



# **RANI CHANNAMMA UNIVERSITY, BELAGAVI**

**WEL-COME**

**TO THE COURSE STRUCTRE AND SYLLABUS OF UNDER GRADUATE  
PROGRAMMES – B.Sc/B.H.Sc.**

**II Semester**

**with effect from  
Academic Year 2014-15 and onwards**

# **Syllabus for B.Sc/B.H.Sc.**

## **II – SEMESTER**

### **Group – II**

#### **OPTIONAL / COMPULSORY SUBJECT FOR THE DEGREE IN SCIENCE SUBJECTS**

**Science Subjects: (any three subject of equal importance to be chosen as per the grouping given by Rani Channamma University, Belagavi)**

#### **DETAILED SYLLABUS OF FOLLOWING PAPERS WITH PRACTICALS**

### **1. BOTANY (optional)**

#### **SYLLABUS FOR THE ACADEMIC YEAR 2014-15 ONWARDS**

##### **Paper-I PLANT PHYSIOLOGY AND BIOCHEMISTRY**

**Teaching hours:50**

#### **UNIT-I**

**10 Hours**

Water Relations: solutions, suspensions & colloids, true solutions, percentage, molarity, molar, buffer, molal solutions, pH, colloids, emulsion, and gels.

Permeability, diffusion, imbibition, osmosis: membranes, endosmosis, exosmosis, osmotic pressure, turgor pressure (TP), wall pressure (WP), relation between OP, DPD & TP, concept of water potential, plasmolysis, deplasmolysis, significance of osmosis & imbibition. Importance and sources of water, Active and Passive water absorption.

Mechanism of ascent of sap : root pressure theory and cohesion tension (Dixon & Jolly) theory.

Transpiration: types, mechanism, theories of opening & closing of stomata, factors affecting rate of transpirations, antitranspirants and guttation.

Mineral nutrition: macro and micronutrients and their role & deficiency symptoms.

#### **UNIT-II**

**10 Hours**

Photosynthesis : Photosynthetic pigments, action spectrum, concept of two photosystems: Red drop & Emerson enhancement effect, photo phosphorylation, Calvin cycle, C4 & CAM path way, photorespiration and factors affecting photosynthesis.

Respiration: aerobic, anaerobic & fermentation, glycolysis, Krebs's cycle, electron transport system, redox potential, oxidative phosphorylation, pentose phosphate pathway. respiratory quotient (RQ) and factor affecting respiration.

### UNIT-III

10 Hours

Nitrogen fixation, importance of nitrate reductase, its regulation and ammonium assimilation.

Growth: Photomorphogenesis: photoperiodism, phytochrome, vernalization & concept of biological clock, seed dormancy:- causes and methods of breaking dormancy. Stress physiology:- concept and plant responses to water, salt and temperature stresses.

Growth regulators: physiological roles of Auxins, Gibberellins, Cytokinins, ABA, Ethylene & growth inhibitors.

### UNIT-IV

10 Hours

Thermodynamics: Principles, free energy, energy rich bonds phosphoryl group transfer and ATP. Enzymes: Classification, nomenclature (IUBMB) and properties; co-factors and co-enzymes, isozymes, mechanism

of enzyme action, enzyme inhibition, enzyme kinetics (Michaelis Menten equation).

Proteins: structure and classification of amino-acids, primary, secondary, tertiary and quaternary structure of proteins. Carbohydrates: structure of mono, di and polysaccharides, stereoisomers, enantiomers and epimers.

Lipids: structure of lipid (simple and compound) phospho and glycolipids, fatty acid, saturated and non-saturated.

### UNIT-V

10 Hours

General account: Pharmacognosy & its importance in modern medicine, Crude drugs- classification of drugs, chemical & pharmacological drugs evaluation -organoleptic, microscopic, chemical, physical & Biological

Secondary metabolites: Definition of secondary metabolites & difference with primary metabolites. Interrelationship of basic metabolic pathway with secondary metabolite Biosynthesis (outline only), major types - terpenoids alkaloids & their protective action against pathogenic microbes & herbivores.

Pharmacologically active constituents: Source plants (one example) parts used & uses of

1. Steroids (diosgenin, digitoxin)

2. Tannins (catechin). resins (gingerol, curcuminoids)

3. Alkaloids (quinine, strychnine, reserpine, vinblastin).

# BOTANY PRACTICALS

## B.Sc. II – SEMESTER

### Practical-II

Total number of hours per week: 04

Internal Assessment=10 Marks

Total No. of hours per Semester: 52

Practicals: 40 Marks

1. Study of permeability of membrane using different concentration of Organic solvents.
2. Detection of proteins in pulses and cereals by biochemical tests.
3. Separation of chloroplast pigments by solvent method.
4. Determination of osmotic potential of cell sap by plasmolytic /Gravimetric method.
5. Determination of rate of transpiration by using Ganong's/ Farmer's potometer.
6. Determination of rate of photosynthesis at different wavelengths and concentration of CO<sub>2</sub>.
7. Determination of RQ of carbohydrates, fats and proteins.
8. Study of hydrotropism, geotropism, phototropism and nastic movements.
9. Study of plant drugs- plant parts used as drugs, powder drugs and steps for examination.
10. Microscopic features of some common powder drugs.  
a. Adathoda                      b. Ginger                      c. Alstonia bark
11. Detection of carbohydrates, fats, oils, alkaloids, enzyme activity in plant tissue.
12. Test for detection of inorganic elements in plant ash.

### Suggested Reading..

1. Plant Physiology – S.K. Verma - S.Chand Publication
2. Plant Physiology – S. M. Mukherjee & A.K. Ghosh - New Central Book Agency, Calcutta.
3. College Botany Vol.I- Gangulee Das & Datta
4. College Botany Vol. II- S. Sunder Rajan – Himalaya Publication, Hyderabad.
5. Biochemistry – V. Satyanarayan & V. Chakrapani – Books & Article (P) Ltd., Kolkatta.
6. Biochemistry – Amit Krishna DE – S. Chand & Comp, Delhi.
7. Elementary Biochemistry – J. L. Jain, Sanjay Jain- S. Chand & Com. Ltd. Delhi.
8. Biochemistry - Lubert Stryer – CBS Publishers and Distributors, Bholanath Nagar, Shahdhara, Delhi.
9. Cell physiology and Biochemistry – William D. McElroy - Prentice-Hall of India Private Limited, New Delhi.
10. Book of Pharmacognosy- K.R. Argumugum & N. Murugesh – Sathya Publishers (1993).

11. Text Book of Pharmacognosy- T.E. Wallis Vth Edition – CBS Publishers & Distributors, Delhi.

Q1. Set up an experiment as per Slip A. Write the requirements, principle, procedure and conclusion (show the set up to the examiner). **8 Marks**

Q2. Perform and write the biochemical test of the given sample B for protein/ Carbohydrates/ fats and oils. (Show it to the examiner.) **5 Marks.**

Q3. Detect the inorganic elements in the given sample C. (Show it to the examiner.) **5 Marks.**

Q4. Detect the alkaloid/Enzyme activity in the given sample D. (Show it to the examiner.) **5 Marks.**

Q5. Identify and Give the microscopic features of drugs E & F. **6 Marks.**

Q.6. Identify and comment on Physiological phenomena involved in the experiment G & H. **6 Marks.**

Q.7. Journal **5 Marks.**

**Instructions to Examiners.**

Q.1. One experiment as per slip A (experiment 3 to 7). **8 marks.**  
(Requirements -1 mark, Setting- 3 marks, Principle- 1 mark, Procedure and Conclusion -3 marks)

Q.2. Performing the biochemical test for proteins or carbohydrates or fats and oils in given sample B. **5marks.**  
(Performing the biochemical test -3 marks, writing the test- 2 marks).

Q.3. Detecting the inorganic element in the given sample C. **5 marks.**  
(Detection -3 marks, writing the test- 2 marks).

Q.4. Detecting the alkaloid/enzymatic activity in the given sample D. **5 marks.**  
(Detection -3 marks, writing the test- 2 marks).

Q.5. Identification and giving the microscopic features of drugs E and F. **6 marks.**  
(Identification -1mark, microscopic features -2 marks).

Q.6. Physiological experiments G and H (experiment 1and 8). **6 marks.**  
(Identification of experiment-1mark, explanation of physiological phenomenon-2 marks).

Q.7. Journal **5 marks.**

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## 2. BIOTECHNOLOGY (optional)

SYLLABUS FOR THE ACADEMIC YEAR 2014-15 ONWARDS

### B.Sc. II – SEMESTER

#### PAPER-I BIOMOLECULES AND ANALYTICAL TECHNIQUES

Teaching hours:50

**Total hours allotted: 60**

1. Scope and development of biochemistry: physical and chemical nature of organic and inorganic compounds.  
(02Hrs)
2. Ph and buffer concept, chemical bonds and indicators.  
(04 Hrs)
3. Carbohydrates:  
Structure, classification, properties of important monosaccharide,  
Disaccharides & polysaccharides, chemical reactions of carbohydrates.  
(08 Hrs)
4. Proteins:  
Classification, structure, properties of amino acids, biological functions of proteins, primary, secondary, tertiary and quaternary structures.  
(08 Hrs)
5. Lipids:  
Classification, properties and functions of fatty acids, properties and  
Functions of neutral, glycol and phospholipids and cholesterol.  
(08 Hrs)
6. Enzymes:  
Nomenclature, classification, properties, factors influencing enzyme

catalyzed reactions, enzyme inhibition (reversible and irreversible), outline of purification, industrial application of enzymes.

(08 Hrs)

7. Vitamins:

Dietary source and functions of Water soluble and Fat-soluble vitamins.

(05 Hrs)

8. Hormones:

Chemistry and functions of pituitary and gonadal hormones.

(05 Hrs)

9. Bioenergetics:

Concept of free energy transformations, Redox potentials, Regulations of Glycolysis, Krebs's cycle and Electron Transport System.

(06 Hrs)

10. Principles and applications:

Chromatography - Paper chromatography and Thin Layer Chromatography

Centrifugation, colorimetry, Electrophoresis, Spectroscopy. Radio isotopes and their applications in biology.

(06 Hrs)

## **PRACTICAL-II BIOMOLECULES AND ANALYTICAL TECHNIQUES**

1. Preparation of percent molarity, molality and normality of solution,

Measurement of pH and buffer.

2. Qualitative analysis of Carbohydrates, Amino acids, Proteins and Lipids.

3. Paper Chromatography of amino acids and sugars.

4. Qualitative analysis of body fluids such as blood and urine.

5. Assay of amylase activity.

6. Colorimetric estimation of protein by Biuret method.
7. Colorimetric estimation of blood sugar.
8. Estimation of amino acids.
9. Estimation of creatinine in urine sample.
10. Testing of acid phosphates (Potato) and alkaline phosphates (milk) activity.
11. Demonstration of catalase activity.

**References:**

Biomolecules and analytical techniques

Boyer Rodney, 1999 "Concepts of biochemistry", Pacific Grove, Brooks/cole publishing company.

Deb, A.C. "Fundamental of Biochemistry", New Central Book Agency, Calcutta.

Jain, J.L. "Fundamentals of Biochemistry". S. Chand and Company.

Keshav Trehan; "Biochemistry", wiley Eastern publication.

Lehninger, et.al., 1997: Principal of Biochemistry CBS

publishers. Mathews and Van Horde:

Moron, L.A. sceimgeour, K.G. Hostan, H.R. Ochs, R.S. and Rawn, J.D. 2000:

Biochemistry, 3rd edition

Biomolecule: Mohan P. Arora Biophysics : Mohan P. Arora

Biochemistry: A.C. Deb

Biophysics : Pattabh & Gautham

Text book of Biochemistry (1997), Devlin, Thomas, M.

Biochemistry (1993) Zubay, G.

Biochemistry Fundamentals, Voet et al.

Biochemistry, Friedfider, D.



Practical Biochemistry, Plummer.

Physical Biochemistry: Application to Biochemistry and Molecular  
Biology – Freilder.

Principle of Instrumental Analysis – Skoog & West

Principle & Technique – Practical Biochemistry 5th Ed. (2000) - Walker  
J. & Wilson K.

Biochemical Technique Theory & Practical- White, R.

Principle of Instrumental Analysis – Skoog et al.

Biophysical Chemistry – Upadhyay & Nath.

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### 3. CHEMISTRY (Optional)

SYLLABUS FOR THE ACADEMIC YEAR 2014-15 ONWARDS

## B.Sc. II – SEMESTER

Paper-II

Teaching Hours : 50 Hours

### Inorganic Chemistry

#### UNIT-I Chemical bonding- II

11 hours

Hybridization: Salient features of hybridization, geometry of molecules with respect to  $sp$ ,  $sp^2$ ,  $sp^3$ ,  $dsp^3$ ,  $sp^3d^2$  hybridization.

VSEPR theory- Postulates, regular and irregular geometry ( $BF_3$ ,  $CH_4$ ,  $NH_3$  and  $H_2O$ ). Molecular orbital theory: LCAO concept, elementary account with respect to  $H_2$ ,  $He_2$ ,  $Li_2$ ,  $B_2$ ,  $N_2$ ,  $O_2$ ,  $O_2^+$ ,  $O_2^-$  and  $O_2^{2-}$  molecules, calculation of bond order, stability, magnetic property etc.

Hydrogen bonding: Types, significance of hydrogen bonding, properties explained by hydrogen bonding like a) State of  $H_2O$  and  $H_2S$  b) Melting and Boiling point c) Ice has less density than water.

#### UNIT-II Solids

4 hours

Space lattice, unit cell, crystal systems, calculation of particles per unit cell, laws of crystallography, x-ray diffraction of crystals, derivation of Bragg's equation, Miller indices, determination of structure of NaCl by rotating single crystal method.

#### UNIT-III Organic reagents in inorganic analysis

2 hours

Sensitivity, selectivity and specificity, advantages of organic reagents over inorganic reagents - Dimethyl glyoxime, 8-hydroxyquinoline(oxime).

### Organic Chemistry

#### UNIT-I Reaction Mechanism

05 hours

Introduction, factors influencing the reactions-inductive, electromeric, resonance and hyper conjugation effects.

Types of reagents—Nucleophiles, electrophiles, free radicals, carbocations, Carbanions, Carbenes, Nitrenes, (formation, structure and stability). Elimination reactions-E1 and E2 mechanism.

#### UNIT-II Alkenes, Dienes and Alkynes

06 hours

**Alkenes:** Methods of preparation of alkenes by (i) dehydration of alcohols (ii) dehydro halogenation. Saytzeff's elimination (Formation of highly substituted alkene, 2-butene), Hofmann orientation (Formation of least substituted alkene, 1-pentene).

Chemical reactions of alkenes- Peroxide effect, hydroboration, oxidation, oxy-mercuration–reduction, ozonolysis with respect to 2-butene and 2-methyl-2-butene, oxidation with  $KMnO_4$ , polymerisation.

**Dienes:** Classification and Nomenclature

Preparation of 1,3 butadiene; 1,2 and 1,4 addition reactions (addition of halogens and halogen acids), Diel's-Alder reaction, polymerization of 1,3 butadiene.

**Alkynes:** Acidity of Alkynes, Reactions of acetylene –metal ammonia reduction, oxidation and polymerization

### **UNIT-III Aromatic Hydrocarbons**

**06 hours**

Resonance in benzene, Aromaticity–Huckel's  $4n + 2$  rule with respect to benzene, furan, pyridine and [10]–annulene.

Mechanism of electrophilic aromatic substitution–halogenation, nitration, sulphonation and Friedel-Craft's reaction (evidences for two step mechanism and evidences for formation of electrophile).

**Poly nuclear hydrocarbons:** Classification, examples, isolation of naphthalene from coaltar, constitution of naphthalene, Haworth synthesis.

### **UNIT-III Conversions**

**06 hours**

- a) Alkanes to alkyl halides vice versa
- b) Alkanes to alcohols
- c) Alkanes to alkyhalides to alcohols and vice versa
- d) Alkanes to alkyl cyanides to carboxylic acids
- e) Alkanes to alkenes
- f) Benzene to benzoic acid
- g) Benzene to phenol
- h) Benzene to p-nitrobenzoic acid
- i) Benzene to m-bromoaniline
- j) Naphthalene to 2-naphthol
- k) Naphthalene to 1,4–naphthaquinone
- l) Naphthalene to anthranilic acid

## **Physical Chemistry**

### **UNIT-I First law of thermodynamics**

**5 hours**

Statement, isothermal and adiabatic process, expression for work done in the reversible expansion of adiabatic expansion of an ideal gas ( $PV^\gamma = \text{Constant}$ ) Joule-Thomson effect, Joule-Thomson experiment, derivation of Joule Thomson coefficient for an ideal gas and inversion temperature.

**Thermochemistry** - Kirchoff's equation, bond energies and bond dissociation energies, calculation of bond energy and bond dissociation energies by taking simple molecules. Numerical problems.

### **UNIT-II Liquid State: Physical Properties of Liquids**

**6 hours**

Surface Tension: Effect of temperature on surface tension. Determination of surface tension of liquid by drop numbers method, parachor and its application.

Viscosity: Effect of temperature on viscosity, determination of relative, absolute and intrinsic viscosity of liquids by ostwald's viscometer method.

Refractive index of liquid: Specific and molar refractions, determination of refractive index of liquid by Abbe's refractometer.

### **UNIT-III Liquid Crystals**

**2 hours**

Types and applications.

#### **UNIT-IV Colloids**

**4 hours**

Emulsions: Types of emulsions, Preparation and emulsifiers.

Gels: Classification, preparation and properties, general applications of colloids.

#### **Reference books for inorganic chemistry**

- |  |                               |
|--|-------------------------------|
| 01. Advanced Inorganic Chemistry             | Cotton and Wilkinson          |
| 02. Concise Inorganic Chemistry              | J.D. Lee                      |
| 03. Inorganic Chemistry                      | Huhee and Keiter              |
| 04. Inorganic Chemistry                      | Shriver and Atkin             |
| 05. Principles of Inorganic Chemistry        | Puri and shrama               |
| 06. Inorganic Chemistry                      | A. G. Sharpe                  |
| 07. Essential Chemistry                      | R. Chand                      |
| 08. University Chemistry                     | Mahan and Myers               |
| 09. Modern Inorganic Chemistry               | Madan                         |
| 10. Modern Inorganic Chemistry               | Satya prakash                 |
| 11. Inorganic Chemistry for Under graduates  | R. Gopalan                    |
| 12. College Practical Chemistry              | Ahluwalia, Dhingra and Gulati |
| 13. Instrumental method of chemical analysis | Willard, Martin and Dean      |

#### **Books recommended for organic chemistry:**

- |   |                                 |
|---|---------------------------------|
| 01. Organic Chemistry                       | I.L. Finar Vol I and II         |
| 02. Organic Chemistry                       | Morrison and Boyd               |
| 03. Organic Chemistry                       | F.A. Carey and R.J. Sundberg    |
| 04. Reaction Mechanism in Organic Chemistry | Singh and Mukherji              |
| 05. Text Book of Organic Chemistry          | Bahl amd Bahl                   |
| 06. Text Book of Organic Chemistry          | C.N. Pillai, Universities Press |

#### **Books recommended for physical chemistry:**

- |                        |   |
|------------------------|---|
| 01. Physical Chemistry | Puri and Sharma                           |
| 02. Physical Chemistry | P.L. Soni                                 |
| 03. Physical Chemistry | Roberty A Alberty                         |
| 04. Physical Chemistry | M. V. Sangaranarayanan a n d V. Mahadevan |
| 05. Physical Chemistry | Atkins                                    |
| 06. Physical Chemistry | Bahl, Madan and Tuli                      |

**B.Sc. II – SEMESTER**  
**CHEMISTRY PRACTICALS**

**Practical–II**

Total number of hours per week: 04

Internal Assessment=10 Marks

Total No. of hours per Semester: 52

Practicals: 40 Marks

**A. Organic Spotting:** Identification of following organic compounds and preparation of their derivatives and confirmation by melting points :

01. Oxalic Acid
02. Phenol
03. Naphthalene
04. Urea
05. Benzaldehyde
06. 1-Naphthol
07. Phthalic acid
08. 2-Naphthol
09. Aniline
10. Acetanilide
11. Benzamide
12. Benzoic Acid
13. Salicylic Acid
14. Acetone
15. Ethyl benzoate

**B. Identification by**

01. Element determination
02. Solubility
03. Functional group
04. Physical constant
05. Preparation of derivatives and finding melting points.

**CHEMISTRY (Optional)**

**QUESTION PAPER PATTERN FOR ALL SEMESTER (w. e. f 2014-15 onwards)**

**Time : 3 Hours ] [Max. Marks: 80**

**Section-A**

- 01) Answer any ten questions, each carries two marks. 2x10=20
- a)
  - b)
  - c)
  - d)
  - e)
  - f)
  - g)
  - h)
  - i)
  - j)
  - k)
  - l)

**Section-B**

- Answer any five questions. 5X4=20
- 02)
  - 03)
  - 04)
  - 05)
  - 06)
  - 07)

**Section-C**

- Answer any four questions. 5X8=40
- 07)
  - 08)
  - 09)
  - 10)
  - 11)
  - 12)

## 4. Computer Science (optional)

Subject Code	Subject Name	Workload		Max Marks	IA	Total Marks
		Hrs/week Th	Pr			
<b>Semester - I</b>						
14BSCCSCT11	Computer Concepts & C- Programming	04	-	80	20	100
14BSCCSCP12	C- Programming Lab	-	04	40	10	50
<b>Semester - II</b>						
14BS CSCT21	Data Structure Using C	04	-	80	20	100
14BSCCSCP2	Data Structure Lab	-	04	40	10	50
<b>Semester - III</b>						
14BSCCSCT31	OOPs Using C++	04	-	80	20	100
14BSCCSCP32	C++ Programming Lab	-	04	40	10	50
<b>Semester - IV</b>						
14BSCCSCT41	Introduction to UNIX	04	-	80	20	100
14BSCCSCP42	UNIX Programming Lab	-	04	40	10	50
<b>Semester - V</b>						
14BSCCSCT51	Operating System	04	-	80	20	100
14BSCCSC 5	Operating System Lab	-	04	40	10	50
14BSCCSCT53	Database Management System	04	-	80	20	100
14BSCCSCP5	DBMS Lab	-	04	40	10	50
<b>Semester – VI</b>						
14BSCCSCT61	Computer Networks	04	-	80	20	100
14BSCCSCP62	Computer Networks Lab	-	04	40	10	50
14BSCCSCT63	Core Java	04	-	80	20	100
14BSCCSCP64	Java Programming Lab	-	04	40	10	50

# **B.Sc. II – SEMESTER**

## **COMPUTER SCIENCE (Optional)**

### **Paper-I Data Structures Using C**

**Teaching hours : 50Hrs**

#### **Unit 1:**

**Introduction to Data Structure :** Definition, Classification of data structures : primitive and non primitive. Operations on data structures.

**Dynamic Memory Allocation and Pointers :** Definition, Accessing the address of a variable, Declaring and initializing pointers. Accessing a variable through its pointer. Meaning of static and dynamic memory allocation. Memory allocation functions: malloc, calloc free and realloc.

**Files :** Introduction : Definition & Basic file operations : Naming a file, Opening a file, Reading data from file, writing data to a file and closing a file. Defining, Opening and closing a file. Input/Output operations on files : getc, putc, getw, putw, fprintf, fscanf. Error handling during I/O operations : Common errors during I/O Operations, feof, ferror, Random Access to files: fseek, ftell, rewind, functions. **10 Hrs**

#### **Unit 2:**

**Recursion :** Definition, Recursion in C, Writing Recursive programs – Binomial coefficient, Fibonacci, GCD.

**Searching Techniques:** Basic Search Techniques : Search algorithm searching techniques: sequential search, Binary search – Iterative and Recursive methods. Comparison between sequential and binary search. **10 Hrs**

#### **Unit 3:**

**Sorting Techniques :** General Background : Definition, different types: Bubble Sort, Selection Sort, Merge Sort, Insertion sort, Quick sort.

**Stack :** Definition, Array representation of stack, Operations on stack : Infix, prefix and postfix notations, Conversion of an arithmetic expression from Infix to postfix. Applications of stack. **10 Hrs**

#### **Unit 4:**

**Queue :** Definition, Array representation of queue, Types of queue : Simple queue, circular queue, double ended queue(deque), priority queue, operations on all types of Queues.

**Linked List :** Definition, Components of linked list, Representation of linked list, Advantages and Disadvantages of linked list. Types of linked list: Singly linked list, Doubly linked list, Circular Linked list and circular doubly linked list. Operations on singly linked list : Creation, insertion, deletion, search and display. **10 Hrs**



**Unit 5:**

**Tree :** Definition : Tree, Binary tree, Complete binary tree, Binary search tree, Heap Tree terminology : Root, Node, Degree of a node and tree, Terminal nodes, Non-terminal nodes. Siblings, Level, Edge, Path, Depth, Parent node, ancestors of a node. Binary tree: Array representation of tree, Creation of binary tree. Traversal of Binary Tree : Preorder, In-order and Post-order. **10 Hrs**

**Text Books :**

1. Kamthane : “Introduction to Data Structures in C ”. Pearson Education 2005.
2. Langsam, Ausenstein Maoshe & M.Tanenbaum Aaron “Data Structures using C and C++ ” Pearson Education.

**References:**

1. weiss “Data Structures and Algorithm Analysis in C”, II Edition, Pearson Education.
2. Robert Kruse “Data Structures and program designing using C”.
3. Trembley and Sorenson “Data Structures”.
4. E. Balaguruswamy “programming in ANSI C”.
5. Bandyopadhyaya “Data Structures using C”, Pearson Education.
6. Tenenbaum “Data Structures using C”, Pearson Education.

# **B.Sc. II – SEMESTER**

## **COMPUTER SCIENCE PRACTICALS**

### **Paper-I Data Structures Using C Practical–II**

#### **Sample Programs.**

- 1) Write a C program to create file N students, it should contain Roll-no, Name, marks in two subjects, Using the above created file, create an output file which contains Roll-no, Name, marks in subjects, Total and average.
- 2) Write a C program to simulate the working of towers of Hanoi for N disks, print the total number of moves taken.
- 3) Write a C program to find the Binomial Coefficient using recursion.
- 4) Write a C Program to search for an element using Sequential search.
- 5) Write a C program to search for an element in an array using Binary search. 6) Write a C program to sort a list of N elements using Bubble sort Technique. 7) Write a C program to sort a list of N elements of integer type using Selection sort.
- 8) Write a C Program to sort a list of N elements using Quick sort algorithm.
- 9) Write a C program to sort a list of N elements using Merge sort algorithm.
- 10) Write a C program to demonstrate the working of stack of size N using an array the elements of the stack may assume to be of type integer, the operations to be supported are 1. PUSH 2. POP 3. DISPLAY. The program to should print the appropriate message for stack is underflow and overflow.
- 11) Write a C program to convert and print valid fully parenthesized infix arithmetic expression to postfix.
- 12) Write a C program to simulate the working of a Queue using an array provide the operations QINSERT, QDELETE and QDISPLAY, check the Queue status for empty and full.
- 13) Write a C program to simulate the working of a Circular Queue using an array Provide the operations CQINSERT, CQDELETE and CQDISPLAY, check the Circular Queue status for empty and full.
- 14) Write a C program to construct a single linked list using dynamic variable, list should contain the following information.
- 15) Using dynamic variables and pointers construct Binary search tree, it is found display key found else insert the key in Binary search tree, while constructing the Binary search tree do not add any duplicate, display the tree using any of the traversal method.

## COMPUTER SCIENCE (Optional)

### QUESTION PAPER PATTERN FOR ALL SEMESTER

#### THEORY PAPERS

Question paper has to be set for total marks of 80.

**Section–A:** Ten questions to be answered out of twelve each carry 2 marks

$$2 \times 10 = 20$$

Note: Two questions to be set from each unit, and last two questions from any unit.

**Section–B:** Five questions to be answered out of six each carry 5 marks

$$4 \times 5 = 20$$

**Section–C:** Four questions to be answered out of six each carry 10 marks

$$10 \times 4 = 40$$

$$\text{Total Marks} = 80$$

#### Practical Examination

Evaluation criteria for practical examinations shall be as follows:

##### 1. Writing of Programs -15 Marks

a. One program from the journal list – 08 Marks

b. Another program given by examiner based on the concepts studied -07Marks

##### 2. Execution of programs – 15 Marks

a. Journal Program - 08 Marks

b. Program of Examiner's Choice -07 Marks

##### 3. Viva-Voce -05 Marks

##### 4. Journal / Laboratory Report – 5 Marks

**Total Marks -40 Marks**

**COMPUTER SCIENCE (Optional)**

**QUESTION PAPER PATTERN FOR ALL SEMESTER  
(w. e. f 2014-15 onwards)**

**Time : 3 Hours ]**

**[Max. Marks: 80**

**Section A**

**1) Answer any ten questions, each carries two marks.  $2 \times 10 = 20$**

- a)
- b)
- c)
- d)
- e)
- f)
- g)
- h)
- i)
- j)
- k)
- l)

**Section B**

**Answer any five questions, each carries 4 marks.**

**$4 \times 5 = 20$**

- 2)
- 3)
- 4)
- 5)
- 6)

**Section C**

**Answer any four questions, each carries 10 marks.**

**$10 \times 4 = 40$**

- 7)
- 8)
- 9)
- 10)
- 11)
- 12)

# 5. ELECTRONICS (Optional)

SYLLABUS FOR THE ACADEMIC YEAR 2014-15 ONWARDS

## B.Sc. II – SEMESTER

Paper-II CIRCUITS AND DEVICES

Teaching Hours : 50 Hours

### UNIT – I

#### DIODE CIRCUITS

(10hrs)

Dynamic characteristic of diode, Rectifiers - Half wave and full wave; derivation of Efficiency and Ripple factor. Define TUF, PIV and Voltage Regulation & Line regulation. Comparison between half wave and full wave rectifiers.

Filters(Qualitative only);Shunt Capacitor input filter, Inductor filter, Choke input LC filter, -Section filter. Clipping and clamping circuits (Biased and Unbiased positive & negative).

Problems.

### UNIT – II

#### REGULATED POWER SUPPLY

(10hrs)

Concept of voltage regulation, unregulated & regulated power supply, block diagram of regulated power supply, Zener diode and its characteristics , Design of Zener diode voltage regulator. Transistor series voltage regulator, Concept of IC, Three pin IC regulator block diagram , 78xx series & 79xx series.

Problems.

### UNIT – III

#### ACTIVE DEVICES

(10hrs)

**Transistor** : Introduction, types of transistors, construction and working, characteristics of three modes ( CB, CE and CC), relation between  $\alpha$ ,  $\beta$  and  $\gamma$ .

**FET**; types JFET ( construction working, characteristics and their determination). Enhancement MOSFET and depletion MOSFET, (construction working and characteristics)

**Opto electronic devices** ; Construction, working & applications of LED, LDR, Photodiode, Photovoltaic cell and solar cell.

Problems.

## UNIT – IV

### TRANSISTOR BIASING

(10hrs)

Amplifying action of a transistor, amplification, load line concept( dc and ac), need for biasing ,operating point, , stabilization techniques, stability factor and thermal runaway.

Types of biasing circuits; Fixed bias, Collector feedback bias, Emitter feedback bias and Voltage divider bias (Explanation , derivation of stability factor, advantages & disadvantages in each case). Brief account on heat sink.

Problems.

## UNIT – V

### AMPLIFIERS

(10hrs)

**Amplifiers:** Analysis of a transistor common emitter amplifier using h parameters, determination of voltage gain, current gain, input impedance, output impedance and power gain.

Designing of single stage RC coupled common emitter amplifier, effects of various components and frequency response, Bandwidth.

FET common source amplifier (construction and working only).

**Power amplifier:** Introduction, Classification of power amplifiers, Conversion efficiency of class A amplifier, class B amplifier and class C amplifier. Transformer coupled push pull amplifier.

Problems.

### Reference Books:

1. Electronics theory and Applications - S.L Kakani and K.C.Bhandari.
2. Electronics fundamentals and applications -D.Chattopadhyayand  
P.C.Rakshit
3. Principles of electronics - B.V.Narayana Rao Vol –II
4. Electronics Devices and circuits - David.A.Bell 4<sup>th</sup> edition
5. Elements of Electronics - Bagade and Singh
6. Basic Electronics and Linear circuits - Bhargav, Kulshrestra & Gupta
7. Principles of Electronics - V.K.Mehta.

8 Integrated electronics	- Millman & Halkias
9. Electronics Principle	- Malvino
10. Linear integrated	- D. Roy Choudhary, Shaila.B.Jain
11. Semiconductor devices & circuits	- R.L.Boylested

## **ELECTRONICS PRACTICALS**

### **B.Sc. II – SEMESTER Practical–II LIST OF EXPERIMENTS**

Each experiment is of four hours duration. Minimum EIGHT experiments are to be performed in the semester course

1. Zener diode characteristics apply it to study regulation..
- 2; Diode as Clamper( Biased and Unbiased both Positive and Negative).
3. Diode as Clipper( Biased and Unbiased both Positive and Negative).
4. Full wave bridge rectifier with LC /  $\pi$  - section filter
5. LED characteristics (Minimum Three LEDs)
6. Transistor h-parameters(CE configuration)
7. Biasing circuits .    I) Fixed biasing  
                                  II) Base bias with collector feedback
8. Biasing circuits        I) Base bias with emitter feedback  
                                  II) Voltage divider
9. CE amplifier (Designing, Frequency response curve)
10. FET characteristics
11. FET common source amplifier
12. Photoconductive cell characteristics( Inverse square law and intensity versus photocurrent)
13. Photovoltaic cell characteristics (fill factor estimation)

## 6. GEOLOGY (Optional)

SYLLABUS FOR THE ACADEMIC YEAR 2014-15 ONWARDS

### B.Sc. II – SEMESTER

#### Paper-II

Teaching Hours : 50 Hours

#### UNIT-I

10 Hours

MINERALOGY: Definition of mineral. Properties depending upon light- color, streak, diaphaneity, luster.

Properties depending upon state of aggregation- form- columnar, lamellar and granular.

Imitative shapes- reniform, botryoidal, mamillary, amygdaloidal, vesicular, dendritic, stalactitic and stalagmitic.

#### UNIT-II

10 Hours

Forms- Isomorphism, polymorphism, pseudomorphism

Properties depending upon cohesion and elasticity - Cleavage, fracture, hardness (Moh's scale of hardness) and tenacity;

Other properties: taste, odour, feel, magnetism, electricity.

#### UNIT-III

10 Hours

General characters and uses of following group of minerals: Quartz, Felspar, Mica, Pyroxene, Amphibole, Olivine & Garnet

Gemstones: Definition, Specifications, Types and uses.

#### UNIT-IV

10 Hours

OPTICAL MINERALOGY:

Nature of light – Electromagnetic wave. Ordinary and polarized light – Reflection, refraction and refractive index, critical angle and total internal reflection. Double refraction.

Polarisation: polarization by reflection, Brewster's law - polarization by refraction, polarization by absorption. Construction of Nicol Prism – Behavior of light in the microscope without mineral, with isotropic mineral and with anisotropic mineral.

#### UNIT-V

10 Hours

Petrological microscope: Introduction to parts of microscope. Preparation of thin section.

Optical properties of mineral: in plane polarised light- colour, pleochroism, form, cleavage, fracture, relief.

Properties in analysed/ crossed nicols- Isotropism and anisotropism, Interference Colours Birefringence, Extinction, Zoning and Twinning.



## Books Recommended

Rutley's Elements of Mineralogy	H.H. Read
Optical Mineralogy	Kerr.P.F
Optical Mineralogy	Winchel
Mineralogy for students	M.I. Batty
Mineralogy	Berry & Mason
Dana's Text book of Mineralogy	W.E. Ford
Mineralogy	Berry & Mason
Mineralogy for students	M.I. Batty
Optical Mineralogy	E.E. Wahlstrom
Optical Mineralogy	F.F. Kerr
Elements of Optical Mineralogy	A.N. Winchell
Engineering Geology	Parbin Singh
Treatise of Minerals of India	R.K.Sinha
Ore Deposits of India	G.K.Gokhale & Rao T.C.
Indian Mineral Resources	S.Krishnaswamy
14. Minerals of Karnataka	B.P.Radhakrishna

## GEOLOGY PRACTICALS

### B.Sc. II – SEMESTER

#### Practical–II

Max. Marks: 40

Time: 4 hrs/week

Total 50 hrs

Mineralogy: Study of general characters and uses of following minerals.

Quartz- Rock Crystal, Amethyst, Chalcedony, Agate, Flint, Jasper, Opal. Felspars- Orthoclase, Microcline, Plagioclase; Zeolites- Natrolite, Stilbite; Mica- Biotite, Muscovite, Pyroxene- Hypersthene, Augite, Diopside; Amphibole- Hornblende, Olivine, Garnet; Calcite, Dolomite, Magnesite, Kyanite, Corundum, Beryl, Tourmaline, Talc, Serpentine, Asbestos, Barites.

Determination of specific gravity by Walker steel yard balance. Optical Mineralogy: Optical properties (under plane polarized and analysed light) of following minerals- Quartz, Orthoclase, Microcline, Plagioclase, Muscovite, Biotite, Hypersthene, Augite, Hornblende, Olivine, Kyanite, Calcite, Zircon, Tourmaline, Corundum, Sillimanite, Chlorite, Garnet, Magnetite, Hematite.

Determination of Extinction and Cleavage angle under microscope.

## 7. Home Science (Optional)

SYLLABUS FOR THE ACADEMIC YEAR 2014-15 ONWARDS

### B.Sc. II – SEMESTER

#### PAPER-II CLOTHING CONSTRUCTION & IT'S CARE

**Theory - 4 hours /week**

**Practical - 4 hours/week**

**Total: 60hrs**

Examination: Theory: 80 marks (3 hours duration ) + 20 marks IA

Practical: 40 marks ( 4 hours duration ) +10 marks IA

Objectives:

1. To acquire knowledge in the selection of fabrics for garment construction.
2. To study the methods of garment construction.
3. To study the application of Elements & Principles of design in costume designing.
4. To develop the knowledge regarding care of clothes.
5. To study the Traditional Textiles and Embroideries of India.

#### Theory:

**Unit I :** Clothing Construction.

- a. Importance and factors to be considered in the selection of fabrics.
- b. Methods of taking body measurements.
- c. Prepreparation of fabric for garment construction- Straightening, Preshrinking & Trueing.
- d. Methods of garment construction & steps involved in sewing.

**(12 hours)**

**Unit II:** Elements and Principles of Design in costume designing.

- a) Elements of Art – Line, Form, Space, Texture, Pattern & Colour.
- b) Principles of Design – Proportion, Balance, Emphasis, Rhythm & Harmony.

**(7 hours)**

**Unit III:** a Selection of suitable fabrics according to age with reference to climatic conditions, occupation & social life.

- b. Advantages & disadvantages of Home-made, Tailor-made & Readymade clothing.
- c. Home sewing as a measure of supplementing family income.

**( 9 hours )**

**Unit IV:** Care of clothing

- a) Laundering of cotton, silk, wool & polyester.
- b) Storage of clothes.
- c) Stain removal – classification & general instructions.
- d) Dry cleaning.

**(12 hours)**

**Unit V:** Traditional Textiles and Embroideries of India.

- a) Traditional Textiles  
Dacca Muslin, Patola, Paithani, Ilkal, Chanderi & Brocades.
- b) Embroideries

Karnatak	Kasuti
Punjab	Phulkari
Uttar Pradesh	Chikankari
Kashmir	Kasida
West Bengal	Kantha
Gujarat	Kutch & Kathiawar
Himachal Pradesh	Chamba

(20 hours)

### **Practical:**

- 1 a) Sewing equipments.
- b) Methods of taking body measurements. (1 practical)
2. Sewing machine, its function, maintenance & care (1 practical)
3. Basic stitches: a. Temporary & permanent hand sown  
    b. Decorative (3 practical )
- 4, Construction process of Seams, Plackets, Fullness, Necklines,  
    Fasteners fixing (3 practical )
5. Garment construction- A line frock with puff sleeve (2 practical )
6. Visit to Readymade clothes factory / Boutique / Drycleaning unit.  
( 1 practical )
- 7, Project work – Kitchen Apron ( 1 practical )

### **References:**

1. Durga Deulkar, Household Textiles and Laundry Work, Atma Ram Publications, Delhi.
2. Kamala Devi Chattopadhyaya, Handicrafts of India ,New Age International Publishers Ltd.
3. Susheela Dantiyagi, Fundamentals of Textiles and their care, Orient Longman, Delhi.
4. Zarpkar System of cutting, Gala Publishers, Bombay.
5. Shailaja Naik, Traditional Embroideries of India, A P H Publication, Delhi.
6. Verma Kapil Dev, Cutting & Tailoring ( Theory ) Asian Publishers, New Delhi.
7. Verma Kapil Dev, Cutting And Tailoring ( Practical) Asian Publishers, New Delhi.
8. Premlata Mullick, Textbook of Home Science, Kalyani Publishers.

## 8. MICROBIOLOGY (Optional)

SYLLABUS FOR THE ACADEMIC YEAR 2014-15 ONWARDS

### B.Sc. II – SEMESTER

#### Paper-II MICROBIOLOGICAL TECHNIQUES

**Total Hours-60**

1. **Microscopy:**

**Principles of Microscopy:** Resolving Power, Numerical Aperture, Working distance, and magnification. Different types of Microscopes-Dark field, Phase contrast, Stereomicroscopes, Fluorescent, Electron Microscopes- Scanning and Transmission.

**09 Hours**

2. **Sterilization:**

**A) Physical methods and their mode of action.**

i) Heat

a) Dry heat- Hot air Oven

b) Incineration

c) Moist heat – Autoclave and Pressure cooker.

d) Tyndallizations (Fractional Sterilization)

ii) Filtrations –Types of filters and laminar air flow.

iii) Radiation methods – UV and Gamma Radiations.

**B) Chemical Methods:**

a) Definitions of terms-Disinfectants, Antiseptics and Sanitizers.

Microbicides - Bactericides, Viricides, Fungicides and sporicides. Microbiostatic, Bacteriostatic and fungibioststic agents.

b) Use and mode of action- Alcohols, Aldehydes, Halogens, Phenols, Heavy metals Detergents: Quaternary ammonium compounds.

**15-Hours**

**3. Culturing of microorganisms:**

Culture media- Synthetic and non-synthetic- solid, liquid and semisolid media. Special media- Enriched, selective, transport, differential media. Methods of isolation of bacteria, fungi,- serial dilution, pour plate, spread plate and streak- plate.

Maintenance of pure cultures

Cultivation of anaerobic bacteria –Anaerobic jars method

**14hours**

**4. Strains and Staining Techniques:**

Principles and types of stains- Preparation of bacterial stains for light microscopy. Fixation, simple staining (positive and Negative ), Differential staining (Gram staining and Acid fast staining), Structural staining (Capsule and endospore staining).

**14 -Hours**

**5. Instruments:**

Working principles of Centrifuge, pH meter, Colorimeter and

Spectrophotometer and their applications.

**08-Hours**

**Practicals-II MICROBIOLOGICAL- TECHNIQUES:**

1. Study of microscope: Structure and working principles of Light Microscope.
2. Preparations of the culture media: broth, semisolid and solid. Pour plate, Streak plate and spread plate techniques.
3. Isolation and Enumeration of microorganisms using serial dilution techniques.
4. Staining methods: Simple staining, Gram staining, Acid fast stains and structural stains.
5. Demonstration of slide culture technique of fungi.
6. Demonstration of laboratory instruments: Autoclave, Hot air oven, Incubator, Centrifuge, Spectrophotometer and pH meter.

## References:

1. Aneja K.R , Experiments in Microbiology, plant pathology, Tissue culture and Mushroom cultivation, New Age International, New Delhi.\
2. Atlas. R.M. “ Microbiology-Fundamental and Applications” Mac Millian Publishing company New York.
3. Benson Harold. J “ Microbial Applications ” WCB Mc Millan Publishing Co, New York.
4. Bhattacharya “ Experiments with Microorganisms” – Emkay Publishers.
5. Colwod. D 1999, “ Microbial Diversity” John Wiley and Sons.
6. Cooper,D 1997 “ The tools of Biochemistry” Johan Wiley and songs.
7. Pelechzar M.J. and Chan ECS and Kreig NR -1982 “ Microbiology” Tata McGraw Hill Book Co. New York.
8. Salle. A.J.” fundamentals Principles of Bacteriology” Tata McGraw Hill Publishing Company Ltd. New Delhi.
9. Stainer. R.Y. and Ingraham J.L “ General Microbiology ” prentice Hall of India Pvt. Ltd., New Delhi.
10. IO.SulliaS.b.and Shantaram S 1998 “ GeneralMicrobiology” Oxford and IBH Publishing Co Pvt. Ltd. New Delhi
11. 11.Sunderrajan “ Tools and Techniques of Microbiology” – Anmol Publications.

## **9. MATHEMATICS (Optional)**

**MATHEMATICS SYLLABUS FOR THE ACADEMIC YEAR 2014-15 ONWARDS**

### **B.Sc. II – SEMESTER**

**Paper-III ALGEBRA AND TRIGNOMETRY**

**Teaching Hours : 50 Hours**

#### **UNIT-V**

##### **DIFFERENTIATION IN POLAR CO-ORDINATES**

**15 Hours**

Polar coordinates of a point and polar curve. Angle between the radius vector and the tangent at a point on the curve. Angle of the intersection of two curves Polar and pedal equation of the curves.Points of inflexion.Concavity and Convexity of curves.

#### **UNIT-V**

##### **CURVATURE**

**15 Hours**

Curvature of plane curves, Formulae for radius of curvature in Cartesian.Parametric, polar and pedal forms.Centre of curvature, Evolutes, Involutives, Envelops, and Asymptotes.

## UNIT-V

### INTEGRAL CALCULUS

10 Hours

Reduction Formulae for Integration of  $\sin^n x, \cos^n x, \tan^n x, \cot^n x, \sec^n x, \operatorname{cosec}^n x, \sin^n x \cos^n x, x^n e^{ax}, x^m (\log x)^n$ .

## UNIT-V

### APPLICATIONS OF DEFINITE INTEGRALS

10 Hours

Application of definite integrals to areas, volumes, and surface of revolution. Length of plane curves.

#### Reference Books:

Differential calculus – Shantinarian and Mittal

Differential calculus- P.N. Chattarji

Differential calculus – N.P. Bali

Integral calculus - Shantinarian

Text of Mathematics - G.K. Raganath

## MATHEMATICS SYLLABUS FOR THE ACADEMIC YEAR 2014-15 ONWARDS

### B.Sc. II – SEMESTER

#### Paper-IV ALGEBRA AND REAL ANALYSIS

Teaching Hours : 50 Hours

## UNIT-I

### BOOLEAN ALGEBRA

20 Hours

Lattices and algebraic structures. Principle of duality. Distributive and complemented lattices. Boolean lattices and Boolean algebra. Boolean functions and expressions. Propositional calculus. Design and implementation of digital networks. Switching circuits.

## UNIT-II

### REAL ANALYSIS-I

15 Hours

Real valued functions of more than one variable. Limits and continuity of two variables. Partial derivative of higher order, Homogeneous functions. Euler's Theorem on homogeneous functions of second order and examples. Total derivative, Differentiation of implicit function, Jacobian's, Properties of Jacobian's.

### UNIT-III

#### REAL ANALYSIS-II

15 Hours

Lagrange's Mean value Theorem for functions of two variables. Taylor's and Maclaurin's theorems for two variables. Maxima and Minima of two and three variables. Lagrange's method of undetermined multipliers of two and three variables. (15hrs)

#### Reference Books:

Introduction of Mathematical Analysis -Shantinarayan.

Differential calculus- P.N. Chatterji .

Real Analysis- Asharani and Singhal

Discrete Mathematical Structures for Computer science- Kolman.B and Busy.R.C. (PHI)

Algebra -D.C.Pavate

Text book of Mathematics-G.K.Ranganath

Discrete Mathematics-C.L.Liu

### Mathematics (Optional)

#### QUESTION PAPER PATTERN FOR ALL SEMESTER

##### THEORY PAPERS

Question paper has to be set for total marks of 80.

**Section–A:** Ten questions to be answered out of twelve each carry 2 marks

$$2 \times 10 = 20$$

Note: Two questions to be set from each unit, and last two questions from any unit.

**Section–B:** Five questions to be answered out of six each carry 5 marks

$$4 \times 5 = 20$$

**Section–C:** Four questions to be answered out of six each carry 10 marks

$$10 \times 4 = 40$$

**Total Marks = 80**



# 10. STATISTICS (Optional)

SYLLABUS FOR THE ACADEMIC YEAR 2014-15 ONWARDS

## B.Sc. II – SEMESTER

### Paper-II BIVARIATE DATA ANALYSIS AND PROBABILITY DISTRIBUTIONS

Teaching Hours : 50 Hours

#### UNIT-I

#### **BIVARIATE DISTRIBUTIONS** **08** **Hours**

Bivariate distribution function: Joint, Marginal, Conditional distributions for discrete and continuous variates, Addition and Multiplication law of Expectation. (with proof) Conditional expectation, Covariance, Transformation of two random variables.

#### UNIT-II

#### **SIMPLE CORRELATION AND REGRESSION** **10 Hours**

Definition, Types of Correlation, Scatter diagram Karl Pearson's Correlation Coefficient and its Properties (with proof), Coefficient of determination. Definition and derivation of Rank correlation coefficient. Definition of Regression and derivation of Regression lines, Regression coefficients and their properties (with proof).

#### UNIT-III

#### **STANDARD DISCRETE DISTRIBUTIONS** **12 Hours**

Uniform, Bernoulli, Binomial, Poisson, Negative binomial, geometric distributions, definition, mean, variance and m.g.f, c.g.f. and moments up to fourth order only. Hyper geometric distribution: definition, mean and variance. Recurrence relation for probabilities and moments of Binomial and Poisson distributions.

#### UNIT-IV

#### **STANDARD CONTINUOUS DISTRIBUTION** **12 Hours**

Uniform, Gamma, Exponential, Beta distribution of I and II Kind: Definition, mean, variance, MGF. Normal distribution: Definition and properties: mean, median, mode and variance, odd ordered and even ordered moments. Transformation of Bivariate variables.

#### UNIT-V

**INDEX NUMBER****10 Hours**

Meaning and applications, Price and Quantity relatives, Construction of Index numbers and their computation, interpretations, Simple aggregate and Weighted average methods. Laspeyre's, Paasche's, Marshall-Edgeworth's, Dorbish-Bowley's and Fisher's index number. Time reversal and Factor reversal Tests. Consumer's price index number and its construction.

**Books for Reference:**

1. Rohatgi.V.K.(1984):An introduction to probability theory and Mathematical statistics.
2. Murry R.Speigel (1982): Theory & Problems of Statistics,Schaum's Publishing Series.
3. P.G.Hoel (1971): Introduction to Mathematical statistics,asia publishing house.
4. Cooke, Cramer and Clake: Basic Statistical Computing, Chapman and Hall.
5. Walpole R.E and Myers S.L.(1988):Probability and Statistics for Engineers and Scientists, 6<sup>th</sup> Edition, Prentice Hall, New Jersey.

**STATISTICS PRACTICALS****B.Sc. II – SEMESTER  
Practical–II****STPR-2: PRACTICAL PAPER.**

Bi-variate distributions-Computation of marginal and conditional distributions.  
Correlation: Computation of Karl Pearson's correlation coefficient, Rank correlation coefficient and interpretations.  
Regression: Regression equations.  
Fitting of Binomial distribution.  
Fitting of Poisson distribution.  
Fitting of Normal distribution.  
Index numbers: Construction of Laspeyre's,Paasche's,Marshall-Edgeworth's'Dorbish-Bowley's and Fisher's index numbers.  
Tests of consistency: Time-reversal and Factor-reversal tests.  
Construction of Cost of living index numbers: Aggregate Expenditure and Family Budget methods.

# 11. Zoology (Optional)

## ZOOLOGY SYLLABUS FOR THE ACADEMIC YEAR 2014-15 ONWARDS

### B.Sc. II – SEMESTER

#### Paper-II BIOLOGY OF CHORDATES

Teaching Hours : 50 Hours

##### UNIT-I

**Chordata**- General characters and classification.

Sub-phylum–Hemichordata Characters & organisation of Balanoglossus

Sub-phylum–Urochordata - Characters & organisation of herdmania

Subphylum- Cephalochordata-Characters & organisation of brachiostoma.

Cyclostomata-Characters& general organisation of petromyzon & myxine. **9hrs.**

##### UNIT-II

**Pisces**- General charcters & Classification of Pisces up to orders. General characters of Chondrichthys and Osteichthys. Type study- Scoliodon. Externals, Digestive, Reproductive system and Fish migration.

**5hrs**

**Amphibia** - General characters & Classification up to orders with suitable Examples.Type study-Frog- Externals,Digestive system Reproductive system. Endoskeleton of frog. Axolotl larva & its significance.

**5hrs**

##### UNIT-III

**Reptilia** - General characters & classification of living orders with suitable examples. Indian poisonous & non-poisonous snakes. Poison apparatus. Venom, Anti venom and first aid treatment given during Snake bite.

**5hrs**

**Aves** - General characters & Classification up to orders. Type study- Pigeon-Externals ,Digestive & Reproductive system. Bird migration-Flight adaptations.Beak & foot modification and Flightless birds.

**5hrs**

##### UNIT-IV

**Mammalia** - General characters & classification up to orders.

Type study- Rat –Externals, digestive system. brain.excretory system & reproductive system.

Monotremes-Distinctive charcters, Unique reptilian & mammalian features

& affinities of the Ornithorhynchus & Echidna.  
Metatherians- Their distributions, habits and Salient features. **9hrs**

#### **UNIT-V**

Study of Comparative Anatomy:- Origin, Development & Structure of Heart of Shark, Frog, Pigeon & Rabbit,  
Origin, development & Structure of Brain of Shark, Frog, Pigeon & Rabbit

**12hrs**

#### **Reference Books**

Modern Text Book of Zoology ‘ Vertebrate ‘ –R.L.Kotpal

Modern Text Book of Zoology Chordata – Dhami & Dhami

Modern Text Book of Zoology Vertebrata- Majapuria

Functional Organization of Vertebrata-- H Nigam & R.Sobti-Shoban Lal Nagin Chand & Co.

A manual of Zoology Vertebrata- M.Ekambarnath Ayyar & Swaminathan Ayyar  
S. Vishwanath Publisher.

The Vertebrates Pisces to Mammalia, Hyman L.H. McGraw Hill Co.

Text Book of Zoology – Parker T.J.& Haswell W.A. Macmillan Co.London

Biology of Chordates By Dr Harish .C. Nigam.Vishal Publ Co Lucknow

Comparative Anatomy – By KENT C.G

Outlines of Comparative Anatomy of Vertebrates, By Kingsley J.S. Central Book Depot

Vertebrate Body – Romer A.S. Edw.B.Saunders Co.Philadelphia.

Anatomy of Chordates By Charles.K. Weichert.McGraw Hill Publication.

### **B.Sc. II – SEMESTER Practical–II**

Total number of hours per week: 04

Internal Assessment=10 Marks

Total No. of hours per Semester: 52

Practicals: 40 Marks

- 1] Classification & examples Hemichordata, Urochordata, Cephalochordata  
Cyclostomes-Balanoglossus, Herdmania, Amphioxus, Petromyzon.  
Examples-Fishes:- Scolidon, Pristis, Sphyrna, Catla, Labeo, Hippocampus,  
Eel, Exocoetus, Synaptura. 1
- 2] Examples of Amphibia-Frog, Toad, Ichthyophis, Ambystoma, Axolotl larva,  
Rachophorous. and  
Examples of Reptilia-Calotes, Hemidactylus, Chamaeleon, Mabuaya, Draco,  
Naja, Python, Viper, Crocodile and Turtle. 1
- 3) Examples of Aves:- Psittacula, Owl, Woodpecker, Pigeon, Passer domesticus,  
Mammalia:- Sorex, Bat, Loris, Pangolin, Hystrix, Funambulus, Herpestes. 1
- 4) Endoskeleton of Frog. 2
- 5) Study of Comparative anatomy-  
I] Vertebrate Heart & Brain of Shark, Frog, Pigeon, Rabbit. And  
II] Urinogenital system of Shark, Frog, Pigeon & Rabbit. 2
- [ With the help of Preserved Organs/Systems/Charts/Sketches/Printouts etc]  
Note:- As per the guidelines of U.G.C. for “UG”  
For more details <http://www.ugc.ac.in/pdfnews/6686154> guideline.pdf.  
“Only one species” to be adopted for “demonstration only” by the  
faculty and “students should not do any dissection”.  
Note:- Compulsory Field visit to study animal diversity.  
Note:- Submission of Field study report carries 5 marks.  
Note:- Demonstration of Following systems of locally available Bony fish  
by faculty & “students should not do any dissection”  
\*Type animal for Dissection- Locally available Bony fish
- a] Explanation of externals & Demonstration of Digestive system.  
b] Demonstration of Urinogenital system.  
c] Demonstration of Mounting of Brain  
d] Commercial importance of fishes with suitable examples with reference  
to their usage.
- e] Internal Practical Test. 5

Note:- Students are supposed to draw labelled diagrams and write the  
explanation in their journal.

Note:- Field visit to study animal diversity is compulsory .

Note: - Submission of field study report carries 5 marks.

## Zoology (Optional)

### QUESTION PAPER PATTERN FOR ALL SEMESTER

#### THEORY PAPERS

Question paper has to be set for total marks of 80.

**Section–A:** Ten questions to be answered out of twelve each carry 2 marks

$$2 \times 10 = 20$$

Note: Two questions to be set from each unit, and last two questions from any unit.

**Section–B:** Five questions to be answered out of six each carry 5 marks

$$4 \times 5 = 20$$

**Section–C:** Four questions to be answered out of six each carry 10 marks

$$10 \times 4 = 40$$

**Total Marks = 80**

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## Group – III

### B.Sc. II – SEMESTER General Studies

Mandatory Subject (Common for All Courses)

DETAILED SYLLABUS OF

#### ENVIRONMENTAL STUDIES AND HUMAN RIGHTS

Teaching Hours: 4 Hours per Week

(Total 60 Hours)

#### Section A: Environmental Studies

##### Unit 1: Nature of environmental studies

Definition, Scope and importance

Multidisciplinary nature of environmental studies

Need for public awareness. (01 Hour)

##### Unit 2: Natural resources and associated problems

- (a) **Forest resources:** Use and over-exploitation, deforestation Timber extraction, mining, dams and their effects on forests and tribal people.
- (b) **Water resources:** Use and over-utilization of surface and ground water, floods, draught, Conflicts over water, dams-benefits and problems.
- (c) **Mineral resources:** Use and exploitation, environmental effects of extracting and using mineral resources.
- (d) **Food resources:** World food problems, changes caused by agriculture, effects of modern agriculture, fertilizer-pesticide problems, water logging and salinity.
- (e) **Energy resources:** Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources.
- (f) **Land resources:** Land as resources and land degradation, man induced landslides, soil erosion and desertification.

Role of an individual in conservation of natural resources. Equitable use of resources

for sustainable Lifestyles. (5 Hours)

##### Unit 3: Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.

- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystems.
  - a) Forest ecosystem
  - b) Grassland ecosystem
  - c) Desert ecosystem
  - d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans & estuaries).

(4 Hours)

#### **Unit 4: Biodiversity and its conservation**

- Introduction- Definition: genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Values of Biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, national and local levels.
- India as a megadiversity nation.
- Western ghats as a biodiversity, Hot-spots of biodiversity.

Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts.

- Endangered and endemic species of India.
- Conservation of biodiversity.

#### **Unit 5: Environmental Pollution**

Definition, causes, effects and control measures of:

- a) Air pollution
  - b) Water pollution
  - c) Soil pollution
  - d) Marine pollution
  - e) Noise pollution
  - f) Thermal pollution
  - g) Nuclear hazards
- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
  - Role of an individual in prevention of pollution.
  - Disaster management: Floods, earthquake, cyclone, landslides and Tsunami.

(5 Hours)



### **Unit 6: Social Issues and Environment**

- From Unsustainable to sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people; its problems and concerns.
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
- Wasteland reclamation.
- Consumerism and waste products
- Environment protection Act
- Air (prevention and pollution) Act.
- Water (prevention and pollution) Act.
- Wildlife protection Act.
- Issues involved in enforcement of environmental legislation.
- Public awareness. (4 Hours)

### **Unit 7: Human Population and the Environment**

- Population growth, variation among nations.
- Population explosion, Family welfare programme.
- Environment and human health.
- Value Education- HIV/ AIDS.
- Women and Child Welfare.
- Role of information technology in Environment and human health. (3 Hours)

### **Unit 8 : Field Work**

- Visit to local area to document environmental assets-river /forest/grassland/hill/mountain.
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Study of common plants, insects & birds
- Study of simple ecosystems-ponds, river, hill slopes, etc.

( 3 Hours)

Total 30 Hours

### **REFERENCES :**

1. Text book of Environmental studies by S. Sinha, M. Shukla & R. Shukla (2005) AITBS Publishers, Delhi.
2. Agrawal, K.C. 2001 Environmental Biology, Nidi Publ, Ltd. Bikaner.

3. Bharucha Erach, The Biodiversity of India, Mapin Publishing PVT. Ltd. Ahmedabad-380013, India E mail [mapin@icenet.net](mailto:mapin@icenet.net)
4. Brunner R.C. 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
5. Clark R.S. Marine pollution, Clarendon Press Oxford
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.t. 2001 Environmental Encyclopedia, Jaico Publ. House. Mumbai, 1196p
7. De A.K. Environmental Chemistry, Wiley Eastern Ltd.,
8. Down to Earth Centre for science & Environment.
9. Jadhav H. & Bhosle V.M. 1995 Environmental Protection and laws. Himalays Pub. House Delhi, 284p
10. Mckinney M.L. & schocl R.M. 1996 Environmental Science System & solutions Web. Enhanced edition 639p
11. Heywood, Vh & Wastson R.T. 1995 Global biodiversity Assesment Cambridge Univ. Press 1140p
12. Miller T.G. Jr. Environment Science Wadsworth publishing co.
13. Odum E.P. 1971 Fundamental Ecology W.B. Saunders Co. USA 574p
14. Rao M.N. & data A.K. 1987 Waste water treatment, Oxford & IBH publ. Co. Pvt. Ltd. 345p
15. Sharma B.K. 2001 Environmental chemistry Goel Publ. House, Meerut.
16. Trivedi R.K. Handbook of Environmental Laws rules, guidelines, compliances and standards, Vol I and II Enviro Media
17. Trivedi R.K. & P.K. Goel introduction to air pollution, Techno-Science Publications.
18. Wagner K.D. 1998 Environmental Management. W. B. Saundars Co. Philadelphia, U.S.A. 499p

## Section B: Human Rights

**Unit 1:** 10 hours

### FUNDAMENTALS OF HUMAN RIGHTS

Nature of Human Rights, Origin and development of the concept of Human Rights. Functions of Human rights in modern society. Human rights and democratic governance: Limitations of Human Rights.

**Unit 2 :** 10 hours

### CLASSIFICATION OF HUMAN RIGHTS

Civil and Political Rights – Nature and functions Social and Economic Rights : Right of vulnerable groups such as women, Children minorities, tribal and the disabled. Constitutional incorporation or Human Rights in India.

**Unit 3 :** 10 hours

### ENFORCEMENT OF HUMAN RIGHTS

Basic principles governing enforcement of human rights at national, regional and international levels. National Human Rights Commission – Organisation, functions and powers.

### REFERENCES:

1. K.P. Saksena "Human Rights" 1996 New Delhi.
2. Dr. S. Mangalmurthy a "Human Rights " Chetan Book House Mysore 2004.
3. Krishnamurthy S. "*Human Rights and Police Administration*" B. R. Publishing Corporation, Bangalore.
4. B.P. Singh "*Human Rights in India*" Deep & Deep Publication New Delhi.
5. D.D. Basu, "*Human Rights in Constitutional Law*" prentice hall.
6. S.O. Agarwal, "*Human Rights*" Central law Agency, Allahabad.
7. V.A. Anand "*Human Rights*" Allahabad Law Agency, Faridabad.
8. Dr. M. Jayakar Bhandari, Vasantkumar, Raghava Naik "*Environmental Studies and Human Rights*"
9. Gokulesh Sharma, Human Rights.
10. Arjun Dev, "Human Rights" Publication 1996.

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