – 2		
5	Measures of Dispersion - 1		
6	Measures of Dispersion - 2		
7	Correlation		
8	Rank Correlation		
9	Regression		
10	Simple random Sampling		
11	Chi-square test of goodness of fit		
12	Application of T-test and F-test		

Sr. No. Name of the Practical		Practicals 10
1.	Hermitian and Skew Hermitian matrixes	
2	Given values and given vector of a matrix	
3	Application of differential equation	

#### **BIF 214 – Practical on Mathematics**

#### Nature of question paper:

### **Annual Practical Examination**

- A) Every candidate must produce a certificate from the Head of the Department in his college, stating that he has completed in a satisfactory manner a practical course on the lines laid down from time to time by the Academic Council on the recommendations of the Board of Studies and that the laboratory Journal has been properly maintained. Every candidate must have recorded his/her observations in the Laboratory journal and written a report on each exercise performed. Every journal is to be signed periodically by a member of the teaching staff and certified by the Head of the Department at the end of the year. Candidates are to produce their journals at the practical examination and such journals will be taken into account by the examiners in assigning marks.
- B) The practical examination will be of 6 hours duration and will be conducted on two successive days (3 hours per day)

Distribution of Marks for Practical Examination:

3.	Zoology and Microbiology:	
	One major experiment	10 marks
	One minor experiment	05 marks
4.	Biochemistry Techniques:	
	One major experiment	10 marks
	One minor experiment	05 marks
3.	Biostat/Maths	10 marks
4.	Oral on Practicals	05 marks
5.	Journal	05 marks

Total Marks:50 marksNote: Experiments may be arranged as per convenience of the examiner.

	Pre-revised	Revised Semester System	
		(Implemented from June 2010)	
Paper I	Introduction to Bioinformatics	Sem I: Introduction to Bioinformatics	
D	Commente a Francia and a la	Sem II. Database programming languages	
Paper	Computer Fundamentals	Sem I. Computer Fundamentals	
11		Sem II: Programming concept and C- language	
Paper	<b>Basic Botany and Zoology</b>	Sem I: Plant Science	
III:		Sem II: Animal Science	
Paper	Microbiology and Virology	Sem I: Basics in Microbiology	
IV		Sem II: Techniques in Microbiology	
Paper	Cell Biology and Biological	Sem I: Basics in Cell Biology	
V	Chemistry	Sem II: Proteins and Enzymes	
Paper	General Chemistry	Sem I: Physical and Inorganic Chemistry	
VI		Sem II: Organic and Inorganic Chemistry	
Paper	<b>Basic Mathematics and</b>	Sem I: Mathematical Methods	
VII	Statistics	Sem II: Statistical Methods	
Paper -	<b>Basic Concept of Physics</b>	Sem I: Basics in Physics	
VIII		Sem II: Applied Physics	
Paper -	English for Communication	Sem I: English for Communication-I	
IX		Sem II: English for Communication-II	

Equivalence subjects of B	. Sc.	Bioinformatics	Part I	(Sem I	& II)
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Nature of Question Paper				
Q.No.1	Multiple Choice based objective type question (four options for each question be given)	8 Marks		
Q.No. 2	Attempt any two of the following (out of three)	16 Marks		
Q.No. 3	Shot notes (4 out of 6)	16 Marks		
	Total	40 Marks		