



WEL-COME

TO THE COURSE STRUCTRE AND SYLLABUS OF UNDERGRADUATE

PROGRAMMES – **B.Sc**

II Semester

w.e.f.

Academic Year 2017-18 Onwards

B.Sc I – Semester

Group – I

1. BASIC – ENGLISH

Detailed Syllabus for B. Sc. / B.Sc. Comp-Sc / BCA / B. Sc. in CCJ (With effect from 2016-17 onwards) Semester II: Basic English Teaching Hours: 5 per Week

I Text: Prose

- 1. A Chameleon Anton Chekhov
- 2. The False Gems Guy de Maupassant
- 3. The Secret of Work Swami Vivekanand
- 4. Duty Mulk Raj Anand
- 5. Our Home in Space Sir James Jeans

Poetry

- 1. Hunger Jayant Mahapatra
- 2. Telephone Conversation Wole Soyanka
- 3. The Diameter of the Bomb Yehuda Amichai
- 4. This is a Photograph of Me Margret Atwood
- 5. The Emperor of Ice Cream Wallace Stevens

II Grammar and Communication Skills

- A) Synonyms and Antonyms text based
- B) Frame Wh- questions
- C) Communicative Skills
- D) Short Speech Skills Global Warming, Water Scarcity, Pollution, Terrorism, Anti-social activities, Startups, Plantation, bio-diversity, rain harvesting, women education, Clean Mission India, Impact of strikes, Alcoholism, First day in college, Mother's day, Yoga day, Environment day and Science day. (about 100-150 words)
- E) Preparing an Advertisement Notebook, Pen, Soap, Smart Phone, TV, Computer, Shoes, etc.
- F) Resume and CV writing

Pattern of Question Paper

(80 Marks paper of three hours and 20 Marks for I.A)

1)	Objective type questions	
	(5 from Prose and 5 from Poetry)	10X1=10
2)	Reference to Context (One from Prose and	
	(one from Poetry out of four)	2X5=10
3)	Essay type question on Prose (one out of two)	1X10=10
4)	Essay type question on Poetry (one out of two)	1X10=10
5)	Short Notes (One from Prose and	
	(One from Poetry out of four)	2X5=10
	A) Synonyms	5X1=05
	B) Antonyms	5X1=05
	B) Framing Wh- questions	5X1=05
7)	A) Short Speeches	1X5=05
	B) Preparing an Advertisement	1X5=05
	C) Resume Writing/CV	1X5=05

80

Additional English:

Detailed Syllabus for B. Sc. / B.Sc. Comp-Sc / BCA / B. Sc. in CCJ (With effect from 2016-17 onwards) Semester II: Additional English Teaching Hours: 5 per Week

Text: The Cutting Edge: Science & Scientists

(Ed. Colin Swatridge (Macmillan)

Only the following biographical sketches are to be taught.

- 1. Rene Descartes (1596-1650)
- 2. Antoine Lavoisier (1743-94)
- 3. Ivan Pavlov (1849-1926)
- 4. Sigmund Freud (1856-1939)
- 5. Werner Heisenberg (1901-1976)

Grammar and Composition

- 1) Relative Clauses
- 2) Conditionals and 'wish'
- 3) Use of words as Two different forms of Speech
- 4) Report Writing (functions, seminars, excursion, tours, accident, earthquake, flood, etc.)

Pattern of Question Paper

(80 Marks per paper of three hours and 20 Marks for I.A)

1) Objective type questions	10X1 = 10
2) Comprehension Questions on the biographical sketches	5X2=10
3) Essay type question on the biographical sketches	
(One out of two)	1X10=10
4) Essay type question on the biographical sketches	
(One out of two)	1X10=10
5) Short Notes on the biographical sketches	
(Two out of four)	2X5=10
6) A) Relative Clauses	5X1=05
B) Conditionals and 'wish'	5X1=05
7) Use of words in a sentence as	
two different forms of Speech	5X2 = 10
8) Report writing 10	
	80

2. BASIC - KANNADA

ಸಾಹಿತ್ಯ ಕೌಮುದಿ-೨

ಬಿ.ಎಸ್ಸಿ. ಎರಡನೆಯ ಸೆಮಿಸ್ಟರ್

ಅನುಬಂಧ – ೩

ಪದ್ಯ ಭಾಗ

೧. ಕಾವ್ಯ ಪ್ರಯೋಗ ಪರಿಣತಮತಿಗಳ್ -ಶ್ರೀವಿಜಯ ೨. ವಚನಗಳು -ಬಸವಣ್ಣ ಮತ್ತು ಅಕ್ಕಮಹಾದೇವಿ ೩. ಭೇದದಲಿ ಹೊಕ್ಕಿರಿದನೋ ಮಧುಸೂದನ -ಕುಮಾರವ್ಯಾಸ ಬ್ಲೆನ್ ಹೀಂ ಕದನ -ಬಿಎಂಶ್ರೀ છ. ಕುರುಡು ಕಾಂಚಾಣಾ –ದ. ರಾ. ಬೇಂದ್ರೆ Н. ೬. ನೀವಲ್ಲವೆ? –ಕೆ. ಎಸ್. ನರಸಿಂಹಸ್ವಾಮಿ -ಜಿ. ಎಸ್. ಶಿವರುದ್ರಪ್ಪ ೭. ನನ್ನ ಹಣತೆ –ಬೆಟಗೇರಿ ಕೃಷ್ಣಶರ್ಮ ಯಾತಕವ್ವಾ ಹುಬ್ಬಳ್ಳಿ–ಧಾರ್ವಾಡ! ల. –ಈಶ್ವರ ಸಣಕಲ್ಲ ౯. ಕೋರಿಕೆ -ಶ್ರೀರಾಮ ಇಟ್ಟಣ್ಣವರ ೧೦. ಸಂಕ್ರಾಂತಿ

ಗದ್ಯ ಭಾಗ

00.	ಧನ್ವಂತರಿಯ ಚಿಕಿತ್ಸೆ	–ಕುವೆಂಪು
೧೨.	ಸಂಸ್ಕೃತಿ ಮತ್ತು ಸಾಹಿತ್ಯ	–ಎ.ಎನ್. ಮೂರ್ತಿರಾವ್
೧೩.	ಸಿ. ವಿ. ರಾಮನ್	–ಜೆ. ಆರ್. ಲಕ್ಷ್ಮಣರಾವ್
೧೪.	ಫ್ರೆಡ್ಹಾಯ್ಲ್: ಅಪ್ರತಿಮ ಖಭೌತ ವಿಜ್ಞಾನಿ	–ಡಾ. ಶಂಕರ ಆರ್. ಕಂದಗಲ್
೧೫.	ಪ್ರಿಯದರ್ಶಿ ಅಶೋಕ	– ಮಾಸ್ತಿ ವೆಂಕಟೇಶ ಅಯ್ಯಂಗಾರ
೧೬.	ದೇವಿ	– ಶಾಂತಾದೇವಿ ಕಣವಿ

4. BASIC - MARATHI

B.Sc

Semester II

Basic Marathi

Course: Literary Form: Translation : The Kalam

Efect : P. M. Nayar

Translation : Meera Shete-Shambu

Vishwakarma Publications, Pune.

4. BASIC-ARABIC

SYLLABUS OF ARABIC SUBJECT BSc. Second Semester Arabic Basic (With effect from 2016-17 onwards)

Paper : Prose, Poetry and History of Arabic Literature **Scheme of teaching :** 5 hours per week

Prescribed Text Books

1.	Al-Qiratul Wadhiha Part-II (Prose)
	Following Lessons.
	1.Al Firashatu wazzahratu. 2.Azziyaratu. 3. Fis sooqi
	4.Al Mahattatu. 5. Usratul amm. 6. Dukaanul Fawakhi
	By:Waheeduz.zama Al-Kiranvi.Pub.By:Maktaba Husainia
	Deoband (U.P)

Mukhtaaraatul Adab (Poetry) By: Zaidaan Badraan Pub.By: Majlis-e- Isha atul uloom Jamia Nizamiya Hyderabad.59 Following Poems 1.AtTaa ir 2. AnNasheedul madrasi 3. Alkitabu 4. Unsheedatul Eid 5.Al Alamu. 6. Unshudatus Sabah.

3. Tareekh Adab-e-Arabi

Chapter No.I Teesri fasl

By: Dr.syed tufail Ahmad madaniPub.By:Deccan Traders Book Seller

& Publisher 23-2-378, Moghalpura, Hyderabad. (A.P)

4. The Holy Quraan. Pub.By:Taj Company Mumbai

Sura-Alam Nashrah.

The question paper should be broadly based on the following pattern.

1)	Multiple choice from first and second text	10x1	=	10
2)	Summary from first and second text with choice	$2x7\frac{1}{2}$	=	15
3)	R.C. from first and second text with choice	3x5	=	15
4)	Appreciation of verses from second text 3 out of 5	3x5	=	15
5)	Question from third text with choice	2x7½	=	15
6)	Question on Sura	1x10	=	10

80

5. BASIC – URDU

B.Sc Second Semester Urdu-Basic(MIL)

(With effect from 2016-17 onwards)

Paper-II. Prose, Poetry and Essays

Scheme of teaching:- Duration- 16 Weeks- 5hours per Week

Prescribed text books.

Detailed Text

I.Zouqey Adab(Vol 1) (Part 2)

by

Prof. M.N Saeed.

Pub. By Hamim Pulishers 3, 1st floor, Lal Masjid Building Shivaji Nagar, Bangalore-51.

Non-Detailed Text:

II. Jaded Ilme Science

(Lessons 3,4,5 Only)

(Page 76 to 130)

Wazarat Hussain

Pub. By Educational Book House

Aligarh-202002.

by

Scheme of Examination (I & II Semester)

Total Marks – 100(Theory-80 Marks + Internal Assessment 20- Marks

- a) Each Paper of 100 Marks shall carry 20 Marks Internal Assessment out of 20 Marks , 4+10 shall be for semester test and remaining 3+3 shall be for H. Assignment & Attendance.
- b) In each paper 2 test shall be conducted for the award of Internal Assessment Marks, first test of 1 hour duration for maximum of 20 marks reduced to 4, shall be conducted in 8th week . Second test in 12th week of respective semester of maximum 80 marks & of 3 hours duration then reduced to 10 marks.

The question paper should be broadly based on the following pattern. (I & II Semester)

 Multiple Choice questions from Detailed and N.D text. 10 * 1 = 10 (10 out of 10)

Detailed text (Prose & Poetry)

2. Essay type question on Prose (1 out of 2)	1 * 10 =10
3. Question on reference to the context	4* 2 ^{1/2} =10
(4out of 6)	
4. Summary of the Poem (1 out of 3)	1 * 10 =10
5. Appreciation of verses from Gazals (4 out of 6)	4 * 2 ^{1/2} =10
Non-Detailed text	
6. Essay type question	2 * 10 = 20
(1 out of 2)	
Short Notes (2 out of 4)	1* 10 = 10

7. BASIC – SAMSKRIT

(With effect from 2016-17 onwards)

Bsc Part –I						
	Basi	ic -	- Samskrit			
Second S	Semester					
Teaching	g Hours	:	5 Hours per week			
Exam Ma	irks	:	80+20=100 of 3 hou	ırs	Duration	
Text : संस्	Text : संस्कृत काव्य सुषमा (Samskrit Kayya Sushama) Samaja Pustakalaya					
Depot Dh	narwad					
1. भवानी भाव परीक्षा : 35 Marks				35 Marks		
2. मात	2. मातड्ग वृत्तान्त :			:	35 Marks	
3. व्याकरण Grammer		:	10 Marks			
स्त्री	स्त्रीलिड्ग शब्दाः					

Bsc Part -I

Basic – Samskrit

Question Paper Pattern

Second Semester

1.	New Type Questions [Fill in the blanks]/ Select	10 Marks
	correct answer (any ten out of twelve)	
2.	a) Translate & Explain (any two out of three)	10 Marks
	Stanza's	10 Marks
	b) Translate & Explain from prose (any two out of	
	three)	
3.	Explain with reference to context (any two out of four)	16 Marks
4.	Short notes (any two out of four)	08 Marks
5.	Answer the following question (any one from each	16 Marks
	section)	
6.	Grammar (Feminine genders)	10 Marks
	Total	80 Marks

7. BASIC – PERSIAN

Teaching Hourse: 5 Hours per Week

PRESCRIBED TEXTBOOK

Following portion only Gulastaan-E-Saadi Baharistan-E-Jaami <u>Textbook</u> Shahkar-E-Farsi by Hafez Abdul Alim Khan Pub by:-Ram Narayanlal Bani mahdho2 katra road Allahabad(U.P)

8. BASIC – HINDI

Syllabus of B. Sc/BCA II Semester

Hindi Basic 2016-17 onwards

Teaching hours per week:	05 hours	Total Marks:	100 Marks
Examination:	03 hours	Theory:	80 Marks

Internal Assessment: 20 Marks

Text Books:

- काव्य सरगम- सं. संतोष कुमार चतुर्वेदी, लोकभारती प्रकाशन, इलाहाबाद-१ (अध्ययन के लिए मैथिलीशरण गुप्त से अशोक वाजपेयी तक की कविताएँ)
- 2. सामान्य निबंध
- 3. अनुवाद

Distribution of Marks

काव्य सरगम – 55 अंक सामान्य निबंध – 15 अंक अनुवाद – 10 अंक

Α	Objective Type Questions (10 out of 14)	10 Marks
В	Annotations from Text Book (3out of 5)	15 Marks
С	Essay Type of Questions from Text Book (2 out of 4)	20 Marks
D	Short Notes from Text Book (2out of 4)	10 Marks
E	General Essay (सामान्य निबंध) (1out of 3)	15 Marks
F	Translation (अनुवाद) (Kannada/English in to Hindi)	10 Marks
	Theory total	80 Marks
	Internal Assessment	20 Marks
	Total	100 Marks

Reference Books:

- १. छायावाद- डॉ. नामवर सिंह
- २. प्रगतिवाद- डॉ. शिवकुमार मिश्र
- ३. अज्ञेय और प्रयोगवाद- शैल सिन्हा
- ४. प्रैमचंद के श्रेष्ठ निबंध- डॉ. सत्यप्रकाश मिश्र
- ५. अनुवाद विज्ञान- डॉ. भोलानाथ तिवारी
- ६. अनुवाद कला- डॉ. विश्वनाथ अय्यर
- ७. निबंधों का खजाना- आरती अग्निहोत्री
- ८. श्रेष्ठ हिंदी निबंध- ब्रज किशाँर प्रसाद सिंह

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

(With effect from 2017-18 onwards)

1. MICROBIOLOGY (Optional)

SEMESTER- II

PAPER –2.1 MICROBIOLOGICAL TECHNIQUES

Total Hours Allotted: 50

1. Microscopy:

Principles of Microscopy- resolving power, numerical aperture, working distance and magnification. 2. Principles of photomicrography. 3. Working principles and applications of a) Dark field microscope b) Phase contrast microscope c) Fluorescence Microscope e) Electron Microscopy- TEM and SEM **8 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) Radition methods-UV and Gamma Raditions.
 - B) Chemical methods:
 - a) Definitions of terms-Disinfectants, Antiseptics Sanitizers.

Microbicides- Bactericides, Viricides, Fungicides &Sporicides, Microbiostatic, Bacteriostatic and fungi biostatics agents.

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

12 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. Different methods for maintenance of pure culture.

Cultivation of anaerobic bacteria- Anaerobic jars method. **12 Hours**

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). **12 Hours**

5. Instruments:

Working principles of Centrifuge, pH meter, Colorimeter and Spectrophotometer and their applications.

6- HOURS

PRACTICALS-2.2 Microbiological Techniques:

- 1. Study of microscope.Structure and working principle of Light microscope.
- Preperation of the culture media: Broth, Semisolid and solid.Poureplate,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 staining and structural stains.
- 5. Demonstration of slides culture techniques 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 McMillian Publishing Co, New York.
- 4. Bhattacharya "Experiments with Microorganisms"-Emkay Publishers.
- 5. Colwod. D 1997 "Microbial Diversity" Johan Wiley.
- 6. Cooper, D 1997 : The tools of Biochemistry" Johan Wiley and sons.
- 7. Pelechzar M.J. and Chand 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.SulliaS.B.andShantaram S 1998" General Microbiology" oxford and IBH Publishing Co Pvt.Ltd.New Delhi.
- 11.Sunderrajan" Tools and Techniques of Microbiology"- Anmol Publications.

2. PHYSICS (Optional)

(With effect from 2017-18 onwards) Physics 2.1: SOUND AND THERMAL PHYSICS (Total Hours: 50) 17BSCPHYT12

UNIT I

SOUND

Free, forced and sustained vibrations, resonance with examples.

Analytical treatment of undamped, Damped and forced vibrations, Condition for amplitude at resonance, phase of forced vibrations, effect of damping on phase of forced vibrations. Theory of Helmholtz Resonator and determination of unknown frequency.

Transducers and their characteristics: Pressure microphone (Carbon), moving coil loud speaker.

Problems.

(9 + 1 = 10hours)

KINETIC THEORY OF GASES

Postulates of kinetic theory of gases, Maxwell's law of distribution of velocities (derivation assuming constants a and b). Average, r.m.s and most probable velocity (derivation). Mean free path, derivation of Clausius expression, & Maxwell's expression. Brownian Motion and derivation of Einstein's equation for translational Brownian motion.

UNIT II

Problems.

(9 + 1 = 10 hours)

UNIT III

THERMODYANMICS

Heat engines: Otto Engine, Otto Cycle, expression for efficiency. Diesel engine: Diesel cycle, expression for efficiency and Carnot's Theorem. Entropy: Concept of entropy. change in entropy in reversible and irreversible processes. Entropy – Temperature diagram, Second law of thermodynamics. Maxwell's Relations : Derivation of Maxwell's Relations . Applications to Clausius – Clapeyron's equation. Problems.

(8 + 2 = 10 hours)

UNIT IV

LOW PRESSURE AND TEMPERATURE

Production of low pressure: Exhaust pump and its characteristics (Exhaust pressure, degree of vacuum attainable, speed of pump). Expression for speed of pump.

1. Diffusion pump: Principle, construction and working.

2. Ionization gauge: Principle, construction and working.

Production of low temperature: Joule Thomson effect, porous plug experiment with analytical treatment concept of is version temperature. Problems.

(9 + 1 = 10 hours)

UNIT V

Radiation

Radiation pressure (qualitative), Stefan's Law and its derivation using radiation pressure. Determination of Stefan's constant. Energy distribution in the Black body spectrum. Wein's displacement law and Rayleigh – Jean's Law (qualitative). Planck's law and its derivation. Derivation of Wein's Displacement law & Rayleigh Jean law from Planck's law.

Problems.

(9 + 1 = 10 hours)

PHYSICS 2.2 : LAB – II

17BSCPHYP22

LIST OF EXPERIMENTS

- 1. Helmholtz Resonator.
- 2. Frequency of A.C using sonometer.
- 3. Velocity of sound through material of wire using sonometer.
- 4. Characteristics of loud speaker (Tweeter and Woofer).
- 5. Determination of thermal conductivity of bad conductor by Lee's method.
- 6. Determination of Stefan's constant.
- 7. Verification of Stefan's law.
- 8. Specific Heat of Liquid by method of cooling.
- 9. Characteristics of microphone.
- 10. Determination of solar constant.

NOTE:

- 1. Experiments are of four hours duration.
- 2. Minimum of eight experiments to be performed.

REFERENCE BOOKS:

- 1. A text book of Sound (II Edition) Brijlal and Subramanyam, Vikas Publishing House, 1977.
- 2. Text book of Sound (I Edition) Khanna and Bedi, Atmaram and Sons, 1985.
- 3. Text book of Sound (III Edition) M. Ghosh, (S.Chand.)
- 4. Kinetic Theory of Gases (I edition) Ideal Book Service, Pune. (1967)
- 5. Kinetic Theory of Gases Kelkar V N.
- 6. Heat and Thermodynamics and Statistical Physics (XVII Edition) –Singhal, Agarwal and Satyaprakash
- 7. Heat and Thermodynamics and Statistical Physics (I Edition) Brij lal Subramanyam and Hemne (S.Chand, 2008).
- 8. Heat and Thermodynamics (I Edition) D.S.Mathur (S.Chand, 1991).
- 9. A treatise on Heat Saha and Srivastava.
- 10. A text book of heat J.B.Rajam.
- 11. A text book of Heat and Thermodynamics-Sears and Salinger
- 12. Kinetic theory of gases R. S. Bhoosanurmath

3. GEOLOGY (Optional)

SYLLABI FOR B.SC.I & II SEMESTER GEOLOGY (OPTIONAL)

2017-18

S. No.	Paper Code	Title of the Paper	Marks			Exam	Inst.
			Theory/ Practical	Internal	Total	Time	week
	B.Sc Semester I						
1.		DYNAMIC GEOLOGY, CRYSTALLOGRAPHY & FIELD GEOLOGY	80	20*	100	3 hrs	4
2.		PRACTICAL : STUDY OF TOPOSHEETS, GEOMORPHOLOGICAL MODELS & CRYSTAL MODELS	40	10**	50	4 hrs	4
	B.Sc Semester II						

3.		MINERALOGY &	80	20*	100	3 hrs	4
		OPTICAL MINERALOGY					
4.		PRACTICAL: MINERALOGY &	40	10**	50	4 hrs	4
		OPTICAL MINERALOGY					
*Theory Internal 20 marks covers: Two theory tests in each semester; AND							
	**One Practical internal test of 10 marks in each semester.						

- a) **Student batch**: As this is a semi technical and at present available only at GSS College, each batch should consist of not more than 10 students for the regular practical classes.
- b) Study Tour: There will be a Geological Study Tour to the places of geological interest mainly to study the field occurrence of geological features during each SEMESTER. It carries weightage in the final practical marks. Each student shall submit a consolidated study tour report along with the journal.
- c) **Practical Record:** Submission of a well-maintained Journal of the Practical Work done during the semester is necessary before the Practical Examination.
- d) Assignments: The students will be given assignments, which are to be submitted before the 2nd Internal Test examination.
- e) Attendance: All the students need to attend and maintain 75% minimum.

All this carries 10 marks including viva-voce.

<u>OBJECTIVES</u>: Introduce the ward to the geological processes, earth resources, our natural environment and the human interactions from a geological perspective. Topics to be covered will include; Earth Materials and Structure, Human interactions with nature, Environmental Hazards, Pollution of the Environment, Natural Resources, Energy Sources and their exploitation. Through these objectives the students will achieve the following know how:

- Develop the understanding of earth and its material.
- Develop greater self-awareness of personal role regarding environmental issues.
- Increase awareness of environmental issues and how they affect society.
- Develop skills and insight into critical thinking and situational awareness of surrounding environment.
- Gain an understanding of the physical processes that operate in and on earth.
- Understand the interactions between humans and the geological processes.
- Understand past, present, and future environmental issues and how they affect the earth and our society.

NATURE OF THEORY AND PRACTICAL EXAMINATION

a) Theory Examination: (Total 100 Marks)

i) There will be one theory paper of 80 marks in each semester.

Each paper will contain THREE Sections, which are to be written in the same answer book.

PART A: TWELVE Questions (Definitions/two sentence answers) numbered	d l-12, each of 2
marks. Students need to answer ANY TEN questions.	(2x10 = 20 Marks)

PART B: SIX Questions (Short answers) numbered as 13,14,15,16,17 & 18. Each of FIVE marksstudents need to answer ANY FOUR questions(4x5 = 20 Marks)

PART C: FIVE Questions (Descriptive answers) numbered 19,20,21,22 & 23. Each of TEN marks,students need to answer ANY FOUR questions(4x10 = 40 Marks)

ii) The remaining 20 marks are allotted for Internal Assessment Marks – of 1 hour 15 minutes for two internal tests in theory.

- a. Two internal tests of 20 marks each reduced to 10 marks.
- b. Internal Assignment/Seminars/Student project work/Viva-voce (10 marks): Students are given assignments/seminars on the subject taught or a student project work.

b) Practical Examination: Total 50 Marks.

- a. Practical examination will have 3 or 4 Questions of **30 marks**.
- b. Practical Record (Journal), Field study tour report and Viva Voce carry (10 marks).
- c. Practical Internal test: One internal test of 20 marks reduced to 10. (10 marks).

B.Sc (GEOLOGY OPTIONAL) SEMESTER II

MINERALOGY & OPTICAL MINERALOGY

Max. Marks: 80

Total teaching hours: 50 (4 hrs/week)

UNIT	ТОРІС	Hrs			
	A. MINERALOGY				
	Definition of mineral.				
	Properties depending upon light- color, streak, diaphaneity, luster.				
I	Properties depending upon state of aggregation- form- columnar, lamellar and granular.	n- form- columnar, 10			
	Imitative shapes- reniform, botryoidal, mamillary, amygdaloidal, vesicular, dendritic, stalactitic and stalagmitic.				
	Forms- Isomorphism, polymorphism, pseudomorphism				
Ш	Properties depending upon cohesion and elasticity - Cleavage, fracture, hardness (Moh's scale of hardness) and tenacity;				
	Other properties: taste, odour, feel, magnetism, electricity.				
	Specific Gravity – Walker Steel Yard Balance.				
	Silicate Mineral Structures.				
ш	General characters and uses of following group of minerals: Quartz, Felspar, Mica, Pyroxene, Amphibole, Olivine & Garnet				
	Gemstones: Definition, Specifications - Carat, Color, Clarity, Rarity, Durability. Types of gemstones and uses.				
	B. OPTICAL MINERALOGY				
	Nature of light – Electromagnetic wave. Ordinary and polarized light – Reflection, refraction and refractive index, critical angle and total internal reflection. Double refraction.				
IV	Petrological microscope: Introduction to parts of microscope. Preparation of thin section.	10			
	Polarization: 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.				
	Optical Accessories: Mica plate, Gypsum Plate and Quartz Wedge.				
V	Optical properties of mineral: in plane polarised light- colour, pleochroism, form, cleavage, fracture, relief.	10			
	Properties in analysed/crossed nicols- Isotropism and anisotropism; Interference Colours; Birefringence; Extinction - types, extinction angle; Zoning and Twinning.				

PRACTICAL

MINERALOGY & OPTICAL MINRALOGY

Max. 1	Marks:	40
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Time: 4 hrs/week

Total 50 hrs

1. 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.

- 2. Determination of specific gravity by Walker steel yard balance.
- 3. **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, Corundum, Garnet, Magnetite & Hematite.
- 4. Determination of Extinction and Cleavage angle under microscope.

BOOKS RECOMMENDED

1. 2. 3. 4. 5. 6. 7. 8. 9. 10.	Rutley's Elements of Mineralogy Optical Mineralogy Optical Mineralogy Mineralogy for students Mineralogy Dana's Text book of Mineralogy Mineralogy Mineralogy for students Optical Mineralogy Optical Mineralogy Elements of Optical Mineralogy	H.H. Read Kerr.P.F Winchel M.I. Batty Berry & Mason W.E. Ford Berry & Mason M.I. Batty E.E. Wahlstrom F.F. Kerr A.N. Winghall
9. 10.	Optical Mineralogy	F.F. Kerr
11. 12. 13. 14. 18.	Elements of Optical Mineralogy Engineering Geology Principles of Engineering Geology Treatise of Minerals of India Principles of Engineering Geology	A.N. Winchell Parbin Singh K.M.Bangar R.K.Sinha Bangar

4. CHEMISTRY (Optional)

Semester	Particulars	Instruction	Duration	Internal	Examination
		Hours per	of Exams	Assessment	Marks
		week		Marks	
т	Theory Paper-I	4hrs	3hrs	20	80
1	Practical-I	4 hrs	4 hrs	10	40
п	Theory Paper-II	4hrs	3hrs	20	80
11	Practical-II	4 hrs	4 hrs	10	40
TTT	Theory Paper-III	4hrs	3hrs	20	80
111	Practical-III	4 hrs	4 hrs	10	40
137	Theory Paper-IV	4hrs	3hrs	20	80
1 V	Practical-IV	4 hrs	4 hrs	10	40
	Theory Paper-Va	4hrs	3hrs	20	80
V	Theory Paper-Vb	4hrs	3hrs	20	80
v	Practical-Va	4 hrs	4 hrs	10	40
	Practical-Vb	4 hrs	4 hrs	10	40
	Theory Paper-	1 hrs	2 hrs	20	20
	VIa	41115	51115	20	80
VI	Theory Paper-	Abre	3 hrs	20	80
V I	VIb	410.5	51115	20	00
	Practical-VIa	4 hrs	4 hrs	10	40
	Practical-VIb	4 hrs	4 hrs	10	40

COURSE PATTERN

CHEMISTRY

TEACHING HOURS : 50 HOURS

B.Sc. II SEMESTER

INORGANIC CHEMISTRY

Chemical bonding-II

Hybridization: Salient features of hybridization, geometry of molecules with respect to sp, sp², sp³, dsp³, sp³d² hybridization.

VSEPR theory- Postulates, regular and irregular geometry(BF₃, CH₄, NH₃ and H₂O). Molecular orbital theory: L C A O c o n c e p t, e lementary account with respect to H₂, He₂, Li₂, B₂, N₂, O₂, 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 H₂O and H₂S b) Melting and Boiling point c) Ice has less density than water.

Organic reagents in inorganic analysis

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

ORGANIC CHEMISTRY

Alkenes, Dienes and Alkynes

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

Chemical reactions of alkenes- Peroxide effect and its mechanism, hydroboration, oxidation, oxy-mercuration-reduction and mechanism, ozonolysis with respect to 2-butene and 2-methyl-2-butene, oxidation with KMnO4.

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

Aromatic Hydrocarbons

04 hours

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

04 hours

02 hours

10 hours

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, constitution of naphthalene, Haworth synthesis, nitration and sulphonation of naphthalene.

Conversions

- a) Alkanes to alkyhalides to alcohols and vice versa
- b) Alkanes to alkyl cyanides to carboxylic acids
- c) Benzene to p-nitrobenzoic acid
- d) Benzene to m-bromoaniline
- e) Naphthalene to 1,4-naphthaguinone
- f) Naphthalene to anthranilic acid

PHYSICAL CHEMISTRY

First law of thermodynamics

Statement, isothermal and adiabatic process, expression for work done in the reversible expansion of adiabatic expansion of an ideal gas (PVY=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.

Liquid State: Physical Properties of Liquids

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.

Liquid Crystals

Types and applications.

Colloids

Emulsions: Types of emulsions, Preparation and emulsifiers. Gels: Classification, preparation and properties, general applications of colloids.

Solids

Space lattice, unit cell, crystal systems, calculation of particles per unit cell, laws of crystallography, x-ray diffraction of crystals, derivation of Brag's equation,

05 hours

06 hours

02 hours

04 hours

04 hours

02 hours

Miller indices, determination of structure of NaCl by rotating single crystal method.

Cotton and Wilkinson

Huhee and Keiter

Shriver and Atkin

Mahan and Myers

Ahluwalia, Dhingra and Gulati

Puri and shrama

A. G. Sharpe

Satya prakash

R. Chand

Madan

J.D. Lee

REFERENCE BOOKS

Inorganic Chemistry

- 01. Advanced Inorganic Chemistry
- 02. Concise Inorganic Chemistry
- 03. Inorganic Chemistry
- 04. Inorganic Chemistry
- 05. Principles of Inorganic Chemistry
- 06. Inorganic Chemistry
- 07. Essential Chemistry
- 08. University Chemistry
- 09. Modern Inorganic Chemistry
- 10. Modern Inorganic Chemistry
- 11. Inorganic Chemistry for Under graduates R. Gopalan
- 12. College Practical Chemistry
- 13. Instrumental method of chemical analysis Willard, Martin and Dean

Organic chemistry

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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

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. Sangaranarayanam and V. Mahadevan
05.	Physical Chemistry	Atkins
06.	Physical Chemistry	Bahl, Madan and Tuli

B.Sc. II SEMESTER CHEMISTRY PRACTICALS

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 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.

5. ELECTRONICS (Optional)

B. Sc. SEMESTER –II

2017-18 onwards

Total Teaching hours: 50, Teaching hours per week : 4 hours

ELE-2: CIRCUITS AND DEVICES

UNIT - I: DIODE CIRCUITS

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, π -Section filter. Clipping and clamping circuits (Biased and Unbiased positive & negative).

8Hrs.+2Hrs.Problems =10hr

UNIT - II: REGULATED POWER SUPPLY.

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.

8Hrs.+2Hrs.Problems =10hrs

UNIT – III : ACTIVE DEVICES

Transistor :Introduction, types of transistors, construction and working, characteristics of three modes (CB, CE and CC), relation between α , β and γ .

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

Optoelectronic devices: Construction, working & applications of LED, LDR, Photodiode, Photovoltaic cell.

8Hrs.+2Hrs.Problems =10hrs

UNIT – IV : TRANSISTOR BIASING

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.

8Hrs.+2Hrs.Problems =10hrs

UNIT – V: AMPLIFIERS

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.

8Hrs.+2Hrs.Problems =10hrs

Reference Books:

1. E	Electronics theory and Applications	- 5	S.L Kakani and K.C.Bhandari.
2. E	Electronics fundamentals and applications	-	D.Chattopadhyayand
			P.C.Rakshit
3. F	Principles of electronics	-	3.V.Narayana Rao Vol –II
4. E	Electronics Devices and circuits	- C	David.A.Bell 4 th edition
5. E	Elements of Electronics	-	Bagade and Singh
6. E	Basic Electronics and Linear circuits	- B	hargav, Kulshrestra & Gupta
7 . Pi	rinciples of Electronics	- V.I	ζ.Mehta.
8 In	ntegrated electronics	- M	illman & Halkias
9. El	ectronics Principle	Malv	ino
10.	Linear integrated		- D. Roy Choudhary, Shaila.B.Jain
11. 5	Semiconductor devices & circuits	-	R.L.Boylested

LIST OF EXPERIMENTS

Lab – 2:

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 / π section filter
- 5. LED characteristics (Minimum Three LEDs)
- 6. Transistor h-parameters(CE configuration)
- 7. Biasing circuits . I) Fixed biasingII) 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. GEOGRAPHY (Optional)

B. A. / B. Sc SEMESTER GEOGRAPHY (OPTIONAL) COURSE STRUCTURE (SCHEME) UNDER CBSE SYSTEM WITH EFFECT FROM 2015-2016 ON WARDS THEORY & PRACTICAL PAPER- I & II

Semester	Title of the Paper	Teaching Hours per Week	Marks	Internal Assessment Marks (IA)	Total Marks	Duration of Examination
1	Theory Paper - I Part – A: Physical Geography Practical Paper - I <i>Representation of Relief</i>	05 04	80 40	20 10 [*]	100 50	3 hours 4 hours
II	Theory Paper - II Part – B: Physical Geography Practical Paper - II Basics of Cartography (Maps & Scales)	05 04	80 40	20 10 [*]	100 50	3 hours 4 hours

*Note: Practical IA includes: 07+03=10 Marks for Assignments/Journal work and Attendance only

B. A. /B. Sc. SYLLABUS IN GEOGRAPHY

SEMESTER – II

THEORY PAPER - II

PART – B: PHYSICAL GEOGRAPHY

Objectives: The aim of this course is to provide an understanding of weather and climate phenomena, dynamics of global climates, interaction between living organisms with climate and physical environment. Further, this paper is to provide in-depth understanding of different oceans, such as evolution of the oceans, physical and chemical properties of seawater, atmospheric and oceanographic circulation.

Course structure: One Theory and One PracticalTeaching Theory: 05 hours per week (assignment / seminar/ discussion)Practical: 04 hours per weekExamination: One Theory paper of 80 Marks and 20 Marks for internal assessment (IA)One Practical of 40 Marks and 10 Marks for internal assessment (IA) (out of
10 IA marks 7 marks for practical record and journal and 3 marks for
attendance).

Units	Торіс	Teaching
		Hours
1	Weather and Climate: Definition and significance of Climatology, Distinction between weather and climate, elements and controlling factors of weather and climate, Composition and structure of atmosphere	08
11	Atmospheric Temperature: Insolation and Heat Balance (Budget), Vertical & Horizontal distribution of Temperature & Isothermal Maps. Atmospheric Pressure: measurement of pressure, pressure belts and Isobaric Maps. Winds: Planetary, Seasonal & Local winds, Cyclones and Anti-Cyclones	16
	Atmospheric Moisture: Hydrological Cycle, Humidity, Clouds and its types, condensation and types of Rainfall.	08
IV	Oceanography: Meaning & Significance of Oceanography, Distribution of Land and Water bodies, Hypsographic curve, Bottom relief of Oceans; continental self, slope and deep sea plains.	10
V	Distribution of Temperature and Salinity of Ocean Water, Water Waves, Tidal theories and types of tides, Ocean Currents: Pacific, Atlantic & Indian ocean, Coral reefs, Oceans as a store house of mineral and food resources, human impact on marine environment.	18
	Total	60 hours

Reference:

- 1. Strahler & Strahler: Physical Geography
- 2. R. N. Tikka: Physical Geography
- 3. Majid Hussain: Physical Geography
- 4. Das Gupta & Kapoor: Physical Geography
- 5. Mallappa P: Physical Geography (Kannada)
- 6. Ranganath: Physical Geography (Kannada)
- 7. M.B.Gaudar: Physical Geography (Kannada)

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B. A. /B. Sc. SYLLABUS IN GEOGRAPHY

SEMESTER – II

PRACTICAL PAPER - II

BASICS OF CARTOGRAPHY (Maps & Scales)

Units	Торіс	Teaching
		Hours
I	Cartography: Definition and importance of Cartography and	04
	cartography as a science of human communication	
II	Maps and Scales:	
	 a) Maps: Meaning and Classification of maps, Characteristic features and uses of maps 	
	 b) Scale: Definition and types of Scale, Conversion of Scale; V.S. into R.F. (five exercises each) and R.F. into V.S. (five exercises each) 	
III	Construction of Scale: Graphical/Plane, Comparative, Time, Pace and	22
	Diagonal scale and their importance (2 exercises each)	

IV	Enlargement and Reduction of Maps by Graphical Method	08
	(three exercises each)	
v	Viva	
	Total	40 hours

Reference:

- 1. R. L. Singh: Elements of Practical Geography
- 2. Gopal Singh: Practical Geography
- 3. Dr. Ranganath: Practical Geography (Kannada)
- 4. Singh and Kanayia: Practical Geography
- 5. R. P. Misra and Ramesh: Fundamental of Cartography
- 6. M. F. Karennavar & S. S. Nanjannavar: Practical Geography (Kannada)
- 7. Pijushkanti Saha & Partha Basu- Advanced Practical Geography.

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B. A. / B. Sc. II Semester (CBCS)

PATTERN/MODEL OF PRACTICAL QUESTION PAPER

Practical Paper- II: BASICS OF CARTOGRAPHY

Center No:.....

Seat No:

Max. Marks: 40

Date:....

Time : 3 Hours

Instructions:

- 1. Attempt all questions.
- 2. This question paper should be attached with the main answer book.
- 3. Examiner should prepare the question paper covering each unit of the syllabus.

Q. No. 1	1	6 marks
	2	(3X2)
	3	
	(For framing the questions, Examiner should refer unit no 1& 2).	

Q. No. 2	a). Convert the following V. S. into R. F. (any two)	4 marks
	i) ii)	
	iii) iv)	
	(Examiner should refer unit no 2).	
	b). Convert the following R. F. into V. S. (any two)	4 marks
	i) ii)	
	iii) iv)	
	(Examiner should refer unit no 2).	
Q. No. 3	a). Draw/Construct thescale and	5 marks
	write its procedure.	
	(Examiner should refer unit no 3).	
	b). Draw/Construct thescale for the	6 marks
	given R. F. and write its procedure.	
	(Examiner should refer unit no 3).	
Q. No. 4	a). Enlarge the given map	5 marks
	(Examiner should refer unit no 4).	
	b). Reduce the given map	5 marks
	(Examiner should refer unit no 4).	
Q. No. 5	Viva	5 marks
	Total	40 marks

7. BIOTECHNOLOGY (Optional)

B.Sc Biotechnology (Optional Subjects) Semester System Syllabus (w.ef: 2017-18 & onwards)

Semester	Title of the paper	Number of hours/week/pap er	Duration of Examination	Internal Assessment Marks- 20/10		Semester end Examination Marks		
				I Test	II Test	SEM - Assig ment	ATTE NDA NCE	
Ι	Cell biology and Genetics	04 Hours	03 Hours	04	10	03	03	80 Marks
	Lab	04 Hours	04 Hours	10 M	larks			40 Marks
II	Biochemistry &Biostatistics	04 Hours	03 Hours	04	10	03	03	80 Marks
	LAB	04 Hours	04 Hours	10Ma	arks			40Marks
III	Microbiology and Immunology	04 Hours	03 Hours	04	10	03	03	80 Marks
	Lab	04 Hours	04 Hours	10 M	larks			40 Marks
IV	Molecular Biology & Bioinformatics	04 Hours	03 Hours	04	10	03	03	80 Marks
	Lab	04 Hours	04 Hours	10 M	larks		•	40 Marks
V Paper I	Plant and animal Biotechnology	04 Hours	03 Hours	04	10	03	03	80 Marks
	Lab	04 Hours	04 Hours	10 M	larks			40 Marks
V paper II	Genetic Engineering & NanoTechnolog y	04 Hours	03 Hours	04	10	03	03	80 Marks
	Lab	04 Hours	04 Hours	10Ma	arks			40 Marks
VI Paper I	Industrial,& Environmental Biotechnology	04 Hours	03 Hours	04	10	03	03	80 Marks
	Lab	04 Hours	04 Hours	10 M	larks			40 Marks
VI Paper II	Agricultural & Medical biotechnology	04 Hours	03 Hours	04	10	03	03	80 Marks
	Lab	04 Hours	04 Hours	10 M	larks			40Marks

SYLLABUS FOR BIOTECHNOLOGY (OPTIONAL)

B.Sc.II Semester

Paper-2.1 BIOCHEMISTRY AND BIOSTATISTICS

Teaching hours: 50

Unit: 1 Carbohydrates: Structure, Properties, Classification and functions (05 Hours)

Unit: 2 Lipids: Structure, Properties, Classification and Functions (05 Hours)

Unit: 3 Amino acids and Proteins: Structure, Properties, Classification and functions of amino acids and proteins. Structural organizations of proteins (primary, secondary, tertiary and quaternary structures) reverse turns and Ramachandran plot (05 Hours)

Unit: 4 Enzymes: Nomenclature, classification, properties, factors influencing enzyme catalyzed reactions, enzyme inhibition (reversible and irreversible), outline of purification, industrial application of enzymes. (05 Hours)

Unit: 5 Vitamins& Hormones: Dietary source and functions of Water soluble and Fatsoluble vitamins. Chemistry and functions of pituitary and gonadal hormones. (05Hours)

Unit: 6 Bioenergetics: Concept of free energy transformations, Redox potentials, Regulations of Glycolysis, Krebs's cycle and Electron Transport System. (05 Hours)

Unit: 7 Principles and applications of Solutions, pH and buffers: Theory of water ionization and its purity (kW), pKa & pKb acids and bases, Derivation of Henderson-Hasselbalch equation and its significance. Buffers: Criteria for selection of buffers, types of buffers, Buffers in Biological systems and their mechanism of action. (05 Hours) **Unit: 8 Analytical techniques:** Principles and applications of Chromatography (Paper, thinlayer, column and GLC), Centrifugation (RPM and G, Ultracentrifugation), Spectroscopy (UV-Visible), Isotopes and Radioactivity: Radioactivity, decay laws, Isotopes in Biological studies.

(05 Hours)

Unit: 9 Biostatistics: Data & its types, Tabulation and classification of data, Frequency distribution and Graphical representation of data, Measures of central tendencies: Mean, Median, Mode and their properties, Measures of Dispersion: Mean deviation, Variance, Standard deviation and coefficient of Variation, Different models of data presentation with special reference to biological samples, Chi square test, student T test, introduction to SPSS analysis with examples etc. (10 Hours)

PRACTICALS -2.2 – 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.

1. References:

- Biomolecules and analytical techniquesBoyer Rodney, 1999 "Concepts of biochemistry", Pacific Grove, Brooks/cole publishing company.
- 3. 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
- 7. Biomolecule: Mohan P. Arora Biophysics : Mohan P. Arora
- 8. Biochemistry: A.C. Deb
- 9. Biophysics : Pattabh & Gautham
- 10. Text book of Biochemistry (1997), Devlin, Thomas, M.
- 11. Biochemistry (1993) Zubay,G.
- 12. Biochemistry Fundamentals, Voet et al.
- 13. Biochemistry, Friedfider, D.
- 14. Practical Biochemistry, Plummer.
- 15. Physical Biochemistry: Application to Biochemistry and MolecularBiology Freilder.
- 16. Principle of Instrumental Analysis Skoog & West
- 17. Bliss ,C.J.K.(1967) Statistics in Biology Vol 1.I Mc Graw hill.New York
- 18. Campbell R.C.(1974) Statistics for Biologists, Cambridge Univ, Press , Cambridge
- 19. Daniel (1999) Biostatistics (3rd Edition) Panima Publishing, Comotation
- 20. Sward law ,A.C.(1985) Practical statistics for Exponents Biologists ,Jhon Wiley and Sons,In
- 21. Khan(1999) Fundamentals of Biostatistics , Publishing Corporation

B.Sc II Sem Biotechnology Practical Examination

(BIOCHEMISTRT AND BIOSTATISTICS)		
Time: 04 Hours Max	.Marks:40	
Q.No.I. Estimate the amount ofin the given sample Protein/Amino acid/ Reducing sugar/creatinine	(10 marks)	
Q.No.II Analyse qualitatively the given sample		
Carbohydrate/Amino acid/Protein/lipid	(10marks)	
Q.No.III .Write the principle /Application of Paper chromatography/Colorimeter/Electrophoresis//Centrifugation	on	
	(05Marks)	
Q.No.IV Problems related to graphical distribution of data	(05 Marks)	
Q.NO.V.Journal	(05 Marks)	
Q.No.VI. Viva-voce	(05 Marks)	

(BIOCHEMISTRY AND BIOSTATISTICS)

B.Sc Degree Examinations

Biotechnology

B.Sc. Biotechnology Theory Question Paper Pattern			
Time: 3 Hrs	Max. Marks: 80		
Q.No.I. Answer any TEN of the following 1)	2X10= 20		
2)			
3)			

- 4)
- 5)
- 6)
- 7)
- 8)
- 9)
- 10)
- 11)
- 12)

Q.NO.II Answer any FOUR of the following 4X5= 20 13) 14) 15)

- 16)
- 17)
- 18)

Q.No.III. Answer any FOUR of the following 19)

- 20)
- 21) 22)
- 23)

4X10= 40

MATHEMATICS SYLLABUS FOR THE ACADEMIC YEAR 2014-2015 ONWARDS B.SC II SEMESTER

PAPERI: DIFFERENTIAL AND INTEGRAL CALCULUS

TOTAL TEACHING HOURS: 50 TEACHING HOURS PER WEEK: 05 HOURS.

UNIT-I

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. Polar sub-tangent and polar sub - normal. **10 hours**

UNIT-II

Dreivative of arc length, Curvature, Radius of curvature in Cartesian. Parametric, polar and pedal forms. Centre of curvature, Evolutes and Involutes. **10 hours**

UNIT III

Limits, continuity of functions of two variables. Partial derivatives, higher order partial derivatives, total derivatives and total differentials, Homogeneous functions, Euler's theorem on homogeneous functions. **10 hours**

UNIT - IV

Concavity and Convexity of curves, Points of inflexion of curves, Envelops, and asymptotes. 10 hours

UNIT - V

Reduction formulae for integration of $\sin^n x$, $\cos^n x$, $\tan^n x$, $\cot^n x$, $\sec^n x$, $\csc^n x$, $\sin^m x \cos^n x$, $x^n e^{ax}, x^m (\log x)^n$. **10 hours**

Books of reference:

- 1. Differential Calculus : Santinarayan and Dr. P.K. Mittal
- 2. Integral Calculus : Santinarayan and Dr. P.K. Mittal
- 3. Differential Calculus and integral Calculus : N.P. Bali
- 4. Text Book of B.Sc Mathematics: G. K. Ranganath
- 5. Differential Calculus and integral Calculus : P. N. Chatterji.

MATHEMATICS SYLLABUS FOR THE ACADEMIC YEAR 2014-2015 ONWARDS B.SC II SEMESTER PAPERII :ALGEBRA AND GEOMETRY

TOTAL TEACHING HOURS: 50

TEACHING HOURS PER WEEK:05 HOURS.

UNIT-I

Boolean algebra: Lattices and algebraic structures. Principle of duality.Distributive and complemented lattices. Boolean lattices and Boolean algebra.Boolean functions and expressions. **10 hours**

UNIT-II

Number theory: Recapof division algorithm, properties of prime and compositenumbers.Congruencesand its properties, Fundamental theorem of arithmetic, Bracket function, Euler'sfunction, Fermat, Euler and Wilson's theorems.10 hours

UNIT-III

Sphere: Equation of a sphere, section of a sphere by a plane, Equation of a sphere through a circle, Equation of a sphere through two given points as ends of a diameter. , Equation to a tangent plane of a sphere. Condition for tangency. Radical planes. Orthogonality of two spheres. **10 hours**

UNIT-IV

Cones : Equation of a cone, enveloping cone of a sphere, Right circular cone.	10 hours
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UNIT-V

Cylinder: Equation of a cylinder, enveloping cylinder of a sphere, Right circular cylinder. 10 hours

Books of reference:

- 1. Discrete Mathematical structure for Computer Science :KOlman. B .Busy R C (Phi)
- 2. Discrete Mathematics: C. L. Liu
- 3. Theory of Numbers Prakash Om (Golden series)
- 4. Analytical Solid geometry: Santinarayan and Dr. P.K. Mittal
- 5. Solid Geometry: N.P. Bali

Question paper pattern

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

Section A:Ten questions to be answered out of twelve, each carry two marks.2X10 = 20.Note: two questions to be set from each unit, and last two questions from any unit. $4 \times 5 = 20$ Section B: Five questions to be answered out of six, each carry five marks. $4 \times 5 = 20$ Section C: Four questions to be answered out of Six, each carry ten marks. $10 \times 4 = 40$ Total marks: 8080

9. BOTANY (Optional)

B.Sc. SEMESTER-II BOTANY (optional)

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, osmoticpressure, turgor pressure (TP), wall pressure (WP), relation between OP,DPD & TP, conceptof 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, Kreb'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 phosporyl group transfer and ATP. Enzymes: Classification, nomenclature (IUBMB) and properties; co-factors and coenzymes, isozymes, mechanism of enzyme action, enzyme inhibition, enzyme kinetics (MichaelisMenten 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. Drug 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, curcminoides)

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

B.Sc. II – SEMESTER Practicals

Total number of hours per week: 04, Internal Assessment=10 Marks, Max Marks: 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 CO2.

- 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. Mukherjei& 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 - LubertStryer - 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 Pharmocognosy- K.R. Argumugum& N. Murugesh – Sathya Publishers (1993).

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

B.Sc. II Semester Practical Examination

Subject: Botany

Time:	4	Hours
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Max Marks: 40

Q1. Set up an experiment as per Slip A. Write the requirements, principle, proce	dure
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	
experimentG & H.	6 Marks.
Q.7. Journal	5 Marks.

Instructions to Examiners.

Q.1. One experiment as per slip A (experiment 3 to 7). 8 ma	ırks.
(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	
5ma	ırks.
given sample B .	
(Performing the biochemical test -3 marks, writing the test- 2 marks).	
Q.3. Detecting the inorganic element in the given sample C. 5 ma	ırks.
(Detection -3 marks, writing the test- 2 marks).	
Q.4. Detecting the alkaloid/enzymatic activity in the given sample D . 5 ma	ırks.
(Detection -3 marks, writing the test- 2 marks).	
Q.5. Identification and giving the microscopic features of drugs E and F . 6 ma	ırks.
(Identification -1 mark, microscopic features -2 marks).	
Q.6. Physiological experiments G and $\hat{\mathbf{H}}$ (experiment 1 and 8). 6 ma	ırks.
(Identification of experiment-1 mark, explanation of physiological	
Phenomenon-2marks).	
Q.7. Journal 5 ma	ırks.

B.Sc II Semester Theory Examination Subject: Botany Pattern of Question Paper Time: 3 Hours Max Marks: 80

All Questions are compulsory

Q.I - Answer any ten out of twelve (1 to 12 sub- questions)

10x2=20

From Unit I, IIand III : 07 sub- questions. From Unit IV –03, From Unit-V 02 sub- questions.

Q.II -Answer any six out of Eight (13 to 20 sub- questions) 6x5=30 From Unit I, II, III 5 sub- questions. From Unit IV- 02 sub-questions:

From Unit V-1 sub -question.

Q.III- Descriptive Answers.

21. a) From Unit I.	OR b) From Unit II	1x10=10
22. a) From Unit III OR	b) From Unit IV	1x10=10
23. a) From Unit IV OR	b) From Unit V	1x10=10

Note: - Minor changes in the Question PaperPattern is permitted, with respect to the teaching hours allotted for each topic.

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10. COMPUTER SCIENCE (Optional)

17BScCSCT21: Data Structures Using C

Teaching Hours: 4 Hrs/week Exam: 80

Objective: To understand the concepts of Data Structures and its significance in solving problems using programming concepts. Provide holistic approach to design, use and implement abstract data types. Understand the commonly used data structures and various forms of its implementation for different applications using C

Expected Learning Outcomes:

- Design and implement commonly used Data structures
- Design Abstract Data types and its implementation
- Ability to program various applications using appropriate data structures in C

UNIT I

Advanced C: Dynamic memory allocation and pointers in C- Declaring and initializing pointers, Pointer & Functions, Pointer & Arrays, Pointer & Strings, Pointer& Structure, Pointer to Pointer. Static and dynamic memory allocation. Memory allocation functions :malloc, calloc, free and realloc. File Management in C: Defining and Opening & Closing File, Input & Output Operations on Files, Random Access to Files,

UNIT II

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

Search: Basic Search Techniques- sequential search, Binary search- Iterative and Recursive methods. Sort- General Background: Definition, different types: Bubble sort, Selection sort, Merge sort, Insertion sort, Quick sort

UNIT III

Recursion: Definition, Recursion in C, Writing Recursive programs – Binomial coefficient, Fibonacci, GCD, towers of Hanoi.

Stack – Definition, Array representation of stack, Operations on stack-push and pop, Infix, prefix and postfix notations, Conversion of an arithmetic expression from Infix to postfix, applications of stacks.

UNIT IV

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.

UNIT V

Linked list – Definition, components of linked list, representation of linked list, advantages and disadvantages of linked list, Arrays versus 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. Implementation of stack and queues using linked list.

10Hrs

10Hrs

10Hrs

49

10Hrs

10Hrs

IA: 20

Marks: Main

References:

- 1. A. K. Sharma, Data Structures Using C, 2nd edition, Pearson Education.
- 2. Achuthsankar S. Nair, T. Makhalekshmi, Data Structures in C, PHI.
- 3. Mark Allen Weiss, Data Structures and Algorithm Analysis in C, Pearson Education.
- 4. Samanta. D., Classic Data Structures, Prentice Hall

Additional Reading

- 5. Richard F. Gilberg, Behrouz A. Forouzan, Data structures-A Pseudocode Approach with C, Thomson Learning.
- 6. A. M. Tenenbaum, Y. Langsam, M. J. Augustein, R. L. Kruse, B. P. Leung and C. L. Tondo, Data Structures using C, PHI.
- 7. Trembley, An introduction to Data Structures with applications, Tata McGraw Hill.
- 8. C. Loudon, Mastering Algorithms, SPD/O'REILLY

17BScCSCT22: Programming Lab- Data Structures using C Practical Hours: 4 Hrs/week Marks: Main exam: 40

IA: 10

- 1. Write a C program to demonstrate the Dynamic Memory Allocation for Structure by reading and printing n student details.
- 2. Write a C program to read a one dimensional array, print sum of all elements along with inputted array elements using Dynamic Memory Allocation.
- 3. Write a C program to add two matrices using pointer to an array concept.
- 4. Write a program to sort array of integers using array of pointers concept.
- 5. Write a program that takes a file as an argument and counts the total number of lines. Lines are defined as ending with a newline character. Program usage should be count filename.txt and the output should be the line count.
- 6. Write a C program to read a text file and convert the file contents in capital (upper-case) and write the contents in an output file.
- 7. Write a C program to find n Fibonacci numbers using recursion.
- 8. Write a C program to find factorial of any number using recursion.
- 9. Write a C program to search for an element in an array using Sequential search
- 10. Write a C program to search for an element in an array using Binary search
- 11. Write a C program to sort a list of N elements using Bubble sort Technique
- 12. Write a C program to sort a list of N elements using Merge sort Technique
- 13. Write a C program to sort a list of N elements using Quick sort Technique
- 14. Write a C program to sort a list of N elements using Insertion sort Technique
- 15. 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 or real, the operations to be supported are 1. PUSH 2. POP 3. DISPLAY. The program should print appropriate messages for STACK overflow, Under flow and empty, use separate functions to detect these cases
- 16. Write a C program to simulate the working of an ordinary Queue using an array. Provide the operations QINSERT, QDELETE and QDISPLAY. Check the Queue status for empty and full.

- 17. Using dynamic variables and pointers Write a C program to construct a singly linked list consisting of the following information in each node; Roll No (Integer), Name (Character string). The operations to be supported are :
 - 1. LINSERT Inserting a node in the front of the list
 - 2. LDELETE Deleting the node based on Roll No
 - 3. LSEARCH Searching a node based on Roll-No
 - 4. LDISPLAY displaying all the nodes in the list
- 18. Write a C program to implement stack operations using linked list.
- 19. Write a C program to evaluate postfix expression using stack.
- 20. Write a C program to convert infix expression to postfix expression using stack

Theory Paper Evaluation Scheme

(i) Internal Test- 20 Marks:

Test: 14 marks Attendance: 03 marks Seminar/assignment: 03 marks

Two tests shall be conducted, one during the mid of the semester and another at the end of the semester for 1 hour 15 mnts duration each. First IA Marks: 20 weightage: 06 Second IA Marks: 20 weightage: 08

Teachers are encouraged to conduct the test either using any open source learning management system such as Moodle (Modular object-oriented dynamic learning environment) Or a test based on an equivalent online course on the contents of the concerned course(subject)offered by or build using MOOC (Massive Open Online Course)platform.

Note: Guidelines given by the University from time-to-time shall be followed for IA.

(ii) Examination-

Max Marks: 80 Duration - 3 Hours.

Theory question paper pattern:-		
Questions	Marks	Remarks
SECTION A	2 x 10 = 20	ability to write short
Q1. Answer all the questions		answers upto 150
10 sub questions (a-j)		words
SECTION B	4 x 5=20	ability to write answers
Q2. through Q6: Answer any four questions		upto 500 word
SECTION C	4 x 10=40	ability to write
Q7. through Q11: Answer any four questions		descriptive answers

Note: For Section-B, one question from each unit shall be considered. For Section-C, one question from each unit shall be considered.

Programming Lab. i.e. Practical Evaluation Scheme

(i) Internal Test- 10 Marks:

Test: 05 marksAttendance: 03 marksSeminar/assignment: 02 marks

Two tests shall be conducted, each of 05 marks, and average of the two shall be considered as final.

Duration of IA test: 45 mins.

Students shall design and implement the programs/assignments given from the set of assignments provided at the beginning of the course commencement.

Course teacher are encouraged to test the students by giving the students problems from the course topic other than the set of assignments given to strengthen student's ability in problem solving

Note: Guidelines given by the University from time-to-time shall be followed for IA.

ii) Practical Examination- 40 Marks Duration - 3 Hours.

Certified Journal is compulsory for appearing Practical Examination Students shall be given two programming assignments taking into consideration of duration of the time allotted to students for writing, typing and executing the programs.

Algorithm/program design	: 15
Execution	: 15 (includes program code correctness and correct
execution results)	
Journal	: 05
Viva-Voce	: 05

12. STATISTICS (Optional)

B.A/ B.Sc. COURSE IN STATISTICS (OPTIONAL) SECOND SEMESTER: THEORY PAPER

Total:50 Hours.

STTH-2: BIVARIATE DATA ANALYSIS AND PROBABILITY DISTRIBUTIONS.

Unit 1: Bivariate distributions:

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 2: Simple Correlation and Regression:

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).

10 Hours.

06 Hours.

Unit 3: Standard Discrete distributions:

Uniform, Bernoulli, Binomial, Poisson, Negative binomial, geometric distributions, definition, mean, variance and m.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: 4. Standard Continuous distribution:

Uniform, Gamma, Cauchy, 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.

14 Hours.

14 Hours.

Unit: 5. Index number:

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, Drobisch-Bowley's and Fisher's index number. Time reversal and Factor reversal Tests. Consumer's price index number and its construction. **08 Hours.**

SECOND SEMESTER:

STPR-2: PRACTICAL PAPER.

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

Books for study:

- 1. Gupta S.C and Kapoor V.K.: Fundamentals of Mathematical Statistics- Sultan Chand & Sons publications.
- 2. Hogg .R.V.and Craig.A.T(1978):Introduction to Mathematical Statistics.-4/e Macmillan
- 3. Mukyopadhyay.P.(1996) .Mathematical Statistics.-Kolkotta Publishing House.
- 4. Mood.A.M., Graybill.F A. and Boes D.C. (1974): Introduction to the Theory of Statistics.

McGrawHill.

- 5. Goon AM, Gupta M.K., Das Gupta.B.(1991): Fundamentals of Statistics vol-I World Press Kolkatta.
- 6. Gupta S.C and Kapoor V.K.: Fundamentals of Applied Statistics- Sultan Chand & Sons publications.

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, 6th Edition, Prentice Hall, New Jersey.

12. ZOOLOGY (Optional)

BSc II Semester Scheme (CBSC - Pattern) <u>Zoology (Optional) Syllabus(Revised)</u> <u>2017 -18 Onwards</u>

Semesters	Syllabus	Total Hours	Theory & Practical/ Week
	BIOLOGY OF CHORDATES	50hrs.	4 hrs.
II	PRACTICAL	12	4 hrs.

NOTE:

THEORY MARKS		PRACTICAL MARKS			
Internal	Annual	Total Marks	Internal	Annual	Total Marks
20	80	100 marks	10	40	50 marks

Question paper pattern for THEORY examination

Que.No.	Marks	Solve	Total Marks
I	02	10	20
II	04	05	20
III	10	04	40
TOTAL 80 MARKS			

PRACTICAL pattern for examination

Que.No.	Solve	Total Marks
I	Dissection (Explain any one system	08
II	Mounting	04
III	Comparative Anatomy	06
IV	Identification / Spotting (Six)	12
V	Project Report	05
VI	Journal	05
		TOTAL 40 MARKS

B.Sc II Semester Syllabus

ZOOLOGY (Optional) 2017-18 Onwards

Total Marks-80

Total Teaching-50hrs.

Biology of Chordates UNIT-I

Chordates: General characters and classification.

8 hrs

- Sub-phylum:Hemichordata-External Characters
 & Digestive system of Balanoglossus.
- Sub-phylum:Urochordata- External Characters & Retrogressive metamorphosis in Herdmania.
- 3. Subphylum:Cephalochordata-ExternalCharacters & feeding mechanism in Branchiostoma.
- 4. Cyclostomata: External Characters &general organisation of Petromyzon & Myxine(Hagfish/Slime).

<u>UNIT-II</u>

- **Pisces:** General characters & Classification of Pisces up to orders **5hrs** with examples. General characters of Chondrichthyes and Osteichthyes.Type study **Scoliodon-**Externals Characters, Digestive system, Reproductive system and Fish migration.
- Amphibia: General characters & classification up to orders with Examples. Type study Frog- Externals characters, Digestive system, Circulatory & Reproductive system. Axolotl larva & its significance.

<u>UNIT-III</u>

- Reptilia: General characters & classification up to orders with 5hrs Examples. Type study Calotes-Externals characters, Digestive system, Circulatory & Reproductive system. Indian poisonous & non-poisonous snakes.
- Aves General characters & Classification up to orders with.
 10hrs Examples Type study Pigeon-Externals characters, Digestive System, Respiratory & Reproductive system. Bird migration, Flight adaptations, Flightless birds, Beak & Feet modification.

<u>UNIT-IV</u>

Mammalia: General characters & classification up to orders with	5hrs
Examples Type study Rat- Externals characters, Diges	tive
System. Circulatory, Nervous, Excretory& Reproductiv	е
Systems.	

Comparative Anatomy:

Origin, development & structure of Heart, Brain **12 hrs** and integument in Fishes, Amphibians, Reptiles, Aves and Mammals.

PRACTICALS

Total Practicals -12 1. Classification of Urochordata, Cephalochordata, Cyclostomes 01 **Examples:** Balanoglossus, Herdmania, Branchiostoma. Peteromyzon. 2. Classification of Fishes -01 Examples: Scoliodon, Pristis, Sphyrna, Catla catla, Labeo rohita, Hippocampus, Eel, Exocoetus & Synaptura. 3. Classification of Amphibia -01 Examples: Frog, Toad, Ichthyophis, Ambystoma, Axolotl Larva & Rhacophorous. 4. Classification of Reptilia-01 Examples: Calotes, Hemidactylus, Chaemaleon, Mabuya Draco, Naja naja, Python, Viper, Turtle and Crocodile. 5. Classification of Aves -01 Examples: Psittacula, Owl, Woodpecker, Pigeon and Passer domesticus. 01 6. Classification of Mammalia -Examples: Sorex, Bat, Loris, Pangolin, Hystrix, Herpetes & Funambulus. 7. Study of Comparative Anatomy: Heart and Brain in Fishes, Amphibians, Reptiles, 02 Aves and Mammals 8. Explanation & Demonstration in Bony fish/Shark. 04 a). External characters b). Digestive system c). Reproductive system

d). Mounting of Brain

NOTE:

- **1.** With the help of Charts/Models/Diagrams/Printouts & Xerox Sheets are used in practical's demonstration.
- 2. As per UGC guidelines **Only one** species to be demonstrated by Faculty & students should not do any dissection.
- 3. Students are supposed to draw neat labelled diagrams & write The explanation in their journal.
- 4. In practical examination question no I & II are put Charts/ Models/ Diagrams/ Printouts & Xerox Sheets of the system-Students has to identify& write the explanation in their Examination paper.
- 5. Compulsory Study Tour/ Field visit to study Animal diversity. (Submission of project report carries- 5 marks).

REFERENCE BOOKS

- 1. Modern Text Book of Zoology Vertebrate-R.L.Kotpal.
- 2. Chordata Dhami & Dhami.
- 3. Vertebrate- Majapuria.
- 4. Functional Organization of Vertebrate-- H Nigam & R.Sobti-Shoban Lal Nagin Chand & Co.
- A manual of Zoology Vertebrates- M.Ekambarnath Ayyar & Swaminathan Ayyar S. Vishwanath Publisher.
- 6. The Vertebrates Pisces to Mammalia, Hyman L.H. McGraw Hill Co
- 7. The Vertebrates Hyman et al.
- Text Book of Zoology Parker T.J. & Haswell W.A. Macmillan Co. London.
- 9. Biology of Chordates by Dr Harish .C. Nigam.Vishal Publication Lucknow.

GROUP - III

DRAFTED SYLLABUS FOR All UG Courses II SEMESTER

ENVIRONMENTAL STUDIES AND HUMAN RIGHTS (Compulsory Paper)

Teaching hours: 4 hours per week

Section A: ENVIRONMENTAL STUDIES

UNIT-1: NATURE OF ENVIRONMENTAL STUDIES

Definition, Scope, Importance and Awareness Basics of our solar system Earth is called blue planet Public awareness using an environmental calendar of activities

UNIT-2: NATURAL RESOURCES

Meaning Types of natural resources Protection Conservation methods

UNIT-3: ECOSYSTEM

Introduction Types and components of ecosystem Structure and function of following ecosystem a.Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystem

UNIT-4: BIODIVERSITY AND ITS CONSERVATION

Definition Levels of biodiversity Biodiversity at global and national level Western Ghat as biodiversity, hotspot of biodiversity Threats of biodiversity Red data book.

UNIT-5: ENVIRONMENTAL ISSUES Air

pollution and its control Water pollution and its control Noise pollution and its control Thermal pollution and its control Green house effect and global warming Ozone depletion in the stratosphere Acid rain, Nuclear winter. Rules to regulate environmental pollution.

UNIT-6: ENVIRONMENTAL PROTECTION ACT

Power of central government to take measure to protect and improve environment- 1986 act Wildlife protection act – 1972 Forest conservation act- 1980 Authorities who sanction grants for conservation of environment

UNIT-7: HUMAN POPULATION AND THE ENVIRONMENT

Population explosion, family welfare programme Environment and human health. Value education- HIV/AIDS Women and child welfare

FIELD WORK

Visit to nearby industrial area to check the impact on environment.

Section B: Human Rights

(Compulsory Paper) for BA II sem and B.Sc II sem. Courses (Total Marks= 40)

Chapter -I Concept and Development of Human Rights

- a) Meaning Scope and Development of Human Rights
- b) United Nations and Human Rights OHCHR (Office of the United Nations High Commissioner for Human Rights)
- c) Universal Declaration of Human Rights. UDHR 1948, International Covenant on Civil and Political rights. ICCPR 1996 and International Covenant on Economic social and Cultural Rights. (ICESCR) 1966

Chapter -II Human Rights in India

- a) Protection of Human Rights Act, 1993
- b) Third Generation Human Rights (Group Rights) and Fourth Generation Human Rights. (Right to Development and Environmental Rights.)
- c) Judicial Activism and Human Rights.
- d) Convention on the Elimination of All forms of Discrimination against Women.
- e) Convention on the Rights of the Child

Chapter -III Enforcement of Human Rights

- a) National Human Rights Commission, State Human Rights Commission powers and functions.
- b) Media and NGO's
- c) Human Rights Education, Terrorism and Violation of Human Rights.
- d) States Role in Preservation and Protection of Human Rights.

REFERENCES:

- 1. K.P. Saksena "Human Rights" 1996 New Delhi.
- 2. Dr. S. Mangalmurthy a "Human Rights " Chetan Book House Mysore2004.
- 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
- 11. Human Rights- A Source Book

Note: The Final Examination is on Multiple Choice Base

06 Hours

07 Hours

07 Hours