

## **ABOUT UNIVERSITY**

Dr. C.V. Raman University was established on 3 November, 2006, in the district of Bilaspur, Chhattisgarh by the “All India Society for Electronics and Computer Technology” (AISECT), the Sponsoring Body. The University was named after the first Nobel Laureate of the country in the field of science – Dr. C.V. Raman, an Indian physicist efforts influenced in the growth of science in our country. The University's principle goal is to evolve a new cadre of highly skilled technical professionals with deep academic insights and a strong sense of Indian ‘Values and ethics’, commemorating our forefathers who helped shape this nation.

The Sponsoring Body of the University-All India Society for Electronics and Computer Technology (AISECT) is an ISO 9001:2008 certified organization, established in 1985 and is today's one of The India's most reputed and trusted Education Groups which houses private Universities, Engineering Colleges, Professional Institutions & Education Centres across the country. Till date, AISECT has transformed the lives of over 19 lakh students and has uplifted the lives of millions of people in the community. AISECT has been lauded for its exceptional work and has won awards from the World Bank, NASSCOM, TiE, Government of India, Government of Madhya Pradesh and several others on account of its commitment to high quality education over the last 28 years. AISECT is also a partner institution with Gol, GoMP and GoCG in their Common Service Centre Program and several other projects of state and national concern.

## **MAIN OBJECTIVES**

- Provide quality higher education and make provisions for research
- Create higher levels of intellectual abilities among our students
- Establish state-of-the-art facilities for education, training and examination, including online training
- Carry out teaching, research and offer comprehensive learning for a bright professional career
- Create centers of excellence for R&D to promote an environment of innovation and research
- Provide consultancy to public organizations and the Industry
- Award and maintain the standard of degrees, diplomas, certificates and other academic distinctions in accordance with the norms laid down by UGC, AICTE, BCI, MCI and other regulatory bodies.

## **Recognitions**

- The University is recognized under Section 2(f) of the UGC Act.
- Joint Committee Approval of DEB(UGC/AICTE/DEB)
- Other recognitions include AICTE, NCTE, BCI and DEB
- It is the first University in the state of Chhattisgarh to be awarded an ISO: 9001-2008 Certification.
- Membership of the Association of Indian Universities (AIU)
- NAAC B+

## **THE FACULTIES OF STUDIES**

The University has wide range of faculties which offers the traditional as well as the new era job oriented courses. The main emphasis is on providing a wide choice of courses at different levels. The following faculties currently are in operation in the University:

- Faculty of Arts
- Faculty of Commerce
- Faculty of Management
- Faculty of Science
- Faculty of Engineering
- Faculty of Information Technology
- Faculty of Education
- Faculty of Law

## **ABOUT INSTITUTE OF OPEN AND DISTANCE EDUCATION (IODE), CVRU**

Education determines the quality of our life to a great measure, especially professional life. However, for many, in some circumstances, the path to education is ridden with many obstacles, including location, geographical inflexibility and lack of time. Fortunately, distance education is changing that scenario by providing an effective alternative platform to learn new skills and acquire a degree, such as distance education MBA, without having to attend traditional classes.

We, a UGC/DEB approved distance university (1 may 2009), offer various undergraduate and post-graduate degrees, along with a number of diplomas, which have benefitted many distance learners.

Our distance learning programmes are the shining light that many have been looking for; they unite conventional teaching approaches, including course materials in the form of books, and modern teaching methodologies, which include online access to the course. Our unique approach has made us the centre of distance education in Chhattisgarh, helping scores of professionals to obtain a degree and fly high in their careers.

With our distance learning programmes, we are bringing people into the fold of skilled workforce, which has changed the life of many.

What makes us a distinguished Chhattisgarh distance education university?

- Reaching various far-flung regions of the state through information technology
- Providing professional education, need- and knowledge-based
- Setting new national standards in distance education

### **IMPORTANT ACHIEVEMENTS**

- AN ISO 9001: 2008 Certified University
- World Education Award
- Largest Network for Learning Support System.
- Declaration of Term end result Time to Time.
- Best in Skill Development Award 2015
- Best University in Open Distance and online Award 2017

### **ACADEMIC PROGRAMMES OFFERED BY THE UNIVERSITY IN OPEN AND DISTANCE LEARNING MODE**

The University offers through the Institute of Open and Distance Education (IODÉ) both short term and long term programmes leading to Certificates, Diploma and Degrees, which are conventional as well as innovative. Most of these programmes have been developed after an initial survey of the demand for such Programmes in the job market. They are launched with a view to fulfil the learner's need for skill and employability.

- Certification,
- Improvement of skills,
- Acquisition of professional qualifications,
- Continuing education and professional development at work place,
- Self-enrichment,
- Diversification and updation of knowledge, and
- Empowerment.

### **PROMINENT FEATURES OF THE OPEN AND DISTANCE EDUCATION AT CVRU**

The open and distance education at the Dr. C. V. Raman University has certain unique features such as

- Individual study - flexible in terms of place, pace and duration of study.
- Use of latest information and communication technologies.
- Modular approach to programmes.
- Cost-effective programmes.

- Socially and academically relevant programmes based on students need
- Convergence of open and conventional education systems.
- Take higher-education to the unreached sections of the society through the use of information technology.
- Provide need and knowledge-based professional education.
- Set the national standards for Distance Education.

## PROGRAMME DELIVERY MODE

The methodology of instruction in the distance learning mode in the university is different from that of the conventional regular programs. The system adopted for this more learner oriented and the learner is an active participant in the pedagogical process. Most of the instructions are imparted through distance education methodology and face to face mode as per requirement. The programme delivery methodology used in the distance learning mode follows a multimedia approach for instructions, which compromises:

- **Self Instructional Written Material:** The printed study material (written in self instructional style) for both theory and practical components of the programs is supplied to the learners in batches for every course.
- **Audio-Visual Material Aids:** The learning package contains audio and video CDs which have been produced/adopted by the University for Better Clarification and enhancement for understanding of the course material given to the learners. A video programme is normally of 25-30 minutes duration. The video cassettes are screened at the learner support centre during specific sessions which are duly notified for the benefit of the learners.
- **Counseling Sessions:** Normally counseling sessions are held as per schedule drawn by the IODE DR. C. V. RAMAN UNIVERSITY. These are mostly held outside the regular working hours of the learner support centre.
- **Teleconferences:** Live teleconferencing sessions are conducted via Internet/ satellite through interactive Video Conferencing facility (available at some places) from the University studios, the schedule of which is made available at the learner support centre.
- **Industrial Training/Practical/Project work:** Some programmes have industrial training/practical/ project component also. Practical are held at designated institutions for which schedule is provided by the learner support centre. Attendance at practical is compulsory. For Project Work, comprehensive project guide, in the form of booklet, is provided to the student along with the study material.
- The printed study materials will be dispatched periodically to the enrolled students for each paper of study. These materials will be as guide for the students for effective learning. The assignment for internal assessment shall also be dispatched along with the study material. Online modules are also available for some courses. These are in progress

and as and when available, these will be available on the website of the students for registered candidates.

- The counseling sessions will be of 30 days duration for a course in a year. The actual schedule and place of contact program shall be announced and communicated to students in – time.

## **EVALUTION SYSTEM**

The system of evaluation in open and distance learning system has a multi-tier system of evaluation.

1. Self-assessment exercise within each unit of study.
2. Continuous evaluation mainly through assignments which are tutor-marked practical assignments and seminar/workshop/extended.
3. The term-end examinations.
4. Project work.

The evaluation of learners depends upon various instructional activities undertaken by them. A learner has to write assignment responses compulsorily before taking term-end examination from time to time to complete an academic programme. A learner has to submit TMA responses to the learner support centre established by IODE Dr. C. V. Raman University. A learner should keep duplicate copies of assignments responses of TMA that may be required to be produced at Student Evaluation Division on demand. Term-end examination will be conducted at various examination centre approved by institute of open and distance education Dr. C. V. Raman university spread all over the Chhattisgarh. The weightage for Term End Examination will be 70% and weightage for Internal Assessment will be 30 % for this programme.

## **TERM-END EXAMINATION AND PAYMENT OF EXAMINATION FEE**

The University conducts Term-end Examination in semester system and held in the month of Nov/Dec and May/June every year. Students will be permitted to appear in term-end examination subject to the conditions that:

1. Registration for the courses, in which they appeared is valid,
2. Minimum Time to pursue these courses is elapsed.
3. Submission of required number of assignment in respective courses by the due date.

Students can also submit on-line examination form as per guidelines through website at [www.cvrु.ac.in](http://www.cvrु.ac.in). Examination fee is required to be paid online payment gateway as per the fee table. Please do all correspondence regarding the course admission and other detail at the following address:

The Director  
Institute of Open and Distance Education (IODÉ)  
Dr. C. V. Raman University  
Kargi Road, Kota, Bilaspur, Chhattisgarh  
Phone: 07753253851, 8827920016, 8827920019  
Email: [cvrussd@gmail.com](mailto:cvrussd@gmail.com)

**LEARNER SUPPORT DESK**

Phone: 07753253872, 07753253873, 8359050061  
Email: [cvrussd@gmail.com](mailto:cvrussd@gmail.com)

# **PROGRAMME GUIDE**

## **DISTANCE EDUCATION PROGRAMMES**

---

### **BACHELOR OF SCIENCE (B. Sc.)-BIO**

---

- **Scheme of Examination**
- **Detailed Syllabus, Practical & Reference Book**
- **Counseling and Study Structure**
- **Study Modules & Books Information**
- **Date Schedule & Instructions for Submitting Assignments**



**INSTITITUTE OF OPEN AND DISTANCE EDUCATION (IODE)**

**DR. C.V.RAMAN UNIVERSITY**

KARGI ROAD, KOTA, BILASPUR, CHATTISGARH

PHONE : 07753-253851, 8827920016, 8827920019 FAX : 07753-253728

E-mail: [cvrussd@gmail.com](mailto:cvrussd@gmail.com), Website: [www.cvrु.ac.in](http://www.cvrु.ac.in)

**BACHELOR OF SCIENCE (B.Sc.) –BIOLOGY GROUP**

**Duration : 36 Months**

**Eligibility : 12<sup>th</sup> in Mathematics and Biology**

**SCHEME OF EXAMINATION**

Course Code	Name of the Course	Credit	Total Marks	Theory		Practical Marks		Assignments	
				Max	Min	Max	Min	Max	Min
FIRST SEMESTER									
1BSC1	Hindi Language Structure - I	2	50	35	12	-	-	15	5
1BSC2	Entrepreneurship Development	2	50	35	12	-	-	15	5
1BSC3	Botany-I	4	150	70	23	50	17	30	10
1BSC4	Chemistry-I	4	150	70	23	50	17	30	10
1BSC5	Zoology –I	4	150	70	23	50	17	30	10
	Total	16	550	280	101	150	54	120	43
SECOND SEMESTER									
2BSC1	English Language and Indian Culture	2	50	35	12	-	-	15	5
2BSC2	Development of Entrepreneur	2	50	35	12	-	-	15	5
2BSC3	Botany-II	4	150	70	23	50	17	30	10
2BSC4	Chemistry-II	4	150	70	23	50	17	30	10
2BSC5	Zoology –II	4	150	70	23	50	17	30	10
	Total	16	550	280	101	150	54	120	43
THIRD SEMESTER									
3BSC1	Hindi Language aur Samvedana	2	50	35	12	-	-	15	5
3BSC2	Environmental Studies	2	50	35	12	-	-	15	5
3BSC3	Botany-III	4	150	70	23	50	17	30	10
3BSC4	Chemistry-III	4	150	70	23	50	17	30	10
3BSC5	Zoology –III	4	150	70	23	50	17	30	10
	Total	16	550	280	101	150	54	120	43
FOURTH SEMESTER									
4BSC1	English Language and Scientific Temper	2	50	35	12	-	-	15	5
4BSC2	Environmental Study	2	50	35	12	-	-	15	5
4BSC3	Botany-IV	4	150	70	23	50	17	30	10
4BSC4	Chemistry-IV	4	150	70	23	50	17	30	10
4BSC5	Zoology –IV	4	150	70	23	50	17	30	10
	Total	16	550	280	101	150	54	120	43
FIFTH SEMESTER									
5BSC1	Hindi Language (Bhasha Kaushal aur Sanchar Sadhan)	2	50	35	12	-	-	15	5
5BSC2	Computer & Information Technology Basics-I	2	100	35	12	50	17	15	5
5BSC3	Botany-V	4	150	70	23	50	17	30	10
5BSC4	Chemistry-V	4	150	70	23	50	17	30	10
5BSC5	Zoology –V	4	150	70	23	50	17	30	10
	Total	16	600	280	101	200	72	120	43
SIX SEMESTER									
6BSC1	English Language and Aspects of Development	2	50	35	12	-	-	15	5
6BSC2	Computer & Information Technology Basics-II	2	100	35	12	50	17	15	5
6BSC3	Botany-VI	4	150	70	23	50	17	30	10
6BSC4	Chemistry-VI	4	150	70	23	50	17	30	10
6BSC5	Zoology –VI	4	150	70	23	50	17	30	10
	Total	16	600	280	101	200	72	120	43

### **Evaluation Scheme**

1. 33% in each theory, practical, project, dissertation & internal assessment but the total Aggregate for passing is 36%.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- First Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 35 MIN. M: 12**

**COURSE CODE: 1BSC1, CREDIT:-2**

**ASSIG. MAX.M: 15 MIN. M: 05**

**COURSE: -HINDI LANGUAGE STRUCTURE – I**

**इकाई-1**

भारत वंदना (काव्य) सूर्यकांत त्रिपाठी	‘निराला’
जाग तुझको दूर जाना	सुश्री महादेवी वर्मा
स्वतंत्रता पुकारती (काव्य) जयशंकर	‘प्रसाद’
हम अनिकेतन (काव्य)	बालकृष्ण शर्मा ‘नवीन’
भाषा की महत्ता और उसके विविध रूप	
भाषा-कौशल	

**इकाई-2**

करुणा (निबंध) आचार्य रामचन्द्र शुक्ल	
समन्वय की प्रक्रिया (निबंध)	रामधारी सिंह ‘दिनकर’
बिच्छी बुआ (कहानी)	डॉ. लक्ष्मण विष्ट ‘बटरोही’
अनुवाद परिभाषा प्रकार	, महत्व, विशेषताएं
हिन्दी की शब्द-संपदा	
परिभाषिक शब्दावली	

**इकाई-3**

विलायत पहुंच ही गया (आत्मकथांश) महात्मा गांधी	
अफसर (व्यंग्य) शरद जोषी	
तीर्थयात्रा (कहानी) डॉ. मिथिलेश कुमार मिश्र	
मकड़ी का जाला (व्यंग्य) डॉ. रामप्रकाश	श सक्सेना
वाक्य-संरचना: तत्सम, तद्भव देशज विदेशी	

**इकाई-4**

अप्प दीपो भव (वक्तृत्व कला) स्वामी श्रद्धानंद	
भारत का सामाजिक व्यक्तित्व (प्रस्तावना)	जवाहरलाल नेहरू
पत्र मैसूर के महाराजा को (पत्र-लेखन)	स्वामी विवेकानंद
बनी रहेंगी किताबें (आलेख) डॉ. सुनीता रानी घोष	
पत्र-लेखन: महत्व और उसके विविध रूप	
सड़क पर दौड़ते ईहा मृग (निबंध) डॉ. श्यामसुन्दर दुवे	

इकाई-5

योग की शक्ति (डायरी)

कोश के अखाड़े में कोई पहलवान नहीं उतरता (साक्षात्कार) भाषाविद् डॉ. हरदेव बाहरी से प्रो. त्रिभुवननाथ शुक्ल

नीग्रो सैनिक से भेंट (यात्रा-संस्मरण)

डॉ. देवेन्द्र सत्यार्थी

यदि बा न होती तो शायद गांधी को

गिरिराज किशोर से सत्येन्द्र शर्मा

यह ऊँचाई न मिलती (साक्षात्कार) 5 कथाकार

सर-लेखन, भाव-पल्लवन साक्षात्कार और कौशल

**TEXT AND REFERENCE BOOK**

- भारतीयता के अमर स्वर, मध्य प्रदेश हिन्दी ग्रंथ अकादमी



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- First Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 35 MIN. M: 12**

**COURSE CODE: 1BSC2, CREDIT:-2**

**ASSIG. MAX.M: 15 MIN. M: 05**

**COURSE: - ENTERPRENEUSHIP DEVELOPMENT**

**Unit-I Entrepreneurship**

Definition, Characteristics and importance, Types and functions of an entrepreneur, merits of a good entrepreneur motivational factors of entrepreneurship.

**Unit-II**

Motivation to achieve targets and establishment of ideas. Setting targets and facing challenges. Resolving problems and creativity. Sequenced planning and guiding capacity, Development of self confidence. Communication skills, Capacity to influence, leadership.

**Unit-III**

Project Report- Evaluation of selected process. Detailed project report - Preparation of main part of project report pointing out necessary and viability.

Selecting the form of Organization: Meaning and characteristics of sole Proprietorship, Partnership and cooperative committees, elements affecting selection of a form of an organization.

Economic management -Role of banks and financial institutions banking, financial plans, working capital-evaluation and management, keeping of accounts.

**Unit IV**

Production management - Methods of purchase. Management of movable assets/goods. Quality management. Employee management. Packing.

Marketing management Sales and the art of selling. Understanding the market and market policy. Consumer management. Time management.

**Unit-V**

Role of regulatory institutions - district industry centre, pollution control board, food and drug administration, special study of electricity development and municipal corporation.

Role of development organizations, khadi & village Commission/ Board, State Finance Corporation, scheduled banks, MP Women's Economics Development Corporation.

Self-employment-oriented schemes, Prime Minister's Employment schemes, Golden Jubilee Urban environment scheme, Rani Durgavati Self-Employment scheme, Pt. Deendayal Self-employment scheme.

Various grant schemes - Cost-of-Capital grant, interest grant, exemption from entry tax, project report, reimbursement grant, etc.

Special incentives for women entrepreneurs, prospects & possibilities.

Schemes of Tribal Finance Development Corporation, schemes of Antyavasai Corporation, schemes of Backward Class and Minorities Finance Development Corporation.

### **TEXT AND REFERENCE BOOK**

- Entrepreneurship development, K. Ramachandran, Publication- TMH Publishers.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- First Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 1BSC3, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE: - BOTANY-I**

**Unit-1**

Viruses, Mycoplasma and Bacteria : characteristics of viruses and mycoplasma, general account of TMV and T4 bacteriophage. Bacterial structure, nutrition, reproduction and economic importance; general account of Cynobacteria.

**Unit-2**

Algae : General characters, classification and economic importance; important features and life history of Chlorophyceae- volvox, oedogonium, Charophyceae-chara Xanthophyceae - vaucheria, Phaeophyceae - ectocarpus, sargassum, Rhodophyceae - polysiphonia.

**Unit-3**

Fungi: general characters, classification and economic importance, important features and life history of Mastigomycotina- Phytophthora, Zygomycotiana-Mucor. Asco mycotina : Aspergillus, Peziza, Basidiomycotina - puccinia, Deuteromycotina- Cercospora, Colletotrichum, general account of lichens.

**Unit-4**

Bryophyta : classification, study of morphology, anatomy, reproduction of Hepaticopsida Riccia, Marchantia, Anthocerotopsida Anthoceros, Bryopsida- Polytrichum.

**Unit-5**

Pteridophyta : Important characters and classification. Stelar organization. Morphology and anatomy of Rhynia. Structure, anatomy and reproduction in Lycopodium, Selaginella, Equisetum and Marsilea.

### **TEXT AND REFERENCE BOOK**

- A text book of practical botany- Bendra Kumar.
- An introduction to practical botany-Dr. S.P.Lal.
- Text book of practical botany-S.B.Agrawal-Unified/Youngbodh.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- First Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**PRACTICAL MAX.M:50 MIN.M:17**

**COURSE CODE: 1BSC3, CREDIT:-4**

**COURSE: - PRACTICAL BOTANY-I**

- 1) To study and identify the given slide
- 2) To study the external morphology of specimen.
- 3) To study the discard plant specimens.
- 4) To study & identify the specimen.

**TEXT AND REFERENCE BOOK**

- A text book of practical botany- Bendra Kumar.
- An introduction to practical botany-Dr. S.P.Lal
- Text book of practical botany-S.B.Agrawal-Unified/Youngbodh.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- First Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**Theo. Max. M: 70 Min. M: 23**

**COURSE CODE: 1BSC4, CREDIT:-4**

**Assig. Max.M: 30 Min. M: 10**

**COURSE: - CHEMISTRY-I**

**Unit I**

A. Mathematical Concepts : Logarithmic relations, curves stretching, linear graphs and calculation of slopes, Differentiation of functions like  $Kx$ ,  $ex$ ,  $xn$ ,  $\sin x$ ,  $\log x$ ; maxima and minima, partial differentiation and reciprocity relations. Integration of some useful/relevant functions; permutations and combinations. Factorials, Probability.

B. Gaseous States : Deviation from ideal behaviour, van der Waals equation of state. Critical phenomenon : PV isotherms of ideal gases, continuity of states, the isotherms of van der Waals equations, relationship between critical constants and van der Waals constants, the law of corresponding states, reduced equation of states.

**Unit II**

A. Liquid State : Intermolecular forces, structure of liquids (a qualitative description) Liquid crystals: Difference between liquid crystal, solid and liquid. Classification, structure of nematic and cholestric phases. Thermography and seven segment cell.

B. Colloidal State : Definition of colloids, classification of colloids. Solids in liquids (sols): properties- kinetic, optical and electrical; stability of colloids, protective action, Hardy-Schulze law, gold number. Liquids in liquids (emulsions) : types of emulsions, preparation. Emulsifier. Liquids in solids (gels): classification, preparation and properties, inhibition, general applications of colloids.

**Unit III**

Chemical Kinetics : Chemical kinetics and its scope, rate of a reaction, factors influencing the rate of a reaction concentration, temperature, pressure, solvent, light and catalyst. Concentration dependence of rates, mathematical characteristics of simple chemical reactions- zero order, first order, second order, pseudo order, half life and mean life. Determination of the order of reaction - differential method, method of integration, method of half life period and isolation method.

Experimental methods of chemical kinetics - conductometric, potentiometric, optical methods- polarimetry and spectrophotometry. Theories of chemical kinetics: effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy. Simple collision theory based on hard sphere model, transition state theory (equilibrium hypothesis) Expression for the rate constant based on equilibrium constant and thermodynamic aspects.

#### **Unit IV**

A. Structure and Bonding : Hybridizations, Bond lengths and bond angles, bond energy : Localized and delocalized chemical bond, van-der Waals interactions, inclusion compounds, clathrates, charge transfer complexes, resonance, hyperconjugation, aromaticity, inductive and field effects, hydrogen bonding.

B. Mechanism of Organic reactions : Curved arrow notations, drawing electron movements with arrows, half-headed and double headed arrows, homolytic and heterolytic bond breaking.

C. Types of Reagents : Electrophiles and nucleophiles. Types of organic reactions. Energy consideration. Reactive intermediates- carbocations, carbanions, free radicals and carbenes. Methods of determination of reaction mechanism.

#### **Unit V**

A. Stereochemistry : Concept of isomerism, types of isomerism, optical isomerism, elements of symmetry, molecular chirality, enantiomers, stereogenic centres, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogenic centres, diastereomers, mesocompounds, resolution of enantiomers, inversion, retention and racemization. Relative and absolute configurations, sequence rule, D & L , R & S systems of nomenclature. E and Z system of Nomenclature geometrical isomerism in alicyclic compounds. Conformation, conformational analysis of ethane and n-butane. Conformations of cyclohexanes, axial and equatorial bonds, Newman projection and Sawhorse formulae, Fischer and Flying wedge formulae.

#### **TEXT AND REFERENCE BOOK**

- Inorganic Chemistry (Part-I, Part-II), R.L. Dutta, NBS Publication.
- Unified Chemistry, Dr.M.M.Tandon, Shivrati Agrawal & Comp.
- Synthetic Organic Chemistry, O.P.Agrawal, Krishna Prakashan Media Ltd.
- Physical Chemistry, K.L.Kapoor, Macmillan Pub. India, Ltd



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- First Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**PRACTICAL MAX.M:50MIN.M:17**

**COURSE CODE: 1BSC4, CREDIT:-4**

**COURSE: - PRACTICAL CHEMISTRY-I**

Duration of practicals during the entire semester : 90 hours

Duration of practical during the semester examination : 4 hours

Physical Chemistry

A. (Any one experiment will be asked in examination form the following carrying 12 Marks)

1. Calibration of thermometer
2. Determination of melting point
3. Determination of boiling point
4. Determination of mixed melting point
5. Preparation of solutions of various concentrations, NaOH, HCl, H<sub>2</sub>SO<sub>4</sub>.

B. (Any one experiment will be asked in examination form the following carrying 12 Marks)

1. To determine the velocity constant (specific reaction rate) of hydrolysis of methyl acetate/ethyl acetate catalyzed by hydrogen ions at room temperature.
2. To study the effect of acid strength on the hydrolysis of an ester.
3. To compare the strength of HCl and H<sub>2</sub>SO<sub>4</sub> by studying the kinetics of hydrolysis of ester.
4. To study kinetically the reaction rate of decomposition of iodide by H<sub>2</sub>O<sub>2</sub>.
5. Determination of surface tension / percentage composition of given organic mixture using surface tension method.
6. Determination of viscosity / percentage composition of given organic mixture using viscosity method.

Organic chemistry

(Any one experiment will be asked in examination form the following carrying 12 Marks)

1. Distillation
2. Crystallization
3. Decolourisation and crystallization using charcoal
4. Sublimation

Viva: 6 marks

Records: 8 marks

**TEXT AND REFERENCE BOOK**

- Unified Practical Chemistry, Dr. M.M.Tandon, ShivalalAgrawal& Com.
- Unified Chemistry, Tandon, Rathore, Agrawal, ShivalalAgrawal& Com.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- First Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 1BSC5, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE: - ZOOLOGY-I**

**Unit-1**

Classification of Non Chordates upto classes according to Parker and Heswell.(7th Edition)

1. Classification of lower Invertebrates.
2. Classification of higher invertebrates.
3. Protozoa – Type study of Plasmodium.
4. Porifera – Type study of Sycon.

**Unit-2**

1. Coelenterata – Type study of Obelia.
2. Helminthes – Type study of Liver Fluke.
3. Annelida – Type study of Earthworm, Metamerism, Trochophore Larva.

**Unit-3**

1. Arthropoda – Type study of Prawn.
- 2 Mollusca – Type study of Pila.
3. Echinodermata – External Features of Star Fish and Echinoderm Larvae.

**Unit-4**

1. The cell – History of Cell Biology, Cell theory, Prokaryotic and Eukaryotic cell.
2. Microscopy : Compound and Electron Microscopy.

**Unit-5**

1. Nuclear Organization of cell.
2. Extra nuclear organization of cell.
3. Cell reproduction – Amitosis, mitosis, meiosis.

**TEXT AND REFERENCE BOOK**

- Unified Zoology According to unified syllabus for first year, V.K.Tiwari, ShivalalAgrawal& Company.
- R.P. Unified Zoology II year, Ram Prasad & Sons (Hindi)
- R.P.Unified Zoology III year, Ram Prasad & Sons (Hindi)
- Unified Zoology III year, V.K.Tiwari, V.K.Singh, ShivalalAgrawal Company.
- R.P.Unified Zoology, By Dr. S.M.Saxena, Ram Prasad & Sons Publication.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- First Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**PRACTICAL MAX.M:50MIN.M:17**

**COURSE CODE: 1BSC5, CREDIT:-4**

**COURSE: - PRACTICAL ZOOLOGY-I**

The Practical's work will be based on theory syllabus and the candidates will be required to show knowledge of the following –

1. Study of Museum Specimens, slides relevant to the type study in theory
2. Mounting ( Temporary)
  - a. Mouth parts of insects
  - b. Statocyst of Prawn
  - c. Ctenidium and Osphradium of Pila
  - d. Scales of Teleost fish
  - e. Mounting Material
3. Major Dissection
  - a. Earthworm: Digestive system, nervous system and reproductive system.
  - b. Cockroach : Digestive system,Nervous system,.
  - c. Prawn : Nervous System, Appendages.
- 4 Minor Dissection
  - a. Hastate plate and appendages of Prawn.
  - b. Salivary glands of Cockroach.
  - c. Radula of Pila.
5. Cell Biology
  - a. Study of Prokaryotic and eukaryotic cell.
  - b. Study of DNA and RNA models.
  - c. Squash preparation of chromosomes from onion root tip.
  - d. study of meiosis in grasshopper testis.

**PRACTICAL MARKS DISTRIBUTION**

1. Major Dissection 8

2. Minor Dissection 4
3. Mounting 3
4. Spotting (Representative of Each phylum) 10
5. Cytological exercise (any two) 10
6. Viva 5
7. Record & Collection 10

**Total 50**

**TEXT AND REFERENCE BOOK**

- Zoology Practical For B.Sc. by Kulshreshta, SivalalAgrawal&Compony.
- Practical Book for B.Sc. Invertebrate Zoology by S.S.Lal
- Practical Book for B.Sc. Vertebrate Zoology by S.S.Lal



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Second Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 35 MIN. M: 12**

**COURSE CODE: 2BSC1, CREDIT:-2**

**ASSIG. MAX.M: 15 MIN. M: 05**

**COURSE: - ENGLISH LANGUAGE AND INDIAN CULTURE**

**UNIT – I**

1. Amalkanti : Nirendranath Chakrabarti
2. Sita : Toru Dutt
3. Tryst with Destiny : Jawaharlala Nehru
4. Delhi in 1857 : Mirza Ghalib
5. Preface to the Mahabharata : C., Rajagopalachari
6. Where the Mind is Without Fear : Rabindranath Tagore
7. A Song of Kabir : Translated by Tagore
8. Satyagraha : M.K. Gandhi
9. Toasted English : R.K. Narayan
10. The Portrait of a Lady : Khushwant Singh
11. Discovering Babasaheb : Ashok Mahadevan

**Unit – II** Comprehension

**Unit – III** Composition and Paragraph Writing (Based on expansion of an idea).

**Unit – IV** Basic Language Skills : Vocabulary – Synonyms, Antonyms, Word Formation, Prefixes and Suffixes, Words likely to be confused and Misused, Words similar in Meaning or Form, Distinction between Similar Expressions, Speech Skills.

**Unit – V** Basic Language Skills : Grammar and usage – The Tense Forms, Propositions, Determiners and Countable/Uncountable Nouns, Verb, Articles, Adverbs.

**TEXT AND REFERENCE BOOK**

- Essentials of English Grammar by Sultan Chand & Sons
- English Grammar and Composition by Wren & Martin
- Scholar's Senior English Grammar and Composition, T.R. Bhanot, H. Martin, Scholar Publishing House (P) Ltd.
- English Language and Indian Culture, published by M. P. Hindi Granth Academy



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Second Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 35 MIN. M: 12**

**COURSE CODE: 2BSC2, CREDIT:-2**

**ASSIG. MAX.M: 15 MIN. M: 05**

**COURSE: - DEVELOPMENT OF ENTREPRENEURSHIP**

**Unit - I** Entrepreneurship – Meaning, Concept, Characteristics of entrepreneur.

**Unit – II** Types of entrepreneurship, importance and views of various thinkers (Scholars).

- Formation of goals, How to achieve goals.
- Problems in achieving targets and solution.
- Self motivation, elements of self motivation and development
- Views of various scholars, evaluation, solutions.

Leadership capacity : Its development and results.

**Unit – III** Projects and various organizations (Govt., non-Govt), Govt. Projects, Non-Govt.projects.

Contribution of Banks, their limitations, scope.

**Unit – IV** Functions, qualities, management of a good entrepreneur.

Qualities of the entrepreneur (Modern and traditional).

Management skills of the entrepreneur.

Motive factors of the entrepreneur.

**Unit – V** Problems and Scope of the Entrepreneur:

- Problem of Capital
- Problem of Power
- Problem of registration
- Administrative problems
- Problems of Ownership.

**TEXT AND REFERENCE BOOK**

- Entrepreneurship development, K. Ramachandran, Publication- TMH Publishers.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Second Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 2BSC3, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE: - BOTANY-II**

**Unit-1** The cell envelops; plasma membrane, bilayer lipid structure,function of the cell wall. Structure and function of cell organells: Golgibodies,ER, Peroxisome, Vacuole, Chloroplast and Mitochondrion.

**Unit-2** Ultrastructure and function of nucleus: Nuclear membrane, Nucleolus, Extranuclear genome, Presence and functions of mitochondrial and plastid-DNA,Plasmids. chromosomal organization; morphology ,centromere and telomere, special types of chromosome, Mitosis and Meiosis

**Unit-3** Variations in chromosomes structure : Deletions, duplications translocations. inversions; variation in chromosome number, aneuploidy, polyploidy, DNA the genetic material, DNA structure and replication, the nucleosome model, satellite and repetitive DNA.

**Unit-4** Structure of gene, genetic code, transfer of genetic information; trascription, translation, protein syntesis, tRNA, and ribosomes. Regulation of gene expression in prokaryotes and eukaryotes.

**Unit-5** Genetic inheritance; Mendelism; laws of segregation and independent assortment; linkage analysis; interactions of genes. Genetic variations; mutations, spontaneous and induced; transposable elements; DNA damage and repair.

**TEXT AND REFERENCE BOOK**

- Genetics, P.K.Gupta.
- Text book of botany, S.B.Agrawal, ShivrulAgrawal& Company.
- Genetics, B.D.Singh, YugbodhPrakashan Unified, Cell Biology, C.B.PowerHimalya Publishing.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Second Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**PRACTICAL MAX.M:50MIN.M:17**

**COURSE CODE: 2BSC3, CREDIT:-4**

**COURSE: - PRACTICAL BOTANY-II**

Scheme of practical examination Marks:

Mitosis/Meiosis 10

Genetic problem 10

Cell and Cell inclusions 10

Spotting 10

Sessional 10

Total 50

**TEXT AND REFERENCE BOOK**

- Text book of practical botany, Dr. S.P.Lal.
- Text book of Practical botany, S.B.Agrawal, ShivalAgrawal& Company.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Second Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 2BSC4, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE: - CHEMISTRY-II**

**Unit I**

A. Atomic Structure : Idea of de Broglie's matter waves, Heisenberg uncertainty principle, atomic orbitals, Schrödinger wave equation, significance of  $n$  and  $l$ , quantum numbers, radial and angular wave functions and probability distribution curves, effective nuclear charge.

B. Periodic Properties : Atomic and ionic radii, ionization energy, electron affinity and electronegativity : definition, method of determination, trends in periodic table and applications.

C. Chemical Bonding : Covalent bond- valence bond theory and its limitations, directional characteristic of covalent bond. Hybridization and shapes of simple molecules and ions. Valence Shell Electron Pair Repulsion (VSEPR) theory to  $\text{NH}_3$ ,  $\text{SF}_4$ ,  $\text{ClF}_3$ ,  $\text{ICl}_2$  - and  $\text{H}_2\text{O}$ .

**Unit II**

A. Molecular Orbital theory for homonuclear and heteronuclear ( $\text{CO}$  and  $\text{NO}$ ) diatomic molecules, multicenter bonding in electron deficient molecules, bond strength and the bond energy, % ionic character from dipole moment and electronegativity difference. Weak interactions, hydrogen bonding, van der Waals forces.

B. Ionic Solids : Ionic structures, radius ratio effect and coordination number, limitation of radius ratio rule, Lattice defects, semiconductors, lattice energy and Born-Haber cycle, solvation energy and solubility of ionic solids, polarizing power and polarizability of ions. Fajan's rule, Metallic bond, free electron, Valence bond and Band theories.

C. Noble Gases : Chemical properties of the noble gases, chemistry of xenon, structure and bonding in xenon compounds.

**Unit III**

A. s-Block Elements : Comparative study, diagonal relationships, salient features of hydrides, solvation and complexation tendencies including their function in biosystems, an introduction to alkyls and aryls.

B. p-Block Elements : Comparative study (including diagonal relationship) of groups 13-17 elements, compounds like hydrides, oxides, oxyacids and halides of groups 13-16.

Hydrides of boron-diborane and higher boranes. Borazine, borohydrides. Fullerenes, carbides, fluorocarbons, silicates (structural principle), tetrasulphur tetranitride, basic properties of halogens, interhalogens.

**Unit IV**

A. Arenes and Aromaticity : Nomenclature of benzene derivatives. The aryl group, Aromatic nucleus and side chain structure of benzene, molecular formula and Kekule structure. Stability and carbon-carbon bond lengths of benzene, resonance structure. MO picture. Aromaticity the Huckel rule, aromatic ions. Aromatic electrophilic substitution, general pattern of the mechanism, role of s and p complexes. Mechanism of nitration, halogenation, sulphonation, mercuration and Friedel-Crafts reaction. Energy profile diagrams. Activating and deactivating substituents. orientation and ortho/para ratio. Side chain reactions of benzene derivatives. Birch reduction. Methods of formation and chemical reactions of alkylbenzenes and biphenyl.

**Unit V**

A. Cycloalkenes, Dienes and alkynes : Methods of formation, conformation and chemical reactions of cycloalkenes, nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of allenes and butadiene, methods of formation, polymerization. Chemical reactions - 1,2 and 1,4 additions, Diels-Alder reaction. Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroborationoxidation and polymerization.

B. Alkyl and Aryl Halides : Nomenclature and classes of alkyl halides, methods of formation, chemical reactions; mechanisms of nucleophilic substitution reaction of alkyl halides, SN2 and SN1 reactions with energy profile diagrams.

**TEXT AND REFERENCE BOOK**

- Inorganic Chemistry (Part-I, Part-II), R.L. Dutta, NBS Publication.
- Unified Chemistry, Dr.M.M.Tandon, Shivrati Agrawal & Comp.
- Synthetic Organic Chemistry, O.P.Agrawal, Krishna Prakashan Media Ltd.
- Physical Chemistry, K.L.Kapoor, Macmillan Pub. India, Ltd



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Second Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**PRACTICAL MAX.M:50MIN.M:17**

**COURSE CODE: 2BSC4, CREDIT:-4**

**COURSE: - PRACTICAL CHEMISTRY-II**

Macro/Semi-micro Analysis- Cation analysis, separation and identification of ions from group I-VI, anion analysis

Separation of cations by paper chromatography. 4 marks

Preparation of ferrous alum. 8 marks

Organic Chemistry: (12 marks )

1. Detection of elements (N, S and halogens) 2 elements, 4 marks

2. Functional groups (phenolic, carboxylic, carbonyl, esters, carbohydrates, amines, amides, nitro and aniline) in simple organic compounds.

2 functional groups: 8 marks

Viva: 6 marks

Records: 8 marks

**TEXT AND REFERENCE BOOK**

- Unified Practical Chemistry, Dr. M.M.Tandon, ShivalalAgrawal& Com.
- Unified Chemistry, Tandon, Rathore, Agrawal, ShivalalAgrawal& Com.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Second Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIO**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 2BSC5, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE: - ZOOLOGY-II**

**Unit-1**

1. Origin of Chordates. Classification of phylum Chordata upto orders according to Parker and Haswell ( Latest edition).
2. Hemichordata – External features and affinities of Balanoglossus.

**Unit-2**

1. Urochordata – Type study of Herdmania (excluding Development).
- Cephalochordata – Type study of Amphioxus. Affinities of Amphioxus.

**Unit-3**

1. Comparison between Petromyzon and Myxine.
2. Comparative account of limb bones and girdles of vertebrates (Amphibia, Reptiles, Birds and Mammals).

**Unit-4**

1. Parthenogenesis.
2. Gametogenesis.
3. Fertilization, Patterns of cleavage

**Unit-5**

1. Frog and chick embryology upto the formation of three germinal layers.
- 2 Fate map construction in frog & chick Gastrulation in frog and chick upto the formation of germinal layers.
3. Concept of competence, determination and differentiation.
4. Extra embryonic membranes in chick.
5. Concept of regeneration

**TEXT AND REFERENCE BOOK**

- Unified Zoology According to unified syllabus for first year, V.K.Tiwari, ShivalalAgrawal& Company.
- R.P. Unified Zoology II year, Ram Prasad & Sons (Hindi)
- R.P.Unified Zoology III year, Ram Prasad & Sons (Hindi)
- Unified Zoology III year, V.K.Tiwari, V.K.Singh, ShivalalAgrawal Company.
- R.P.Unified Zoology, By Dr. S.M.Saxena, Ram Prasad & Sons Publication



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Second Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**PRACTICAL MAX.M:50MIN.M:17**

**COURSE CODE: 2BSC5, CREDIT:-4**

**COURSE: - PRACTICAL ZOOLOGY-II**

The practical work will be based on theory syllabus and the candidates will be required to show knowledge of the following :

2 Study of museum specimens and slides relevant to theory paper.

3 Osteology

a. Girdles and limb bones of : Frog, Varanus, Fowl and Rabbit

4 Cell Biology.

Study of DNA and RNA Models.

a. Preparations of polytene chromosome in chironomous larva

b. Squash preparation of chromosome from Onion root tip.

c. Study of Meiosis in Grasshopper testis.

4 Embryology : Study of different developmental stages of frog and chick – whole mounts and sections.

**TEXT AND REFERENCE BOOK**

- Zoology Practical For B.Sc. by Kulshreshta, SivalalAgrawal&Compony.
- Practical Book for B.Sc. Invertebrate Zoology by S.S.Lal
- Practical Book for B.Sc. Vertebrate Zoology by S.S.Lal



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Third Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 35 MIN. M: 12**

**COURSE CODE: 3BSC1, CREDIT:-2**

**ASSIG. MAX.M: 15 MIN. M: 05**

**COURSE: - HINDI LANGUAGE AUR SAMVEDANA**

इकाई .एक

1. आचरण की सभ्यता : सरदार पूर्ण सिंह
2. जवानी (काव्य) : श्री माखनलाल चतुर्वेदी
3. विज्ञान : परिभाषा, शाखाएँ, संक्षिप्त इतिहास
4. सपनों की उड़ान : ए. पी.जे अब्दुल कलाम
5. प्रमुख वैज्ञानिक आविष्कार और हमारा जीवन
6. त्रुटि संशोधन

इकाई .दो

1. शिरीष के फूल-निबंध : आचार्य हजारी प्रसाद द्विवेदी
2. विकास का भारतीय मॉडलर: धर्मपाल
3. निबंध लेखन की कला
4. संधि.समास : संरचना और प्रकार
5. निराला : संस्मरण - महादेवी वर्मा

इकाई .तीन

1. मांडव (यात्रा वृत्तांत): पं. रामनारायण उपाध्याय
2. हिन्दी भाषा का मानकीकरण
3. भारतीय कृषि
4. जीवन : उद्भव और विकास
5. जनजातीय जीवन
6. उसने कहा था (कहानी) : श्री चन्द्रधर शर्मा गुलेरी

इकाई .चार

1. महाजनी सभ्यता (निबंध) : प्रेमचन्द
2. मुहावरे और लोकोक्तियाँ

3. सौर मण्डल
4. ब्रह्माण्ड और जीवन
5. शिकागो (व्याख्या) : स्वामी विवेकानंद
6. संक्षिप्तियां

इकाई .पांच

1. मध्यप्रदेश एवं छत्तीसगढ़ के पर्यटन स्थल
2. फिल्टर तो चाहिए ही. डॉ. देवेन्द्र दीपक
3. भारतीय वनस्पतियाँ और जीव
4. पर्यावरण
5. भोलाराम का जीवन (व्यंग्य) हरिशंकर परसाई
6. टाँगन का पंछी : विद्यानिवास मिश्र

### **TEXT AND REFERENCE BOOK**

- हिन्दी भाषा एव संवेदना , मध्य प्रदेश हिन्दी ग्रंथ अकादमी



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Third Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 35 MIN. M: 12**

**COURSE CODE: 3BSC2, CREDIT:-2**

**ASSIG. MAX.M: 15 MIN. M: 05**

**COURSE: - ENVIRONMENTAL STUDIES**

**UNIT – I Study of Environmental and ecology :**

- (a) Definition and Importance.
- (b) Environmental Pollution and problems.
- (c) Public participation and Public awareness.

**UNIT – II Environmental Pollution :**

- (a) Air, water, noise, heat and nuclear pollution.
- (b) Causes, effect and prevention of pollution.
- (c) Disaster management – Flood, Earthquake, cyclones and landslides.

**UNIT – III Environment and social problems :**

- (a) Development – non-sustainable to Sustainable.
- (b) Energy problems of cities.
- (c) Water preservation – rain-water collection.

**UNIT – IV Role of mankind in conserving natural resources :**

- (a) Food resources – World food problem.
- (b) Energy resources – increasing demand for energy.
- (c) Land resources – Land as resources.

**UNIT – V Environment conservation laws :**

- (a) Conservation laws for air and water pollution.
- (b) Wildlife conservation laws.
- (c) Role of information technology in protecting environment & health.

**TEXT AND REFERENCE BOOK**

- Environmental Science & Engineering, R.Anandan R. Kumaravelan, Scitech Publication (India) Pvt. Ltd.
- Environment & Ecology, Dr. J.P.Sharma, Laxmi Publication.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Third Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 3BSC3, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE: -BOTANY-III**

**UNIT – I** Characteristics and Classification of Gymnosperms, Heterospory and Origin of Seed Habit, Evolution and Diversity of Gymnosperms, Geological Time Scale, and Fossilization. Fossil Gymnosperms:

Lyginopteris and Lagenostoma.

**UNIT – II** Morphology, Anatomy Reproduction and life cycle of Cycas, Pinus and Ephedra.

**UNIT – III** Origin and Evolution of Angiosperms, Fundamental components of 6, 7, 8 taxonomy, Plant Identification, Principles and rules of Botanical Nomenclature, Herbarium and Botanical gardens; Classification of Angiosperms: Bentham and Hooker, and Hutchinson, Modern trends in Taxonomy.

**UNIT – IV** Diagnostic characteristics and Economic Importance of Families –Ranunculaceae, Brassicaceae, Malvaceae, Rutaceae, Fabaceae, and Apiaceae.

**UNIT – V** Diagnostic characteristics & Economic Importance of Families – Asteraceae, Asclepiadaceae, Solanaceae, Lamiaceae, Euphorbiaceae, Liliaceae and Poaceae.

**TEXT AND REFERENCE BOOK**

- S.B.Agrawal, Embryology of Angiosperms.
- Plant anatomy, P.C.Vashista.
- Gymnosperm, Saxena Sarabhai, Anatomy of Angiosperm by J.N. Dwivedi, Central Book Depot Publisher.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Third Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**PRACTICAL MAX.M:50MIN.M:17**

**COURSE CODE: 3BSC3, CREDIT:-4**

**COURSE: -PRACTICAL BOTANY III**

Gymnosperms-

- Morphological and anatomical study of Cycas, Pinus, and Ephedra (all parts).
- Study of permanent slides of Cycus, Pinus and Ephedra.

Angiosperms-

- Study of types of inflorescence and flowers with labelled sketches.
- Technical description of common flowering plants belonging to families mentioned in theory syllabus.

Spotting-

Viva- voce-

**TEXT AND REFERENCE BOOK**

- Text book of practical botany, S.B.Agrawal, ShivrulAgrawal& Company.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Third Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 3BSC4, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE: - CHEMISTRY-III**

**UNIT I**

Thermodynamics-1 Definition of thermodynamic terms: System, surrounding, Types of systems, intensive and extensive properties. State and path functions and their differentials. Thermodynamic process. Concept of heat and work.

First Law of Thermodynamics: Statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's Law: Joule Thomson coefficient and inversion temperature.

Second Law of Thermodynamics- Need for the law, different statements of the law, Carnot cycle and its efficiency. Carnot theorem. Thermodynamic scale of temperature.

**UNIT II**

Thermodynamics-II (a) Concept of entropy: Entropy as a state function, entropy as a function of P&T, entropy change in physical change, Clausius inequality, entropy as criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases. Third Law of Thermodynamics: Nernst heat theorem, statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data, Gibbs and Helmholtz functions, Gibbs function (G) and Helmholtz function(A) as a thermodynamic quantities, A and G as a criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G and A with P, V and T.

(b) Chemical equilibrium Equilibrium constant and free energy. Thermodynamic derivation of law of mass action. Le Chateliers's principle. Reaction isotherm and reaction isochore: Clapeyron equation and Clausius- Clapeyron equation, applications.

**UNIT III**

Chemistry of elements of I transition series: Characteristic properties of d-block elements. Properties of the elements of the first transition series, their binary compounds such as carbides, oxides and sulphides. Complexes illustrating relative stability of their oxidation states, coordination number and geometry chemistry of elements of II and III transition series: General characteristics, comparative treatment with their 3d-analogues in respect of ionic radii, oxidation states, magnetic behaviour, spectral properties and stereochemistry

#### **UNIT-IV**

(a) Coordination Compounds: Werner's coordination theory and its experimental verification, EAN Concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, VBT of transition metal complexes.

(b) Oxidation and Reduction: Use of redox potential data, analysis of redox cycle, redox stability in H<sub>2</sub>O: Frost, Latimer and Pourbaix diagram. Principles involved in the extraction of elements.

#### **UNIT-V**

(a) Electromagnetic Spectrum: Absorption Spectra; UV absorption spectroscopy: Absorption laws (Beer-Lambert law), molar absorptivity, presentation and analysis of UV spectra, types of electronic transitions, effect of conjugation.

Concept of chromophore and auxochrome. Bathochromic, hypsochromic, hyperchromic and hypochromic shifts. UV spectra of conjugated enes and enones. IR absorption spectroscopy; molecular vibrations, Hook's law, selection rules, intensity and position of IR bands, measurement of IR spectrum, fingerprint region, characteristic absorptions of various functional groups and interpretation of IR spectra of simple organic compounds.

#### **TEXT AND REFERENCE BOOK**

- Inorganic Chemistry (Part-I, Part-II), R.L. Dutta, NBS Publication.
- Unified Chemistry, Dr.M.M.Tandon, ShivrulAgrawal & Comp.
- Synthetic Organic Chemistry, O.P.Agrawal, Krishna Prakashan Media Ltd.
- Physical Chemistry, K.L.Kapoor, Macmillan Pub. India, Ltd



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Third Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**PRACTICAL MAX.M:50MIN.M:17**

**COURSE CODE: 3BSC4, CREDIT:-4**

**COURSE: - PRACTICAL CHEMISTRY-III**

Time: 6 hours

Inorganic Chemistry 18 marks

Calibration of the fractional weights, pipettes and burettes. Preparation of standard solutions. Dilution of 0.1 M to 0.001 M solutions.

Quantitative analysis -Volumetric analysis.

- (a) Determination of acetic acid in commercial vinegar using NaOH.
- (b) Determination of alkali content- antacid tablet using HCl.
- (c) Estimation of calcium content in chalk as calcium oxalate by permagnometry.
- (d) Estimation of hardness of water by EDTA

Gravimetric analysis:

Barium as barium sulphate

Organic Chemistry Laboratory Techniques 18 marks

A. Thin layer chromatography

Determination of R<sub>f</sub> values and identification of organic compounds.

- (a) Separation of green leaf pigments (spinach leaves may be used).
- (b) Preparation and separation of 2,4-dinitrophenylhydrazones of acetone, 2-butanone, hexane-2 and 3-one using toluene and light petroleum (40:6).
- (c) Separation of a mixture of dyes using cyclohexane and ethylacetate (8:5:1.5). B. Paper chromatography: Ascending and Circular Determination of R<sub>f</sub> values and identification of organic compounds
  - (a) Separation of a mixture of phenylalanine and glycine, alanine and aspartic acid, leucine and glutamic acid. Spray reagent ninhydrin.
  - (b) Separation of a mixture of DL-alanine, glycine and L-leucine using nbutanol: acetic acid: water (4:1:5). Spray reagent ninhydrin.
  - (c) Separation of monosaccharides- a mixture of D-galactose and Dfructose using n-butanol: acetone: water (4:1:5). Spray reagent-aniline hydrogen pthalate.

**TEXT AND REFERENCE BOOK**

- Experiments & calculations in chemistry, Dr.S.S.Dara, S.Chand& Company Lmt.
- Unified Chemistry, Dr. M.M.N. Tandon, ShivalalAgrawal& Com.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODÉ)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Third Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 3BSC5, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE: ZOOLOGY-III**

**Unit I: Heredity & Variation, Gene and Genetic Material**

1. Chromosome: The Physical basis of heredity and transmitters of heredity.
2. Types of chromosomes: Lampbrush, salivary gland and Beta Chromosomes.
3. Nucleocytoplasmic interactions : Ultra structure of nucleus, nucleolus, Role of nucleus and nucleolus in nucleocytoplasmic interactions including Synthesis & Export of RNA, transport of Proteins
4. Heredity and Variation : Sources of variation, Genotype, phenotype and environmental variations (elementary idea )
  - Mendel's laws of heredity
  - Kinds of variations
  - Genetic basis of variation.
- 5 (a) Chemistry of Gene ; Nucleic Acids and their structure.
  - (b).Concept of DNA replication.
  - (c).Nucleosome (Solenoid model).
  - (d) Split genes, overlapping genes and Pseudo genes.
  - (e) Genetic Code.

**Unit II: Cytoplasmic Inheritance, Gene Expression and Regulation**

1. Cytoplasmic inheritance: Maternal effect on limnea (Shell Coiling), Kappa particles in Paramecium.
2. Transcription in Prokaryotes and Eukaryotes
3. Translation in Eukaryotes
4. Gene Expression: Regulation of protein synthesis, transcription in Prokaryotes and Eukaryotes.
- 5: Gene Expression: Operon model

**Unit III: Linkage and Chromosomal Aberrations**

1. Gene Linkage: Kinds and Theories of linkage, significance of linkage.

2. Gene linkage, Mechanism of genetic recombination.
3. Sex Chromosomes System: Sex differentiation, chromosome theory of sex determination.
4. Sex linked inheritance ( Haemophilia, Colour blindness )
5. Structural changes in chromosomes.
6. Numerical changes in chromosomes.

#### **Unit VI: Mutation and Applied Genetics**

1. Types of Mutation.
2. Causes of mutation.
3. Mutagens- classification, Types & effects.
4. Gene therapy.
5. DNA finger printing.

#### **Unit V: Human Genetics & Genetic Engineering**

1. Human chromosomes, Elementary idea of Human Genome Project
2. Common genetic diseases in man (Autosomal syndromes, sex chromosome syndromes, diseases due to mutation-Sickle cell anaemia, Albinism & Alkaptonuria.
3. Multiple factors and blood groups.
4. Twins- physical traits, mental traits.
5. Techniques used in recombinant DNA technology. Construction of Chimeric DNA, Elementary idea of plasmids & vectors.
6. Gene cloning and Polymerase Chain Reaction (PCR) ,Gel Electrophoresis, Northern & Southern Blotting.

#### **TEXT AND REFERENCE BOOK**

- Unified Zoology According to unified syllabus for first year, V.K.Tiwari, ShivalalAgrawal& Company.
- R.P. Unified Zoology II year, Ram Prasad & Sons (Hindi)
- R.P.Unified Zoology III year, Ram Prasad & Sons (Hindi)
- Unified Zoology III year, V.K.Tiwari, V.K.Singh, ShivalalAgrawal Company.
- R.P.Unified Zoology, By Dr. S.M.Saxena, Ram Prasad & Sons Publication.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Third Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**PRACTICAL MAX.M:50MIN.M:17**

**COURSE CODE: 3BSC5, CREDIT:-4**

**COURSE: PRACTICAL ZOOLOGY-III**

1. Identification of spots related to theory.
2. Squash preparation of onion root tip / Chironomous larva salivary gland/grass hopper testis.
3. Study of instruments techniques related to applied genetics – PCR, Gel electrophoresis, DNA fingerprinting etc.
4. Problems based on genetics.

Scheme of Practical Examination

Time: 3 hours MM: 50

1. Spotting ( 5 Spots) 10 Marks
2. Squash preparation 05 Marks
3. Study of instruments / techniques related to applied genetics 05 Marks
4. Problems on Genetics 10 Marks
5. Viva-Voce 10 Marks
6. Practical Record and Collection 10 Marks

Total 50 Marks

**TEXT AND REFERENCE BOOK**

- Zoology Practical For B.Sc. by Kulshreshta, SivalalAgrawal&Compony.
- Practical Book for B.Sc. Invertebrate Zoology by S.S.Lal
- Practical Book for B.Sc. Vertebrate Zoology by S.S.Lal



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fourth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 35 MIN. M: 12**

**COURSE CODE: 4BSC1, CREDIT:-2**

**ASSIG. MAX.M: 15 MIN. M: 05**

**COURSE: -ENGLISH LANGUAGE AND SCIENTIFIC TEMPER**

**UNIT – I**

- |                      |   |                                    |
|----------------------|---|------------------------------------|
| 1. Tina Morris       | : | Tree                               |
| 2. Nissim Ezekiel    | : | Night of the Scorpion              |
| 3. C.P. Snow         | : | Ramanujan                          |
| 4. Roger Rosenblatt  | : | The Power of WE                    |
| 5. George Orwell     | : | What is Science?                   |
| 6. C.Rajagopalachari | : | Three Questions                    |
| 7. Desmond Morris    | : | A short extract from the Naked Ape |
| 8. A.G. Gardiner     | : | On the rule of the road            |

**UNIT – II** Comprehension of an unseen passage.

**UNIT – III** Letter Writing : Formal Letters, Informal letters, Applications.

**UNIT – IV** Report Writing.

**UNIT – V** Language Skills

Correction of common errors in sentence structure : usage of pronouns, subject/ verb agreement word order, gender; compound nouns, collective nouns, possessives, articles and prepositions. (advanced)

**TEXT AND REFERENCE BOOK**

- Essentials of English Grammar by Sultan Chand & Sons
- English Grammar and Composition by Wren & Martin
- Scholar's Senior English Grammar and Composition, T.R. Bhanot, H. Martin, Scholar Publishing House (P) Ltd.
- English Language and Scientific Temper- Madhya Pradesh Hindi Granth Academy



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fourth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 35 MIN. M: 12**

**COURSE CODE: 4BSC2, CREDIT:-2**

**ASSIG. MAX.M: 15 MIN. M: 05**

**COURSE: -ENVIRONMENTAL STUDY**

:

**UNIT – I Problem of natural resources**

- (a) Problem of water resources – Utilization of surface and ground water, over utilization, flood, drought, conflicts over water, dams-benefits and problem.
- (b) Problems of forest resources – uses and over utilization, deforestation, utilization of timber, dams and its effect on forests and tribes.
- (c) Problems of land resources – Land as a source, erosion of land, man-induced landslides and desertification.

**UNIT – II Bio-diversity and its protection –**

- (a) Value of bio-diversity – Consumable use : Productive use, Social, alternative, moral aesthetic and values.
- (b) India as a nation of bio-diversity and multi-diversity at global, national and local levels.
- (c) Threats to bio-diversity – Loss of habitat, poaching of wildlife, man-wildlife conflicts.

**UNIT – III Human Population and Environment**

- (a) Population growth, disparities between countries.
- (b) Population explosion, family welfare Programme.
- (c) Environment and human health.

**UNIT – IV Multidisciplinary nature of environmental studies :**

- (a) Natural resources
- (b) Social problems and the environment
- (c) Eco system.

**UNIT – V Environmental Wealth :**

- (a) Rivers, ponds, fields and hills.
- (b) Rural, Industrial, Agricultural fields.
- (c) Study of common plants, insects and birds.

**TEXT AND REFERENCE BOOK**

- Environment & Ecology, P.K.Pandey, Goel Publication.
- Environment & Ecology, Dr.J.P.Sharma, Laxmi Publication.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fourth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 4BSC3, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE: - BOTANY-IV**

**UNIT – I** The Root system: Root apical meristems, Differentiation of primary and secondary tissues and their roles, Anatomy of Monocot and Dicot roots, Morphological modification of root for storage, respiration, reproduction and interaction with microbes.

**UNIT – II** The Shoot system: Shoot apical meristem and histological organization, Anatomy of primary stem in Monocotyledons and Dicotyledons, Secondary growth in stem and root – Vascular cambium and its functions, Characteristics of growth rings, Sapwood and Heart wood, Secondary Phloem, Cork Cambium and Periderm.

**UNIT – III** The Leaf system: Origin, Development, Diversity in size, shape and arrangement, Internal structure of Dicot and Monocot leaf in relation to photosynthesis and water loss, Adaptations to water stress, senescence and abscission.

**UNIT – IV** The Flower system: Concept of flower as a modified shoot, Structure of Anther, Microsporogenesis and Male Gametophyte, Structure of Pistil, Ovules, Megasporogenesis and Development of Female Gametophyte (Embryo Sac) and its types, Pollination –Mechanism and Agencies of Pollination, Pollen Pistil interactions and Self incompatibility.

**UNIT – V** Double Fertilization, Development and types of Endosperm and its morphological nature, Development of Embryo in Monocots and Dicots, Fruit development and maturation. Seed structure and dispersal, Vegetative Propagation.

**TEXT AND REFERENCE BOOK**

- Text book of botany Vol. 2, S.B.Agrawal, Shivrul Agrawal & Company.
- Text book of botany Vol. 3, S.B.Pandey, Vikas Publishing House.
- Taxonomy of Angiosperms, V.N.Nayak.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fourth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**PRACTICAL MAX.M:50MIN.M:17**

**COURSE CODE: 4BSC3, CREDIT:-4**

**COURSE: -PRACTICAL BOTANY-IV**

- 1- Cutting, staining and mounting of cross section of two materials of monocotyledons/dicotyledons root and stem and leaf like Sunflower and Maize or other available material. 15
- 2- Organisation of shoot Apex and Root Apex. 5
- 3- Study of Ovules and Anthers and their types 5
- Structure of stigma and style (Hibiscus, Maize, Ocimum, Citrus and Clitoria (Aprajita) or plant studied by you.
- 4-Spotting-
- 5-Viva- voce-
- 6-Practical Record-

**TEXT AND REFERENCE BOOK**

- B.Sc. Third year Practical botany, Dr. Ashok Bendre, Rastogi Publications.
- Text book of practical botany vol. 3, S.B.Agrawal, Shivrul Agarwal and company



## Dr. C.V. RAMAN UNIVERSITY

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fourth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 4BSC4, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE: - CHEMISTRY-IV**

### UNIT I

Phase equilibrium Statement and the meaning of the terms: phase component and the degree of freedom, derivation of the Gibbs phase rule. Phase equilibria of one component system: water, CO<sub>2</sub> and S system. Phase equilibria of two component system: solid liquid equilibria, simple eutectic: Bi-Cd, Pb-Ag system, desilverisation of lead.

Partial miscible liquids: Phenol-water, trimethylamine–water and nicotine-water systems. Lower and upper consolute temperature. Effect of impurity on consolute temperature. Immiscible liquids, steam distillation, Nernst distribution law: thermodynamic derivation, applications.

### UNIT-II

Electrochemistry Electrical transport- conduction in metals and in electrolyte solutions, specific conductance and equivalent conductance, measurement of equivalent conductance, variation of specific conductance and equivalent conductance with dilution.

Migration of ions and Kohlrausch law, Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's dilution law, its uses and limitations. Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only). Transport number: Definition and determination by Hittorf method and moving boundary method. Application of conductivity measurements: determination of degree of dissociation, determination of K<sub>a</sub> of acids, determination of solubility product of sparingly soluble salt, conductometric titrations.

Definition of pH and pK, determination of pH using hydrogen, quinhydrone and glass electrodes by potentiometric methods.

**UNIT III** (a) Chemistry of Lanthanides Elements: electronic structure, oxidation states, ionic radii and lanthanide contraction, complex formation, occurrence and isolation of lanthanide compounds.

(b) Chemistry of Actinides: General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from U, Similarities between the later actinides and later lanthanides.

(c) Acids and Bases: Arrhenius, Brønsted-Lowry, Lux-Flood, Solvent system and Lewis concepts of acids and bases.

(d) Non-aqueous Solvents: Types of solvents and their general characteristics, reaction in non-aqueous solvents with reference to liquid NH<sub>3</sub> and liquid SO<sub>2</sub>

**UNIT IV**

(a) Aldehydes and ketones: Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes and ketones from acid chlorides, synthesis of aldehydes and ketones using 1,3-dithianes, synthesis of ketones from nitriles and from carboxylic acids. Physical properties. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol perkin and knovenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction, Mannich reaction.

(b) Carboxylic Acids: Nomenclature, structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Preparation of carboxylic acids, reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction.

Synthesis of acid chlorides, esters and amides. Reduction of carboxylic acids. Mechanism of decarboxylation. Methods of formation and chemical reactions of unsaturated monocarboxylic acids. Dicarboxylic acids: Methods of formation and effect of heat and dehydrating agents. Methods of formation and chemical reactions of halo acids, hydroxyl acids, malic, tartaric and citric acids.

**UNIT- V**

Organic Compounds of Nitrogen Preparation of nitroalkanes and nitroarenes. Chemical reaction of nitroalkanes. Mechanism of nucleophilic substitution in nitroarenes and their reductions in acidic, neutral and alkaline media, Picric acid.

Halonitroarenes: reactivity, structure and nomenclature. Structure and nomenclature of amines, physical properties and stereochemistry of amines. Separation of mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Amine salt as phase transfer catalysts. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles), reductive amination of aldehydic and ketonic compounds. Gabriel-Phthalamide reaction, Hoffmann bromamide reaction, Reactions of amines, electrophilic aromatic substitution in aryl amines, reaction of amines with nitrous acid. Synthetic transformation of aryl diazonium salts, azo coupling.

**TEXT AND REFERENCE BOOK**

- Inorganic Chemistry (Part-I, Part-II), R.L. Dutta, NBS Publication.
- Unified Chemistry, Dr.M.M.Tandon, Shivrati Agrawal & Comp.
- Synthetic Organic Chemistry, O.P.Agrawal, Krishna Prakashan Media Ltd.
- Physical Chemistry, K.L.Kapoor, Macmillan Pub. India, Ltd



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fourth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**PRACTICAL MAX.M:50 MIN.M:17**

**COURSE CODE: 4BSC4, CREDIT:-4**

**COURSE: - PRACTICAL CHEMISTRY-IV**

Time: 6 hour

Organic Chemistry 12 marks

Qualitative analysis

Identification of an organic compound through the functional group analysis, determination of melting point and preparation of suitable derivatives.

Physical Chemistry 12 marks

Transition temperature

1. Determination of transition temperature of given substance by thermometric, dilatometric method (e.g.) ( $\text{MnCl}_2 \times 4\text{H}_2\text{O}$  /  $\text{SrBr}_2 \times 2\text{H}_2\text{O}$ ).

Phase equilibrium

1. To study the effect of solute (e.g. NaCl, succinic acid) on the critical solution temperature of two partially miscible liquid (e.g., phenol water system) and to determine the concentration of that soluble in phenol water system.

2. To construct the phase diagram of two component (e.g., diphenyl amine/benzophenone) by cooling curve method.

Thermochemistry 12 Marks

1. To determine the enthalpy of neutralization of weak acid/weak base versus strong acid/ strong base and determine the enthalpy of ionization of the weak acid/ base.

Inorganic chemistry-Quantitative Volumetric Analysis

1. Estimation of ferrous and ferric by dichromate method.

2. Estimation of copper using thiosulphate.

Viva 6 Marks

Sessional 8 Marks

**TEXT AND REFERENCE BOOK**

- Unified Practical, Dr. M.M.N.Tandon, Shivalal Agrawal & Comp.



## **Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fourth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 4BSC5, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE: - ZOOLOGY-IV**

### **Unit I**

#### **Nutrition, Metabolism**

1. Physiology of digestion in mammals
2. Protein Metabolism-Deamination, decarboxylation. Transamination of amino acids, and Ornithine cycle.
3. Carbohydrate metabolism- Glycogenesis, Glycogenolysis, glycolysis, The Citric acid cycle, Gluconeogenesis.
4. Lipid Metabolism-Beta oxidation of fatty acids.

### **Unit II**

#### **Respiration**

1. Organs of respiration in mammals
2. Mechanism of respiration in mammals.
3. Physiology of respiration (transport of gases, chloride shift).
4. Properties and function of respiratory pigments.

### **Unit III**

#### **Regulatory Mechanisms and Enzymes**

1. Osmoregulation.
2. Physiology of Excretion- urea and urine formation in mammals.
3. Thermoregulation.
4. Definition and nomenclature of enzymes, classification of enzymes.
5. Mechanism of enzyme action.

### **Unit IV**

#### **Neuromuscular Co- ordination**

1. Structure and properties of nervous tissue.

2. Physiology of nerve impulse conduction.
3. Types of muscles and their properties.
4. Theory of muscle contraction and its biochemistry.

#### **Unit V**

##### **Endocrine system**

1. Structure and functions of Pituitary Gland.
2. Structure and functions of Thyroid Gland.
3. Structure and functions of Adrenal Gland.
4. Structure and functions of Parathyroid, Thymus and Islets of langerhan's.

#### **TEXT AND REFERENCE BOOK**

- Unified Zoology According to unified syllabus for first year, V.K.Tiwari, ShivalalAgrawal& Company.
- R.P. Unified Zoology II year, Ram Prasad & Sons (Hindi)
- R.P.Unified Zoology III year, Ram Prasad & Sons (Hindi)
- Unified Zoology III year, V.K.Tiwari, V.K.Singh, ShivalalAgrawal Company.
- R.P.Unified Zoology, By Dr. S.M.Saxena, Ram Prasad & Sons Publication.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fourth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)      PRACTICAL MAX.M:50MIN.M:17**

**COURSE CODE: 4BSC5, CREDIT:-4**

**COURSE: -PRACTICAL ZOOLOGY-IV**

1. Detection of protein, carbohydrate and lipid.
2. Study of Human salivary enzyme activity in relation to pH.
3. Detection of nitrogenous waste products – Ammonia & Urea
4. Use of Kymograph
5. Exercise on Haematology – Counting of RBC /WBC and Blood grouping in blood samples.
6. Estimation of Haemoglobin in blood samples.
7. Histological study of various endocrine glands –T. S. of Thyroid, T. S. of Pituitary gland , T. S. of Adrenal gland , T. S. of Testis, T. S. of Ovary.
8. Histological study of Alimentary canal & various digestive organs – T.S of Stomach , T.S of Intestine , T.S of Pancreas, and T. S. of liver.
9. Histological study of Visceral organs - T.S of Lungs, L.S. of Kidney
10. Histological study of Muscles – Striated, Unstriated & Cardiac muscle.

**TEXT AND REFERENCE BOOK**

- Zoology Practical For B.Sc. by Kulshreshta, SivalalAgrawal&Compony.
- Practical Book for B.Sc. Invertebrate Zoology by S.S.Lal
- Practical Book for B.Sc. Vertebrate Zoology by S.S.Lal



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fifth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 35 MIN. M: 12**

**COURSE CODE: 5BSC1, CREDIT:-2**

**ASSIG. MAX.M: 15 MIN. M: 05**

**COURSE: HINDI LANGUAGE (BHASHA KAUSHAL AUR SANCHAR SADHAN)**

**इकाई - 1**

1. भारतीय संस्कृति
2. भारतीय समाज व्यवस्था
3. सभ्यता एवं संस्कार
4. वैश्विक चेतना
5. समन्वयीकरण (भारतीय एवं अंतर्राष्ट्रीय सदंर्भ में)

**इकाई - 2**

1. धर्म
2. न्याय
3. दर्शन
4. नीति
5. साहित्य

**इकाई - 3**

1. संचार संसाधन : सम्पर्क के नए क्षितिज
2. समाचार पत्र
3. भारतीय प्रेस परिषद्
4. रेडियो
5. दूरदर्शन

**इकाई - 4**

1. सिनेमा
2. रंगमंच
3. सर्गीत
4. चित्र, मूर्ति, स्थापत्य कला
5. शिल्प कला

इकाई - 5

1. कम्प्यूटर
2. दूरभाष: विज्ञान की सौगात
3. मंत्र (कहानी): प्रमे चंद्र
4. मातृभूमि (कविता): मैथिलीशरण गुप्त
6. साहित्यकार का दायित्व: डॉ. प्रेम भारती

#### **TEXT AND REFERENCE BOOK**

संदर्भ पुस्तक – मध्यप्रदेश हिन्दी ग्रंथ अकादमी भोपाल द्वारा प्रकाशित पुस्तक



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fifth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 35 MIN. M: 12**

**COURSE CODE: 5BSC2, CREDIT:-2**

**ASSIG. MAX.M: 15 MIN. M: 05**

**COURSE: -COMPUTER & INFORMATION TECHNOLOGY BASICS-I**

**Unit I :**

**INTRODUCTION TO COMPUTER ORGANIZATION –I**

History of development of Computer system concepts. Characteristics, Capability and limitations.

Generation of computer. Types of PC's Desktop. Laptop, Notebook. Workstation & their Characteristics.

**Unit II :**

**INTRODUCTION TO COMPUTER ORGANIZATION –II**

basic components of a computer system Control Unit, ALU. Input/Output function and Characteristics, memory RAM, ROM, EPROM, PROM.

**Unit III :**

**INPUT & OUTPUT DEVICES**

Input Devices : Keyboard, Mouse, Trackball. Joystick, Digitizing tablet, Scanners, Digital Camera, MICR, OCR, OMR, Bar-code Reader, Voice Recognition, Light pen, Touch Screen.

Output Devices: Monitors Characteristics and types of monitor, Video Standard VGA, SVGA, XGA,

LCD Screen etc. Printer, Daisy wheel, Dot Matrix, Inkjet, Laser, Line Printer. Plotter, Sound Card and Speakers.

**Unit IV :**

STORAGE DEVICES : Storage fundamental primary Vs Secondary. Various Storage Devices magnetic Tape. Cartridge Tape, Data Drives, Hard Drives, Floppy Disks, CD, VCD, CD-R, CD-RW, Zip Drive, DVD, DVD-RW.

**Unit V :**

INTRODUCTION TO OPERATING SYSTEM : Introduction to operating systems, its functioning and types. basic commands of dos & Windows operating System.

Disk Operating System (DOS) - Introduction, History and Versions of DOS.

DOS Basics - Physical Structure of disk, Drive name, FAT, file & directory structure and naming rules, booting process, DOS system files.

DOS Commands - **Internal** - DIR, MD, CD, RD, Copy, DEL, REN, VOL, DATE, TIME, CLS, PATH, TYPE etc. **External** CHKDSK, SCOPE, PRINT DISKCOPY, DOSKEY, TREE, MOVE, LABEL, APPEND, FORMAT, SORT, FDISK, BACKUP, MODE, ATTRIB HELP, SYS etc.

## **TEXT AND REFERENCE BOOK**

- Computer Fundamentals, 6<sup>th</sup> Edition PradeepK.SinhaPritiSinha BPB Publication



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fifth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)      PRACTICAL MAX.M:50 MIN.M:17**

**COURSE CODE: 5BSC2, CREDIT:-2**

**COURSE: PRACTICAL COMPUTER & INFORMATION TECHNOLOGY BASICS-I**

**DOS :**

- DOS commands : Internal & External Commands.
- Special batch file : Autoexec, Bar Hard disk setup.

**Windows 98:**

- Desktop setting : New folder, rename bin operation, briefcase, function. Control panel utility.
- Display properties: Screen saver, background settings.

**Ms-Word:**

- Creating file: save, save as HTML, Save as Text, template, RTF Format.
- Page setup utility: Margin settings, paper size setting, paper source, layout.
- Editing: Cut, paste special, undo, redo, find, replace, goto etc.
- View file: page layout, Normal Outline, master document, ruler header, footer, footnote, full screen.
- Insert: break, page number, symbol, date & time, auto text, caption file, object, hyperlink, picture etc.
- Format: font, paragraph, bullets & numbering, border & shading, change case, columns.
- Table : Draw label, insert table, cell handling, table auto format, sort formula



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fifth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 5BSC3, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE:- BOTANY –V**

**UNIT – I**

Plant Water Relations: Properties of water, Importance of water in plant life, Diffusion, Osmosis & Osmotic relation to plant cell, Water Absorption, Ascent of Sap, Essential macro & micronutrients and their role. Transpiration: Structure & Physiology of Stomata, Mechanism of Transpiration, Factors affecting the rate of transpiration.

**UNIT – II**

Photosynthesis: Chloroplast, Photosynthetic pigments, Red drop, Emerson's effect, Concept of two Photosystems, Light reaction, Dark reaction - Calvin cycle, Hatch-Slack cycle, CAM cycle, Factors affecting rate of photosynthesis & Photorespiration.

**UNIT – III**

Respiration: Mitochondria, aerobic and anaerobic respiration, Respiratory coefficient, mechanism of respiration - Glycolysis, Kreb's cycle, Pentose phosphate pathway, Electron transport system, Factors affecting rate of respiration, Redox potential and theories of ATP synthesis.

**UNIT – IV**

Definition, classification and chemical structure: monosaccharide, disaccharide, oligosaccharide and polysaccharides; Amino acids, essential and non essential amino acids; Lipids, saturated and non saturated fatty acids.

Classification, nomenclature and characteristics of Enzymes, Concept of holoenzyme, apoenzyme, co-enzyme and co-factors, mode & mechanism of enzyme action, Factors affecting enzyme activity. Plant Hormones, mode of action of Auxins, Gibberellins, Cytokinin and Abscissic acid.

## **UNIT – V**

Genetic Engineering: Tools and techniques of recombinant DNA technology; cloning vectors; genomic and cDNA library; transposable elements; gene mapping and chromosome walking. Biotechnology: Functional definition; basic aspects of plant tissue culture; cellular totipotency, differentiation and morphogenesis biology of Agrobacterium; vectors for gene delivery and marker genes; salient achievements in crop biotechnology.

## **TEXT AND REFERENCE BOOK**

- Biotechnology Expanding horizons, B.D.Singh, Kalayani Publishers.
- Botany for Degree Student, A.C.Dutta, Oxford Publishers.
- Plant physiology, S.N.Pandey.
- Text book for botany degree student vol. 3, S.B.Agrawal, shivlalagrawal& Company.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fifth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**PRACTICAL MAX.M:50 MIN.M:17**

**COURSE CODE: 5BSC3, CREDIT:-4**

**COURSE: PRACTICAL BOTANY-V**

- 1- Preparation of solution of specific Normality, Molal and Molar solutions.
- 2- Exercises related to osmosis and osmotic relation.
- 3- Exercises related to Transpiration.
- 4- To separate Plastidial pigments by Paper Chromatography.
- 5- To perform the exercise of Photosynthesis & Respiration.
- 6- To perform biochemical test for Carbohydrate, Lipid and Protien.
- 7- To extract Enzyme for any plant part and demonstrate its activity.

**TEXT AND REFERENCE BOOK**

- Text book of botany vol. 2, S.B.Agarawal, ShivilalAgarawal and company.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fifth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 5BSC4, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE: CHEMISTRY-V**

**UNIT I**

**Spectroscopy - I**

- (a) Electromagnetic radiation, regions of the spectrum, basic features of different spectrometers, statement of the Born-Oppenheimer approximation, degrees of freedom.
- (b) Rotational spectrum of diatomic molecules. Energy levels of a rigid rotator (semi classical principles), selection rules, spectral intensity, distribution using population distribution (Maxwell-Boltzmann distribution), determination of bond length, qualitative description of non-rigid rotator, isotope effect.
- (c) Raman spectrum, concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules, application of Raman spectrum.

**UNIT II**

**Spectroscopy - II**

- (a) UV Spectroscopy : Electronic excitation, elementary idea of instrument used, Applications to structure determination of organic molecules. Woodward-Fieser rule for determining  $\lambda_{max}$  of  $\alpha, \beta$ -unsaturated carbonyl compounds.
- (b) Infrared Spectrum : Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, intensity, determination of force constant and qualitative relation of force constant and bond energies, effect of anharmonic motion and isotope on the spectrum, idea of vibrational frequencies of different functional groups.

**UNIT III**

**Bioinorganic Chemistry-I**

Essential and trace elements in biological processes, metalloporphyrins with special reference to haemoglobin and myoglobin, Biological role of alkali and alkaline earth metal ions with special reference to  $Ca^{2+}$ . Nitrogen fixation.

**Bioinorganic Chemistry - II**

Role of metal ions in biological process, Na/K pump, metal complexes as therapeutic agents, anticancer agents, antiarthritis drugs and chelation therapy.

#### **UNIT IV**

Hard and Soft Acids and Bases (HSAB) Classification of acids and bases as hard and soft, Pearson's HSAB concept, acid-base strength and hardness and softness, Symbiosis, theoretical basis of hardness and softness, electronegativity and hardness and softness.

Gravimetric Analysis Principles of gravimetric estimation, supersaturation, co-precipitation, post-precipitation and Ash treatment with respect to the estimation of Ba, Zn and Cu.

Water Analysis Hardness, types of hardness-Temporary, permanent and total hardness, acidity and alkalinity, BOD, COD and DO.

#### **UNIT V**

##### **Carbohydrates - I**

Classification and nomenclature, monosaccharide, mechanism of osazone formation, interconversion of glucose and fructose, chain lengthening and chain shortening of aldoses. Configuration of monosaccharide, erythro and threo diastereoisomers. Conversion of glucose into mannose. Formation of glycosides, ethers and esters, determination of ring size of monosaccharide, cyclic structure of D(+) glucose, mechanism of mutarotation. Structures of ribose and deoxyribose.

##### **Carbohydrates - II**

An introduction to glycosidic linkages in di- and poly-saccharides. Reducing and non reducing sugars. Structure determination of maltose, sucrose, starch and cellulose.

#### **TEXT AND REFERENCE BOOK**

- Inorganic Chemistry (Part-I, Part-II), R.L. Dutta, NBS Publication.
- Unified Chemistry, Dr.M.M.Tandon, ShivalAgrawal& Comp.
- Synthetic Organic Chemistry, O.P.Agrawal, Krishna Prakashan Media Ltd.
- Physical Chemistry, K.L.Kapoor, Macmillan Pub. India, Ltd.
- Spectroscopy, H.Kaur



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fifth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**PRACTICAL MAX.M:50 MIN.M:17**

**COURSE CODE: 5BSC4, CREDIT:-4**

**COURSE: - PRACTICAL CHEMISTRY - V**

Time: 6 hour

Inorganic Chemistry 12 Marks

Analysis of inorganic mixture containing five radicals with at least one interfering radical (phosphate, borate, oxalate or fluoride).

Organic Chemistry 12 Marks

Preparation:

- (i) Acetylation
- (ii) Benzoylation
- (iii) meta-Dinitrobenzene
- (iv) Picric acid

Physical Chemistry 12 Marks

- (i) Effluent Analysis

Identification of cations and anions in different water samples.

- (ii) Water analysis

To determine the amount of dissolved oxygen in water samples in ppm units.

Viva 06 Marks

Sessional 08 Marks

**TEXT AND REFERENCE BOOK**

- Unified Chemistry, Dr. M.M.N.Tandon, ShivrulAgrawal& Company.
- Experiment & Calculations in Engineering Chemistry, Dr. S.S. Dara, S.Chand& Com. Ltd.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fifth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 5BSC5, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE:- ZOOLOGY-V**

**Unit –I**

**Aquaculture**

- Definition and scope of aquaculture.
- Prawn culture –(Culture of fresh water prawn, Methods of prawn fishing, preservation and processing of prawns)
- Pearl culture and Pearl Industry.
- By products of fishing industry.
- Frog culture, Breeding and selection.

**Unit –II**

**Pisciculture**

- General account of Edible fresh water fishes.
- Carp culture: Management of ponds, Preservation and processing of fishes.
- Maintenance of Aquarium
- Plankton and their role in Fisheries.
- Elementary knowledge of polyculture.

**Unit –III**

**Economic Entomology**

- Sericulture: Species of silkworm, life history of Bombyx mori, Sericulture Industry in India.
- Apiculture –life cycle and species Methods of bee keeping, Products of bees, enemies of bees.
- Lac culture: Lifecycle, Host Plant cultivation.
- Common Pest: Stored Grains Sitophilus oryzae and Tribolium Castanaeum, Vegetable pest Piers brassicae and Dacus cucurbitae..

- Biological control of insect pests.

#### **Unit –IV**

##### **Toxicology**

- Toxicology: Basic concepts,
- Heavy metal toxicity- Pb, Cd, Hg.
- Toxicity testing, LC 50, LD 50, acute and chronic toxicity.
- Pesticide and their toxicological effect.
- Occupational health hazards and their control.

#### **Unit-V**

##### **Lab Techniques**

- pH- Definition, Study of pH- meter, determination of pH.
- Chromatography: Principles & Types of chromatography (Paper Chromatography).
- Types of microtome and their uses.
- General ideas of some common fixatives, stains and reagents.
- Museum keeping, preservation and skeleton preparation, taxidermy(Bird)

#### **TEXT AND REFERENCE BOOK**

- Unified Zoology According to unified syllabus for first year, V.K.Tiwari, ShivalalAgrawal& Company.
- R.P. Unified Zoology II year, Ram Prasad & Sons (Hindi)
- R.P.Unified Zoology III year, Ram Prasad & Sons (Hindi)
- Unified Zoology III year, V.K.Tiwari, V.K.Singh, ShivalalAgrawal Company.
- R.P.Unified Zoology, By Dr. S.M.Saxena, Ram Prasad & Sons Publication.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Fifth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**PRACTICAL MAX.M:50 MIN.M:17**

**COURSE CODE: 5BSC5, CREDIT:-4**

**COURSE:-PRACTICAL- ZOOLOGY-V**

1. Study of museum specimen of fresh water edible fishes.
2. Study of pH of Water and soil.
3. Study of Chromatography ( Paper Chromatography).
4. Study of working instrument : Microtome.
5. Study of different techniques for Museum Keeping..
6. Maintenance of aquarium.
7. Study of pests-  
Stored grain pests- Sitophilus Oryzae & Tribolium castanaeum.  
Vegetable pests- Pieris brassicae & Dacus cucurbitae
8. Study of Plankton – Euglena, Paramecium, Cyclops, Mysis, Daphnia

**TEXT AND REFERENCE BOOK**

- Zoology Practical For B.Sc. by Kulshreshtha, SivalalAgrawal&Compony.
- Practical Book for B.Sc. Invertebrate Zoology by S.S.Lal
- Practical Book for B.Sc. Vertebrate Zoology by S.S.Lal



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Sixth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 35 MIN. M: 12**

**COURSE CODE: 6BSC1, CREDIT:-2**

**ASSIG. MAX.M: 15 MIN. M: 05**

**COURSE:- ENGLISH LANGUAGE AND ASPECTS OF DEVELOPMENT**

**Unit 1**

1. William Wordsworth : “The World is Too Much With Us”
2. K. Aludiapillai : “Communication Education and Information Technology”
3. “Democratic Decentralisation”
4. S. C. Dubey : “Basic Quality of Life”
5. Sister Nivedita : “The Judgment Seat of Vikramaditya”
6. Juliun Huxley : “War as a Biological Phenomenon”
7. Robert Frost : “Stopping by Woods on a Snowy Evening”
8. Ruskin Bond : “The Cherry Tree”

**Unit II**

Short Essay of about 250-300 words

**Unit III**

Translation of a short passage from Hindi to English

**Unit IV**

Drafting CV, writing e-mail message for official purpose

**Unit V**

Language Skills :

One-word substitution, homonyms, homophones, words that confuse, Punctuation, Idioms

### **TEXT AND REFERENCE BOOK**

- Essentials of English Grammar by Sultan Chand & Sons
- English Grammar and Composition by Wren & Martin
- A Practical Guide to English Translation and Composition by K.P. Thakur (BharatiBhawan Publishers)
- Scholar's Senior English Grammar and Composition, T.R. Bhanot, H. Martin, Scholar Publishing House (P) Ltd.
- English Language and Aspects of Development, published by M. P. Hindi Granth Academy



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Sixth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 35 MIN. M: 12**

**COURSE CODE: 6BSC2, CREDIT:-2**

**ASSIG. MAX.M: 15 MIN. M: 05**

**COURSE:-COMPUTER & INFORMATION TECHNOLOGY BASICS-II**

**Unit I**

**Word Processing : Word**

Introduction to word Processing.

- MS Word: features, Creating, Saving and Operating Multi document windows, Editing Text selecting, Inserting, deleting moving text.
- Previewing documents, Printing document to file page. Reduce the number of pages by one.
- Formatting Documents: paragraph formats, aligning Text and Paragraph, Borders and shading, Headers and Footers, Multiple Columns.

**Unit II**

**Introduction to Excel**

Excel & Worksheet :

- Worksheet basic.
- Creating worksheet, entering data into worksheet, heading information, data text, dates, alphanumeric, values, saving & quitting worksheet.
- Opening and moving around in an existing worksheet.
- Toolbars and Menus, keyboard shortcuts.
- Working with single and multiple workbook coping, renaming, moving, adding and deleting. coping entries and moving between workbooks.
- Working with formulas & cell referencing.
- Autosum.
- Coping formulas
- Absolute & Relative addressing.

### **Unit III**

#### **INTRODUCTION TO POWER POINT**

- Features and various versions.
- Creating presentation using Slide master and template in various colour scheme.
- Working with slides make new slide move, copy, delete, duplicate, lay outing of slide, zoom in or out of a slide.
- Editing and formatting text: Alignment, editing, inserting, deleting, selecting, formatting of text, find and replace text.

### **Unit IV**

#### **POWER POINT – II**

- Bullets , footer, paragraph formatting, spell checking.
- Printing presentation Print slides, notes, handouts and outlines.
- Inserting objects Drawing and Inserting objects using Clip Arts picture and charts.
- Slide sorter, slide transition effect and animation effects.
- Presenting the show making stand alone presentation, Pack and go wizards.

### **Unit V**

Evolution, Protocol, concept, Internet, Dial-up connectivity, leased line, VSAT, Broad band, URLs, Domain names, Portals. E-mail, Pop & web based Email. Basic of sending and receiving Emails, Email & Internet Ethics, Computer virus, Antivirus software wage, Web Browsers.

#### **TEXT AND REFERENCE BOOK**

- Computer Fundamentals 6<sup>th</sup> Edition Pradeep Ku. Sinha&PritiSinha, BPB Publications.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Sixth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)      PRACTICAL MAX.M:50 MIN.M:17**

**COURSE CODE: 6BSC2, CREDIT:-2**

**COURSE: -PRACTICAL COMPUTER & INFORMATION TECHNOLOGY BASICS-II**

**DOS :**

- DOS commands : Internal & External Commands.
- Special batch file : Autoexec, Bar Hard disk setup.

**Windows 98:**

- Desktop setting : New folder, rename bin operation, briefcase, function. Control panel utility.
- Display properties: Screen saver, background settings.

**Ms-Word:**

- Creating file: save, save as HTML, Save as Text, template, RTF Format.
- Page setup utility: Margin settings, paper size setting, paper source, layout.
- Editing: Cut, paste special, undo, redo, find, replace, goto etc.
- View file: page layout, Normal Outline, master document, ruler header, footer, footnote, full screen.
- Insert: break, page number, symbol, date & time, auto text, caption file, object, hyperlink, picture etc.
- Format: font, paragraph, bullets & numbering, border & shading, change case, columns.
- Table : Draw label, insert table, cell handling, table auto format, sort formula



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Sixth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 6BSC3, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE: BOTANY –VI**

**UNIT – I**

**Ecosystems:** Structure and types, Biotic and Abiotic components, Trophic levels, Food chains, Food webs, Ecological pyramids, Energy flow; Biogeochemical cycles: Concept, Gaseous and Sedimentary cycles, Carbon, Nitrogen, Phosphorus and Sulfur cycle.

**UNIT – II**

**Ecological adaptations:** Morphological, Anatomical and Physiological responses, Water adaptation (Hydrophytes, Xerophytes and Mesophytes), Temperature adaptation (Thermoperiodism and Vernalization), Light adaptation (Heliophytes and Sciophytes), Plant Succession: Causes, trends and processes, types of succession - Lithosere, Hydrosere and Xerosere.

**UNIT – III**

**Population Ecology:** Distribution patterns, Density, Natality, Mortality, Growth curves, Ecotypes and Ecads; Community Ecology: Characteristics, Classification, Life forms. Biodiversity: Basic concept, definition, Importance, Biodiversity of India, Hotspots, In situ and ex situ conservation, Endangered and threatened species, Red data book.

**UNIT – IV**

**Soil:** Physico-chemical properties, Soil formation, Development of Soil Profile, Soil classification, Soil composition, Soil factors; Pollution: Definition, Types & Causes; Global warming, Climate change and Ozone holes.

**UNIT – V**

**Phytogeography:** Phytogeographical regions of India, Vegetation types of Madhya Pradesh, Biosphere reserves, Sanctuaries and National parks of Madhya Pradesh, Natural resources – definition and classification of natural resources, Conservation and management of natural

resources, Land resources management, Water resources management, Wet land resource management.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Sixth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)      PRACTICAL MAX.M:50 MIN.M:17**

**COURSE CODE: 6BSC3, CREDIT:-4**

**COURSE:-PRACTICAL BOTANY-VI**

- 1- To determine the minimum size of Quadrat by species area curve method.
- 2- To conduct exercise on Frequency, Density and Abundance.
- 3- Study of soil with reference to soil texture, water holding capacity, pH and test for Carbonate and Nitrate.
- 4- Preparation of slides of Xerophytic, Hydrophytic and Mesophytic plants.
- 5- To comment upon Phytogeographic region (model/ charts) and National Parks (Photographs).
- 6- Spotting
- 7- Viva-voce
- 8- Practical Record

**TEXT AND REFERENCE BOOK**

- Ecology and Environment, P.D.Sharma, C.Rastogi Publishing.
- Text book of plant ecology, R.S.Ambasth, C.B. Publishers.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Sixth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 6BSC4, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE:- CHEMISTRY-VI**

**UNIT I**

(a) Photochemistry Interaction of radiation with matter, difference between thermal and photochemical process. Law of photochemistry-Grotthus-Draper law, Stark-Einstein law, Beer-Lambert's law. Determination of rate constant of unimolecular reactions. Electronic transitions, Jablonski diagram depicting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions-energy transfer processes .

(b) Physical properties and molecular structures Optical activity, polarization-(Clausius-Mossotti equation), orientations of dipoles in an electrical field, dipole moment, induced dipole moment, measurement of dipole moment temperature and refractivity method. Dipole moment and structure of molecules, magnetic properties- paramagnetism, diamagnetism and ferromagnetism.

**UNIT II**

(a) Solutions, dilute solutions and colligative properties-I Ideal and non ideal solutions, methods of expressing concentrations of solutions, activity and activity coefficient. Dilute solutions-colligative properties. Raoult's law, relative lowering of vapour pressure, molecular weight determination. Osmosis, law of osmotic pressure and its measurements, determination of molecular weight from osmotic pressure.

(b) Solutions, dilute solutions and colligative properties-II Elevation of boiling point and depression of freezing point. Thermodynamic derivation of relation between molecular weight and elevation of boiling point and depression in freezing point. Experimental methods of determining various colligative properties. Abnormal molar mass, degree of dissociation and association of solute.

**UNIT III**

Inorganic polymers Introduction and scope of inorganic polymers, special characteristics, classification, homo and hetero atomic polymers and their applications. Silicones and phosphazenes as examples of inorganic polymers, nature of bonding in triphosphazenes.

## UNIT IV

### Organometallic chemistry

- (a) Definition, nomenclature and classification of organometallic compounds. Preparation, properties, bonding and applications of alkyls and aryls of Li, Al, Hg, Sn and Ti.
- (b) A brief account of metal-ethylenic complexes and homogeneous hydrogenation; mononuclear carbonyls and the nature of bonding in metal carbonyls. Transition metal organometallic compounds with bonds to hydrogen and boron.
- (c) Metal nitrosyls: modes of coordination, nature of bonding and probable applications.

## UNIT V

- (a) Organometallic compounds Organomagnesium compounds-the Grignard reagents-formation, structure and synthetic applications, organozinc compounds, formation and chemical reactions, Organolithium compounds-formation and chemical reactions.
- (b) Organosulphur compounds Nomenclature, structural features, method of formation and chemical reactions of thiols, thioethers, sulphonic acids, sulphonamides and sulphaguanidine.
- (c) Amino acids Classification, structure, stereochemistry of amino acids, acid base behaviour, isoelectric point, general methods of preparation and properties of  $\alpha$ -amino acids
- (d) Proteins and peptides Introduction to peptides linkage, synthesis and end group analysis of peptides, solid phase synthesis, classification, properties and structure of proteins (primary, secondary and tertiary).

## TEXT AND REFERENCE BOOK

- Inorganic Chemistry (Part-I, Part-II), R.L. Dutta, NBS Publication.
- Unified Chemistry, Dr.M.M.Tandon, Shivrati Agrawal & Comp.
- Synthetic Organic Chemistry, O.P.Agrawal, Krishna Prakashan Media Ltd.
- Physical Chemistry, K.L.Kapoor, Macmillan Pub. India, Ltd



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Sixth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**PRACTICAL MAX.M:50 MIN.M:17**

**COURSE CODE: 6BSC4, CREDIT:-4**

**COURSE:- PRACTICAL CHEMISTRY-VI**

Time: 6 hour M.M: 50

Inorganic Chemistry 12 Marks

Complex Compound Preparation:

1. Diaquabis(methyl acetoacetato)nickel(II)
2. Diaquabis(ethyl acetoacetato)cobalt(II)
3. Bis(methyl acetoacetato)copper(II) monohydrate
4. Potassium chlorochromate(IV)
5. Tetraamminecopper(II) sulphate monohydrate
6. Mercury(II) tetrathiocyanatocobaltate(II)
7. Hexaamminenickel(II) chloride

Organic Chemistry 12 Marks

Binary mixture analysis containing two solids: Separation, identification and preparation of derivatives.

Physical Instrumentation 12 Marks

(iii) Job's method

(iv) Mole-ratio method.

Viva 06 Marks

Sessional 08 Marks

**TEXT AND REFERENCE BOOK**

Experiments & Calculations in engineering chemistry, Dr. S.S. Dara, S.Chand& Company Ltd.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Sixth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**THEO. MAX. M: 70 MIN. M: 23**

**COURSE CODE: 6BSC5, CREDIT:-4**

**ASSIG. MAX.M: 30 MIN. M: 10**

**COURSE:- ZOOLOGY-VI**

**Unit –I**

**Concept of Ecology**

- Abiotic and Biotic Factors
- Energy flow in ecosystem
- Food chain and Food web
- Biogeochemical cycle: CO<sub>2</sub>, N and P
- Population Concept- Characteristics of population. Factors affecting population growth.
- Community Concept-Succession, Periodicity ,Indicators

**Unit –II**

**Habitat Ecology**

- Fresh water habitat – Factors and classification.
- Marine habitat- Factors and classification
- Terrestrial habitat – Factors and classification.
- Ecological divisions of India.
- Natural resources and their Conservation with special reference to forests

**Unit –III**

**Man and Environment**

- Wild life conservation (Laws, National Parks and Sanctuaries of MP)
- Environmental degradation and pollution.
- Thermal and Noise pollution
- Radiation Ecology ,Global Warming and Green House Effect
- Urbanisation and effect of human population on environment.

#### **Unit –IV**

##### **Origin of life and evolution**

- Origin of life- modern concept only
- Lamarckism, Darwinism.
- Modern Synthetic theory :Variations Mutations, Isolation & Speciation
- Adaptations and Mimicry
- Micro, macro Evolution and Mega evolution.

#### **Unit –V**

##### **Palaeontology and distribution**

- Fossils, Methods of fossilisation, Determination of age of Fossils.
- Study of Extinct forms: Dinosaurs and Archaeopteryx
- Zoogeographical distribution of animals
- Evolution of man.

#### **TEXT AND REFERENCE BOOK**

- Unified Zoology According to unified syllabus for first year, V.K.Tiwari, ShivalalAgrawal& Company.
- R.P. Unified Zoology II year, Ram Prasad & Sons (Hindi)
- R.P.Unified Zoology III year, Ram Prasad & Sons (Hindi)
- Unified Zoology III year, V.K.Tiwari, V.K.Singh, ShivalalAgrawal Company.
- R.P.Unified Zoology, By Dr. S.M.Saxena, Ram Prasad & Sons Publication.



**Dr. C.V. RAMAN UNIVERSITY**

Institute of Open and Distance Education (IODE)  
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- Sixth Semester

**PROGRAMME: BACHELOR OF SCIENCE (BIOLOGY)**

**PRACTICAL MAX.M:50 MIN.M:17**

**COURSE CODE: 6BSC5, CREDIT:-4**

**COURSE:-PRACTICAL ZOOLOGY-VI**

1. Study of Fresh water, Marine and Terrestrial Fauna.
2. Water analysis – Oxygen, Chloride.
3. Pond ecosystem.
4. Wild life : Endangered and threatened species.
5. Study of specimen related with Micro, Mega evolution, Commensalisms Symbiosis, Mimicry, Parasitism and colouration.
6. Study of various fossils: Living fossil, Limulus, Latimera, dinosaurs, Archaeopteryx.

Scheme

Scheme of Practical Examination

Time 3 hrs M M 50 marks

1. Water analysis – Estimation of Oxygen, chloride 10 marks
2. Spotting 12. marks
3. Wild life : Endangered and threatened species. 08 marks
4. Pond ecosystem 05 marks
5. Viva. 05 marks
6. Practical record and Collection. 10 marks

Total 50 marks

**TEXT AND REFERENCE BOOK**

- Zoology Practical For B.Sc. by Kulshreshta, Sivalal Agrawal & Compony.
- Practical Book for B.Sc. Invertebrate Zoology by S.S.Lal.
- Practical Book for B.Sc. Vertebrate Zoology by S.S.Lal.

**COUNSELING AND STUDY STRUCTURE**

Course Code	Name of the Course	Credit	Total Hours of Study	Counselling and Study Structure (hours)			
				Face to Face Counselling	Self study	Practical	Assignments
SEMESTER-I							
1BSC1	Hindi Language Structure - I	2	60	8	34	-	18
1BSC2	Entrepreneurship Development	2	60	8	34	-	18
1BSC3	Botany-I	4	120	16	44	24	36
1BSC4	Chemistry-I	4	120	16	44	24	36
1BSC5	Zoology-I	4	120	16	44	24	36
SEMESTER-II							
2BSC1	English Language and Indian Culture	2	60	8	34	-	18
2BSC2	Development of Entrepreneur	2	60	8	34	-	18
2BSC3	Botany-II	4	120	16	44	24	36
2BSC4	Chemistry-II	4	120	16	44	24	36
2BSC5	Zoology-II	4	120	16	44	24	36
SEMESTER-III							
3BSC1	Hindi Language aur Samvedana	2	60	8	34	-	18
3BSC2	Environmental Studies	2	60	8	34	-	18
3BSC3	Botany-III	4	120	16	44	24	36
3BSC4	Chemistry-III	4	120	16	44	24	36
3BSC5	Zoology-III	4	120	16	44	24	36
SEMESTER-IV							
4BSC1	English Language and Scientific Temper	2	60	8	34	-	18
4BSC2	Environmental Study	2	60	8	34	-	18
4BSC3	Botany-IV	4	120	16	44	24	36
4BSC4	Chemistry-IV	4	120	16	44	24	36
4BSC5	Zoology-IV	4	120	16	44	24	36
SEMESTER-V							
5BSC1	Hindi Language (Bhasha Kaushal aur Sanchar Sadhan)	2	60	8	34	-	18
5BSC2	Computer & Information Technology Basics-I	2	60	8	22	12	18
5BSC3	Botany-V	4	120	16	44	24	36
5BSC4	Chemistry-V	4	120	16	44	24	36
5BSC5	Zoology-V	4	120	16	44	24	36
SEMESTER-VI							
6BSC1	English Language and Aspects of Development	2	60	8	34	-	18
6BSC2	Computer & Information Technology Basics-II	2	60	8	22	12	18
6BSC3	Botany-VI	4	120	16	44	24	36
6BSC4	Chemistry-VI	4	120	16	44	24	36
6BSC5	Zoology-VI	4	120	16	44	24	36

**STUDY MODULES AND BOOKS INFORMATION**

Course Code	Name of the Course	Module/Books to be used	Publisher
<b>SEMESTER-I</b>			
1BSC1	Hindi Language Structure - I	Module Published by CVRU	Ram Prasad & Sons
1BSC2	Entrepreneurship Development	Module Published by CVRU	Ram Prasad & Sons
1BSC3	Botany-I	Module Published by CVRU	Ram Prasad & Sons
1BSC4	Chemistry-I	Module Published by CVRU	Ram Prasad & Sons
1BSC5	Zoology-I	Module Published by CVRU	Ram Prasad & Sons
<b>SEMESTER-II</b>			
2BSC1	English Language and Indian Culture	Module Published by CVRU	Ram Prasad & Sons
2BSC2	Development of Entrepreneur	Module Published by CVRU	Ram Prasad & Sons
2BSC3	Botany-II	Module Published by CVRU	Ram Prasad & Sons
2BSC4	Chemistry-II	Module Published by CVRU	Ram Prasad & Sons
2BSC5	Zoology-II	Module Published by CVRU	Ram Prasad & Sons
<b>SEMESTER-III</b>			
3BSC1	Hindi Language aur Samvedana	Module Published by CVRU	Ram Prasad & Sons
3BSC2	Environmental Studies	Module Published by CVRU	Ram Prasad & Sons
3BSC3	Botany-III	Module Published by CVRU	Ram Prasad & Sons
3BSC4	Chemistry-III	Module Published by CVRU	Ram Prasad & Sons
3BSC5	Zoology-III	Module Published by CVRU	Ram Prasad & Sons
<b>SEMESTER-IV</b>			
4BSC1	English Language and Scientific Temper	Module Published by CVRU	Ram Prasad & Sons
4BSC2	Environmental Study	Module Published by CVRU	Ram Prasad & Sons
4BSC3	Botany-IV	Module Published by CVRU	Ram Prasad & Sons
4BSC4	Chemistry-IV	Module Published by CVRU	Ram Prasad & Sons
4BSC5	Zoology-IV	Module Published by CVRU	Ram Prasad & Sons
<b>SEMESTER-V</b>			
5BSC1	Hindi Language (Bhasha Kaushal aur Sanchar Sadhan)	Module Published by CVRU	Ram Prasad & Sons
5BSC2	Computer & Information Technology Basics-I	Module Published by CVRU	Ram Prasad & Sons
5BSC3	Botany-V	Module Published by CVRU	Ram Prasad & Sons
5BSC4	Chemistry-V	Module Published by CVRU	Ram Prasad & Sons

5BSC5	Zoology-V	Module Published by CVRU	Ram Prasad & Sons
<b>SEMESTER-VI</b>			
6BSC1	English Language and Aspects of Development	Module Published by CVRU	Ram Prasad & Sons
6BSC2	Computer & Information Technology Basics-II	Module Published by CVRU	Ram Prasad & Sons
6BSC3	Botany-VI	Module Published by CVRU	Ram Prasad & Sons
6BSC4	Chemistry-VI	Module Published by CVRU	Ram Prasad & Sons
6BSC5	Zoology-VI	Module Published by CVRU	Ram Prasad & Sons

**DATE SCHEDULE & INSTRUCTIONS FOR SUBMITTING ASSIGNMENTS**

<b>DUE DATE OF SUBMISSION OF ALL ASSIGNMENTS AT THE STUDY CENTRE</b>		
<b>Semester</b>	<b>Assignment No.</b>	<b>Due Date</b>
First Semester	1BSC1 1BSC2 1BSC3 1BSC4 1BSC5	<ul style="list-style-type: none"> <li>• April 30 (for January Session )</li> <li>• October 31 (for July session)</li> </ul>
Second Semester	2BSC1 2BSC2 2BSC3 2BSC4 2BSC5	<ul style="list-style-type: none"> <li>• October 31 (for January session)</li> <li>• April 30 (for July session)</li> </ul>
Third Semester	3BSC1 3BSC2 3BSC3 3BSC4 3BSC5	<ul style="list-style-type: none"> <li>• April 30 (for January Session )</li> <li>• October 31 (for July session)</li> </ul>
Fourth Semester	4BSC1 4BSC2 4BSC3 4BSC4 4BSC5	<ul style="list-style-type: none"> <li>• October 31 (for January session)</li> <li>• April 30 (for July session)</li> </ul>
Fifth Semester	5BSC1 5BSC2 5BSC3 5BSC4 5BSC5	<ul style="list-style-type: none"> <li>• April 30 (for January Session )</li> <li>• October 31 (for July session)</li> </ul>
Sixth Semester	6BSC1 6BSC2 6BSC3 6BSC4 6BSC5	<ul style="list-style-type: none"> <li>• October 31 (for January session)</li> <li>• April 30 (for July session)</li> </ul>

## INSTRUCTIONS TO STUDENTS FOR FORMATTING THE ASSIGNMENTS

### सत्रीय कार्य हेतु छात्रों के लिये निर्देश

1. This booklet contains the assignments for the entire (All Semester) programme. Each course has one assignment. All assignments should be completed and submitted at IODE CVRU/ study centre before the due date.

इस पुस्तिका में पूरे पाठ्यक्रम के लिये (सभी सेमेस्टर) के सत्रीय कार्य दिये गये हैं। प्रत्येक पाठ्यक्रम के लिये एक सत्रीय कार्य दिया गया है जिसे पूर्ण करने के पश्चात निर्धारित तिथि तक डॉ. सी. वी. आर.यु. के दूरस्थ शिक्षा संस्थान / अध्ययन केन्द्र को भेजना आवश्यक है।

2. Please note that you will not be allowed to appear for the Term End Examinations for the course, until the assignments are submitted before the due date.

कृपया ध्यान रहे जब तक सत्रीय कार्य निर्धारित तिथि तक जमा नहीं होंगे, आप सत्रांत परीक्षा में नहीं बैठ सकेंगे।

3. The assignments constitute the continuous component of the evaluation process and have 30% weightage in the final grading. You need to score minimum marks as per Examinations Scheme of Particular Programme in assignment in each course in order to clear the continuous evaluation component.

सत्रीय कार्य सतत् मूल्यांकन का महत्वपूर्ण अंग है एवं अन्तिम ग्रेडिंग में 30 प्रतिशत अंक निर्धारित हैं। सतत् मूल्यांकन में उत्तीर्ण करने हेतु प्रत्येक सत्रीय कार्य में संबंधित कार्यक्रम के परीक्षा योजना के अनुसार न्यूनतम अंक प्राप्त करना अनिवार्य है।

4. The assignment should be hand written on a A-4 size paper with proper cover which contains all the required information as given on the next page. You can use the photocopy of the cover for each assignment.

सत्रीय कार्य ए-4 साइज पेपर पर हस्तलिखित होना चाहिए तथा उस पर अगले पृष्ठ पर दिये गये कवर के अनुसार सभी जानकारी लिखी होनी चाहिए। (आप चाहें तो कवर की फोटोप्रति प्रत्येक सत्रीय कार्य पर लगाकर प्रयुक्त कर सकते हैं)

5. Leave at least 4cm margin on the left, top and bottom of your answer sheets for the evaluator's comments.

प्रत्येक पृष्ठ पर बायें, ऊपर एवं नीचे कम से कम 4 सें.मी. जगह छोड़ें जो मूल्यांकनकर्ता अपनी टिप्पणी के लिये प्रयोग करेगा।

6. Your answers should be brief, precise and in your own words. Please do not copy the answers from the study material.

सत्रीय कार्य के प्रश्नों के उत्तर संक्षेप, स्पष्ट एवं स्वयं के शब्दों में होना चाहिए। उत्तर स्टडी मटेरियल की कॉपी नहीं होना चाहिये।

7. Please do not copy the assignment from other student.

कृपया सत्रीय कार्य दूसरे छात्र से कॉपी न करें।

8. While solving the questions, clearly indicate the question number along with the part being solved. Recheck your work before submitting it.

प्रश्नों के उत्तर लिखते समय, प्रश्न संख्या अथवा उसके भाग का स्पष्ट उल्लेख करें। सत्रीय कार्य जमा करते समय एक बार पुनः जांच कर लें।

9. You may retain a copy of your assignment response to avoid any unforeseen situation.

सत्रीय कार्य की एक प्रतिलिपि अपने पास रखें ताकि किसी अनहोनी घटना से बचा जा सके।

10. You can resolve the difficulties you may face while studying the course material by sending an e-mail to Programme coordinator IODE CVRU/ study centre coordinator. However, the coordinator will not provide solutions to the assignment questions, since they constitute an evaluation component.

पाठ्यक्रम सामग्री के अध्ययन के समय यदि कोई कठिनाई होती है तो उसके निराकरण हेतु कार्यक्रम समन्वयक दूरस्थ शिक्षा संस्थान डॉ. सी. वी. रामन् विष्वविद्यालय / अध्ययन केन्द्र के समन्वयक से ई-मेल द्वारा संपर्क किया जा सकता है। परंतु समन्वयक सत्रीय कार्य के प्रश्नों के उत्तर नहीं देंगे क्योंकि ये मूल्यांकन पद्धति के अंग हैं।

**Note:** Assignments of the course are available for download at the CVRU Website <http://www.cvrु.ac.in> . You can download the assignments as per your course, follow the instructions given and submit it before due dates at the IODE CVRU/study centre.

### Note

[illegible]