

GOVT. BILASA GIRLS' P.G. (Auto.) COLLEGE

Link Road, Bilaspur (C.G.)

Phone No. : 07752-224249, Website : www.bilasagrilscollege.ac.in



SYLLABUS

**B.Sc. Food & Quality Control
Semester - I & II**

2021-22



Rules and Regulations for the Semester System at the Graduation Level

1. These subjects are compulsory for all students:-
 - (a) Environmental Studies (I Semester)
 - (b) English Language (II and III Semester)
 - (c) Hindi Language (IV and V Semester)
 - (d) Skill Based Course (VI Semester)
2. In each semester there will be only one theory paper in each elective Subject.
3. For Honours Degree Course, there will be one additional theory paper in each semester i.e. semesters, III to VI.
For Honours Degree Course, separate practical classes will be held round the year but the examinations shall be held only in even semesters i.e. semesters II, IV and VI.
4. **Marks Pattern:-**
 - (i) For non practical subjects, each theory paper will be of 100 marks i.e. 80 External + 20 Internal.
 - (ii) For practical subjects, each theory paper will be of 75 marks i.e. 60 External + 15 Internal.
 - (iii) Practical examination will be of 50 marks. Practical Classes will be held round the year but examination shall be held only in even semesters i.e. semesters II, IV and VI.
5. **Theory Examination:-**
Duration for theory examination shall be of two and half hours.
6. **Practical Examination:-**
Duration for Practical examination shall be as suggested in the syllabi.
7. **Admission Period:-**
 - (i) Admissions in the First Semester shall be completed before 15th of July every year.
 - (ii) Admissions in Semesters i.e. II, III, IV, V and VI shall be completed within 7 days after the completion of examinations on the provisional basis.
 - (iii) The provisional admission shall be regularized within 7 days from the date of declaration of result.
 - (iv) Request for permission for late admission shall not be entertained.
8. **Schedule of Classes-**
 - (i) I Semester's classes will be commenced from 16th of July every year
 - (ii) III and V Semester's classes will be commenced from 2nd July every year.
 - (iii) II, IV and VI Semester's classes will be commenced from 2nd January every year.
 - (iv) All the classes shall be continued till seven days prior to the commencement of the examination.
9. **Examination Schedule- Tentative Schedules of examinations are as under-**
 - (i) Odd semester (I, III & V) - 20th November to 20th December.
 - (ii) Even semester (II, IV & VI) - 15th April to 14th May.
10. **Examination Pattern -**
 - (a) Questions will be asked Unit wise and Section wise. Questions will be set from all Units Covering the entire syllabi.
 - (b) For non practical subjects, maximum marks will be 80 (External).
 - (c) For the practical based subjects, maximum marks will be 60 (External).
 - (d) In each theory paper there will be three sections and the marks distributed for different sections will be in the following pattern -

**Theory (Non- Practical):- There will be three sections A, B and C in the question paper.
Section - A Objective Type/ In few words (30 words)**

There will be 15 questions to be set, three from each unit and 10 to be attempted. Each question will carry 2 marks.

Section - B Short Answer Type (60 words)

There will be 5 questions to be set, 1 from each unit and all five questions to be attempted. Each question will carry 6 marks.

Section - C Long Answer / Eassy Type Question

There will be 5 questions to be set, 1 from each unit and 2 to be attempted. Each question will carry 15 marks.

Marks Scheme for - Non-practical subject -

Types of Questions	Question to be set from each Unit	Total No. of Questions	Questions to be solved	Marks assigned	Total Marks
Objective / In few words	03	15	10	02	20
Short Answer Type Questions	01	05	05	06	30
Long / Essay type of questions	01	05	02	15	30
					Total - 80

(i) **Theory (Practical Subject):-** There will be three sections A, B and C in the question paper.

Section - A Objective Type/ In few words (30 words)

There will be 15 questions to be set, three from each unit and 10 to be attempted. Each question will carry 2 marks.

Section - B Short Answer Type (60 words)

There will be 5 questions to be set, 1 from each unit and all five questions to be attempted. Each question will carry 4 marks.

Section - C Long Answer / Eassy Type Question

There will be 5 questions to be set, 1 from each unit and 2 to be attempted. Each question will carry 10 marks.

Marks Scheme for - Practical Subject -

Types of Questions	Question to be set from each Unit	Total No. of Questions	Questions to be solved	Marks assigned	Total Marks
Objective / In few words	03	15	10	02	20
Short Answer Type Questions	01	05	05	04	20
Long / Essay type of questions	01	05	02	10	20
					Total - 60

For question papers of compulsory papers of General group subjects i.e. Environmental Studies, English Language, Hindi Language and Skill Based Course, the pattern of question shall be applicable as suggested by the concerned Board of Studies.

(ii) **Practical**

	<i>Each Practical</i>
Laboratory Note Book / Project	10
Vive voce	10
Lab work / Field work	30
Total - 50	

- (e) In odd semester examination, a candidate shall appear in papers of odd semester(s) only. Similarly in even semester examinations, a candidate shall appear in papers of even semester(s) only. Papers of odd and even semesters shall not be confined in one examination.
- (f) Minimum passing marks for external/ semester end theory and practical shall be 34%.

- (g) There shall be provision of 3 grace marks and it would be distributed in maximum two theory Papers / Practical.

Internal Assessment

- Internal Tests are compulsory for theory papers and must be held as per following calendar:-

Odd Semesters 1st Test - August, 2nd Test - October and 01 Assignment (during semester)

Even Semesters 1st Test - February, 2nd Test - March and 01 Assignment (during semester)

- Each test & Assignment will be of 20 marks for the subjects without practical & 15 marks for the subjects having practicals. Average of the marks obtained in the best of two tests & assignment shall be incorporated as the final marks. Qualifying marks is 40%.
- If a candidate failed to attend the test on bonafide grounds, one special test may be arranged on the production of relevant documents, before submission of application forms and fees to the office.
- The Unit tests/Assignment marks to be sent to the examination cell of the college as per notification to be issued by the Principal/ Controller Examination from time to time.
- If a candidate (whose status is Regular / Ex/Supplementary) failed in First Year of the current session (2013-14) of annual system will be appeared in the first semester examination as ex-student with under the rules and regulations of Semester System. Number of Internal Test of passed year (2013-14) will not be incorporated or carried forward.

	Non Practical Subject		Practical Subject	
	External	Internal	External	Internal
MAX MARKS	80	20	60	15
MIN MARKS	28	08	21	06

Eligibility criteria for appearing in the examinations

- A candidate should have 75% of attendance both in theory and practical classes. 65% attendance may be considered only on special circumstances and on certification by the Principal of the college.
- A candidate shall have to qualify in the internal tests securing at least 40% marks.
- A candidate shall be allowed to appear in those papers only in which she has secured qualifying marks in internal test.
- If a candidate after taking admission in 1st semester could not continue the classes or could not obtain eligibility cannot appear in the 1st semester examinations. In such cases the student will not be allowed to continue in second semester and she has to continue the classes and obtain eligibility in 1st semester again in next academic year as ex-student.

11. Lecture Periods /Classes

There shall be a minimum of 50-60 hours Classes for each theory papers in respective course. Minimum of 50-60 hours shall be for each practical paper. This shall be strictly adhered to.

12. Other Guidelines

- There will be no provision for Revaluation, Supplementary or Betterment (Division Improvement).
- A candidate has to clear all the papers within 12 semesters (six years) from the year of first admission in the programme.
- A candidate will choose Honours subject just before the start of third semester from any one of the three elective subjects /group selected by her in the first semester. A candidate can change the Honours subject within 15 days from the date of admission in the third semester.
- The system of credit of ten point scale examination marks in the final mark sheet shall be introduced only after its formal approval by the competent authorities.

- (v) The system of Choice based credit system and Gradation system shall be introduced only after its formal approval by the competent authorities.

For Honours Degree Course (Total Marks: 2800).

13. Admission -

The process of admission in Honours Degree Course will be as follows -

- (i) Student shall select course (Pass Course / Honours Degree Course) at the time of first admission in the college.
- (ii) Admission shall be on merit basis after receiving the application from students.
- (iii) Number of seats for Honours Degree Course will be decided as per the Govt. Rules.

(A) Each theory Paper (Non Practical Subject)

<i>Each Theory Paper</i>		<i>Internal Assessment</i>	
Full Marks	Minimum Passing 34%	Full Marks	Minimum Marks 40%
80	28	20	08

(B) Each theory Paper (Practical Subject)

<i>Each Theory Paper</i>		<i>Internal Assessment</i>	
Full Marks	Minimum Passing 34%	Full Marks	Minimum Marks 40%
60	21	15	06

(C) Each Practical Paper

<i>Minimum Passing Percentage</i>	<i>Full Marks</i>	<i>Minimum Passing Marks</i>
34%	50	17

(D) Grace Marks

Total/Maximum 03 in two theory paper/practical.

Amendments in Promotion Rules for Semester System at the Graduation Level

- (a) A Candidate is eligible to continue the second semester classes immediately after the 1st Semester examinations and can appear in the 2nd semester examinations notwithstanding the number of arrear papers in 1st semester provided she must have appeared in the 1st semester examination.
- (b) A candidate will be promoted to 3rd semester with not more than two papers of 1st semester and she will continue to attend classes of 3rd semester provisionally. She will be allowed to get final admission in the 3rd semester with maximum of four back papers in all 1st semester and 2nd semester.
- (c) A Candidate is eligible to continue the 4th semester classes immediately after 3rd semester examination and can appear in the 4th semester examination with maximum 2 back papers in 1st semester and/or any numbers of back papers in 2nd and 3rd semester.
- (d) A candidate will be promoted in 5th semester with not more than 2 back papers in 3rd semester and not more than 4 back papers in all 3rd and 4th semester provided she has cleared 1st and 2nd semester examination.
- (e) A candidate is eligible to continue the 6th semester immediately after the 5th semester examination and can appear in 6th semester examination with maximum of 2 back papers in 3rd semester and/or any number of back papers in 4th and 5th semester examination.
- (f) If a Candidate of 6th Semester is passed in all the semesters except the 5th Semester with back examination of 6th Semester, she is allowed to appear in the back paper of the 5th Semester with the

- (g) The students at the UG Level can view their valued answer copies and apply for the **Challenged Valuation** within 03 days from the date of the declaration of the result.
- (h) A candidate will be eligible to get Graduation and Graduation Honours degree after passing all the six semester examination. For clearing all semester papers a candidate will be given a period 6 years (12 semesters) from the year of first admission.

सेमेस्टर स्नातक स्तर प्रमोशन नियम

प्रथम सेमेस्टर में प्रवेश की पात्रता:-

- प्रथम सेमेस्टर में छात्राओं का प्रवेश छ.ग. शासन के प्रवेश नियम के आधार पर किया जावेगा।

द्वितीय सेमेस्टर में प्रवेश की पात्रता:-

- विद्यार्थी को प्रथम सेमेस्टर की परीक्षा के तत्काल बाद कितने भी विषयों में बैक के साथ द्वितीय सेमेस्टर में अध्ययन की पात्रता होगी, बशर्ते वह प्रथम सेमेस्टर की परीक्षा में शामिल हुआ हो।

तृतीय सेमेस्टर में प्रवेश की पात्रता:-

- प्रथम सेमेस्टर में 02 से अधिक विषयों में बैक नहीं होना चाहिए।
- प्रथम एवं द्वितीय सेमेस्टर में सम्मिलित रूप से 04 विषयों से अधिक में बैक न हो।

चतुर्थ सेमेस्टर में प्रवेश की पात्रता:-

- प्रथम सेमेस्टर में 02 से अधिक विषयों में बैक नहीं होना चाहिए।
- द्वितीय एवं तृतीय सेमेस्टर में कितने भी विषयों में बैक हो।

पंचम सेमेस्टर में प्रवेश की पात्रता:-

- प्रथम सेमेस्टर उत्तीर्ण होना चाहिए।
- द्वितीय सेमेस्टर उत्तीर्ण होना चाहिए।
- तृतीय सेमेस्टर में 02 से अधिक विषयों में बैक न हो।
- तृतीय एवं चतुर्थ सेमेस्टर में सम्मिलित रूप से 04 विषयों से अधिक में बैक न हो।

षष्ठम सेमेस्टर में प्रवेश की पात्रता:-

- प्रथम सेमेस्टर उत्तीर्ण होना चाहिए।
- द्वितीय सेमेस्टर उत्तीर्ण होना चाहिए।
- तृतीय सेमेस्टर में 02 से अधिक विषयों में बैक न हो।
- चतुर्थ एवं पंचम सेमेस्टर में कितने भी विषयों में बैक हो।
- यदि कोई छात्रा सभी सेमेस्टर में उत्तीर्ण है एवं केवल पंचम सेमेस्टर में 01 (एक) विषय में बैक है, ऐसी छात्रा को षष्ठम सेमेस्टर की परीक्षा के साथ परीक्षा देने का अवसर दिया जावेगा।
- विशेष -
 - ✓ मूल्यांकित उत्तर-पुस्तिकाओं के अवलोकन व Challenged Valuation की प्रक्रिया इस स्नातक स्तर सेमेस्टर परीक्षा अप्रैल-मई से लागू है। छात्राएं परीक्षा परिणाम घोषित होने की तिथि से 3 दिन के भीतर इस हेतु आवेदन प्राचार्य को दे सकती हैं।
 - ✓ विद्यार्थी को स्नातक एवं स्नातक आर्नस की उपाधि तभी प्राप्त होगी जबकि उसने सभी 06 सेमेस्टर की परीक्षाएँ उत्तीर्ण कर ली हों एवं 06 सेमेस्टर की परीक्षाएँ उत्तीर्ण करने हेतु उसे प्रथम प्रवेश की तिथि से लेकर 06 वर्षों की अवधि प्राप्त होगी।
 - ✓ छात्रा जिस सत्र बैक की परीक्षा में सम्मिलित होगी उसी सत्र का पाठ्यक्रम एवं परीक्षा संबंधी नियम लागू होगा।

1

**BCMP - 101
SEMESTER - I
ENVIRONMENTAL STUDIES
PAPER - I**

M.M. 60

SYLLABUS FOR ENVIRONMENTAL STUDIES" FOR UNDER GRADUATE
UNIT-I THE MULTI DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES :

Definition, scope and importance Need for public awarness.

Natural Resources :

Renewable and nonrenewable resources :

Natural resources and associated Problems.

(a) Forest resources : Use and over-exploitation, deforestation, case studies, Timber extraction, mining dams and their effects on forests and tribal people.

(b) Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.

(c) Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) food resources : Word food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilize-pesticide problems, water logging, salinity, case studies.

(e) Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.

(f) Land resources : Land as a resources, land degradation, man induced landslides, soil erosion and desertification.-Role of an individual in conservation of natural resources.

-Equitable use of resources for sustainable life-styles. (9 Lecture)

UNIT-II

(a) ECOSYSTEMS

Concept of an ecosystems. Structure and function of an ecosystem.

- Producers, consumers and decomposers

- Energy flow in the ecosystem.

- Ecological succession.

- Food chains, food webs and ecosystem.

- Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem

b. Grassland ecosystem

c. Desert ecosystem

d. Aquatic ecosystems (Ponds, streams, lakes, rivers, oceans, estuaries) (9 Lecture)

(b) Biodiversity and its Conservation

- Introduction - Definition : genetic, species and ecosystem diversity.

- Biogeographically classification of India.

- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.

- Biodiversity at global, National and local levels.

- 2
- India as mega-diversity nation.
 - Hot-spots of biodiversity :
 - Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
 - Endangered and endemic species of India.
 - Conservation of biodiversity : In situ and Ex-situ conservation of biodiversity. (9 Lecture)

UNIT-III

(A) Environmental Pollution

Definition Causes, effects and control measures of -

- a. Air pollution.
- b. Water pollution.
- c. Soil pollution.
- d. Marine pollution.
- e. Noise pollution.
- f. Nuclear hazards.

Soil waste management : Causes, effects and control measures of urban and industrial wastes.

Role of an individual in prevention of pollution.

Pollution case studies

Disaster management : floods, earthquake, cyclone and Landslides.

(B) Social Issues and the Environment

From Unsustainable to Sustainable development.

- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people, its problems. Case studies.
- Environmental ethics : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Role of Information Technology in Environment and Human Health.
- Case Studies. (9 Lecture)

UNIT-IV

General Background And Historical Perspective-Historical Development AND Concept Of Human Rights-Meaning and Definitions of human rights, kind and classifications of human rights

Protections of human rights under the UNO Charter, protection of human rights under the universal declaration of human rights 1948.

Convention on the elimination of all forms of Discrimination against women.

Convention on the rights of the child 1989.

Unit-V

Impact of human rights Norms in India, Human rights under the constitution of India. Fundamental rights under the constitution of india, Directive Principles of state policy under the constitution of india, Enforcement of human rights in india

Protection of human rights under the human rights act 1993-national human rights commission state human rights commission and human rights court in india.

Fundamental duties under the constitution of india.

Field work

FIELD WORK

Visit to a local area to document environmental assets-river/forest/grassland/hill/mountain.

Visit to local polluted site : Urban/Rural/Industrial/Agriculture.

Study of common plants, insects, birds.

Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours)

REFERENCES :

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2. Bhairucha Erach, the Biodiversity of India, Mapin Publishing Pvt. Ltd Ahmedabad 380 013, India, Email : mapin @ ice net net (R)
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4. Clark R.S. Marine Pollution, Calderon Press Oxford (TB)
5. Cunningham, W.P. Cooper, T.H. Gorhani E & Hepworth, M.T. 200
6. Dr. A.K. Environmental Chemistry Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment (R)
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9. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Mumbai (R).
10. Heywood, V.H. & Watson, R.T. 1995 Global Biodiversity Assessment, Cabridge Univ. Press 1140p.
11. Jadhav H. & Bhosale, V.H. 1995, Environmental Protection and Laws Himalaya Pub. House. Delhi 284p.
12. McKinney M.L. & School R.M. 1996, Environmental Science Publication (TB).
13. Mhaskar A.K., Matter Hazardous. Techno-Science Publication (TB).
14. Miller T.G Jr., Environmental Science, Wadsworth Publishing Co. (TB)
15. Odum. e.P. 1971, Fundamentals of Ecology, W.B. Saunders Co. USA 574p.
16. Rao M.N. & Datta, A.K. 1987, Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.

BCMP - 102
SEMESTER - I
FINANCIAL ACCOUNTING
PAPER - II

M.M. 80

Unit -1 Concept of Double Entry System

Preparation of journal.sub division of Journal: Cash book, preparation of Ledger, Prep of trial balance, capital & Revenue, Accounting standard Meaning, defination AS to

Unit - II Final Accounts with Adjustment

Trading Profit & Loss a/c ,Balance sheet, adjustment entries.

Unit - III Cocept of depreciation

Accounting for depreciation(As per accounting standard 6) Fixed Installment M Diminishing Balance method, Annuity Method, depreciation Fund method, Provisio Reserves.

unit - IV Special Accounting Areas :

Hire-purchase and installment purchase system : Meaning of hirepurchase contract provision regarding hire-purchase contract;

Accounting for goods of substantial sale values, installment purchase system.

Unit - V Partnership

Dissolution of Partnership firm, Amalgamation of Partnership Firm..

SUGGESTED READINGS :

1. Anthony. R.N. and Reece. J.S. : Accounting Principles : Richard Irwin Inc.
2. Gupta. R.L. and Radhaswamy. M: Finacial Accounting : Sultan chand and Sons. Delhi.
3. Monga J.R. Ahuja Girish, and Sehgal Ashok : Financial Accountion : Mayur Paper E Noida.
4. Shikla. M.C. Grewal T.S. and Gupta, S.C. Advanced Accounts; S.Chand & Co. Delhi.
5. Compendium of Statement and Standards of Accounting : The Institite of Chart Accountants of India New Delhi.
6. Agrawala A.N. Agrawala K.N. Higher Sciences of Accountancy : Kitab Mahal, Allahat
7. Shukla S. M. Financial Accounting, Sahitya Bhavan Agra.
8. Singh S. K. Financial Accounting, SBPD publication Agra.

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5

NEW CURRICULUM OF B.Sc. CHEMISTRY
SEMESTER I (2021-2022)
MM-60: HOURS-45, CREDIT-3

The new curriculum will comprise of one theory paper OF 60 marks in each semester and practical work of 50 mark per year. The curriculum is as per the UGC norms & conforming to the directives of the Govt. of Chhattisgarh.

UNIT-I

A. ATOMIC STRUCTURE

Bohr's theory, its limitation and atomic spectrum of hydrogen atom. General idea of de-Broglie matter-waves, Heisenberg uncertainty principle, Schrödinger wave equation, significance of Ψ and Ψ^2 , radial & angular wave functions and probability distribution curves, quantum numbers, Atomic orbital and shapes of s, p, d orbitals, Aufbau and Pauli exclusion principles, Hund's Multiplicity rule, electronic configuration of the elements.

B. PERIODIC PROPERTIES

Detailed discussion of the following periodic properties of the elements, with reference to s and p-block. Trends in periodic table and applications in predicting and explaining the chemical behavior.

- a) Atomic and ionic radii,
- b) Ionization enthalpy,
- c) Electron gain enthalpy,
- d) Electronegativity, Pauling's, Mulliken's, Allred Rochow's scales.
- e) Effective nuclear charge, shielding or screening effect, Slater rules, variation of effective nuclear charge in periodic table.

UNIT-II

A. CHEMICAL BONDING I

Ionic bond: Ionic Solids - Ionic structures, radius ratio & co-ordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy Born- Haber cycle, Solvation energy and solubility of ionic solids, polarising power & polarisability of ions, Fajans rule, Ionic character in covalent compounds: Bond moment and dipole moment, Percentage ionic character from dipole moment and electronegativity difference, Metallic bond-free electron, Valence bond & band theories.

B. CHEMICAL BONDING II

Covalent bond: Lewis structure, Valence bond theory and its limitations, Concept of hybridization, Energetics of hybridization, equivalent and non-equivalent hybrid orbitals. Valence shell electron pair repulsion theory (VSEPR), shapes of the following simple molecules and ions containing lone-pairs and bond pairs of electrons: H₂O, NH₃, PCl₃, PCl₅, SF₆, H₃O⁺, SF₄, ClF₃, and ICl₂- Molecular orbital theory. Bond order and bond

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strength, Molecular orbital diagrams of diatomic and simple polyatomic molecules N_2 , O_2 , F_2 , CO , NO .

UNIT-III

BASICS OF ORGANIC CHEMISTRY

Hybridization, Shapes of molecules, Influence of hybridization on bond properties. Electronic Displacements: Inductive, electromeric, resonance and mesomeric effects, hyperconjugation and their applications; Dipole moment. Electrophiles and Nucleophiles; Nucleophilicity and basicity; Homolytic and Heterolytic cleavage, Generation, shape and relative stability of Carbocations, Carbanions, Free radicals, Carbenes and Nitrenes. Introduction to types of organic reactions: Addition, Elimination and Substitution reactions.

UNIT-IV

STEREOCHEMISTRY & CONFORMATIONAL ANALYSIS

Optical Isomerism: Optical Activity, Specific Rotation, Chirality/Asymmetry, Enantiomers, Molecules with two or more chiral-centres, Diastereoisomers, meso compounds, Relative and absolute configuration: Fischer, Newmann and Sawhorse Projection formulae and their interconversions; Erythrose and threose, D/L, d/l system of nomenclature, Cahn-Ingold-Prelog system of nomenclature (C.I.P rules), R/S nomenclature. Geometrical isomerism: cis-trans, syn-anti and E/Z notations. Conformational analysis of alkanes, ethane, butane, cyclohexane and sugars. Relative stability and Energy diagrams. Types of cycloalkanes and their relative stability, Baeyer strain theory: Theory of strainless rings, Chair, Boat and Twist boat conformation of cyclohexane with energy diagrams; Relative stability of mono-substituted cycloalkanes and disubstituted cyclohexane.

UNIT-V

A . MATHEMATICAL CONCEPTS FOR CHEMIST

Basic Mathematical Concepts: Logarithmic relations, curve sketching, linear graphs, Properties of straight line, slope and intercept, Functions, Differentiation of functions, maxima and minima; integrals; ordinary differential equations; vectors and matrices; determinants; Permutation and combination and probability theory, Significant figures and their applications.

B . GASEOUS STATE CHEMISTRY

Kinetic molecular model of a gas: postulates and derivation of the kinetic gas equation; collision frequency; collision diameter; mean free path; Maxwell distribution and its use in evaluating molecular velocities (average, root mean square and most probable) and average kinetic energy, law of equipartition of energy, degrees of freedom and molecular basis of heat capacities. Joule Thompson effect, Liquification of Gases. Behaviour of real gases: Deviations from ideal gas behaviour, compressibility factor (Z), and its variation with pressure and temperature for different gases. Causes of deviation from ideal behaviour. van der Waals equation of state, its derivation and application in explaining real gas behaviour, calculation of Boyle temperature. Isotherms of real gases and their comparison with van der Waals isotherms, continuity of states, critical state,

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relation between critical constants and van der Waals constants, law of corresponding states.

REFERENCE BOOKS:

1. Lee, J. D. Concise Inorganic Chemistry ELBS, 1991.
2. Douglas, B.E. and McDaniel, D.H. Concepts & Models of Inorganic Chemistry Oxford, 1970
3. Atkins, P.W. & Paula, J. Physical Chemistry, 10th Ed., Oxford University Press, 2014.
4. Day, M.C. and Selbin, J. Theoretical Inorganic Chemistry, ACS Publications, 1962.
5. Rodger, G.E. Inorganic and Solid State Chemistry, Cengage Learning India Edition, 2002.
6. Puri, B. R., Sharma, L. R. and Kalia, K. C., Principles of Inorganic Chemistry, Milestone Publishers/ Vishal Publishing Co.; 33rd Edition 2016
7. Madan, R. D. Modern Inorganic Chemistry, S Chand Publishing, 1987.
8. Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd.(Pearson Education).
9. Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
10. Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
11. Eliel, E. L. & Wilen, S. H. Stereochemistry of Organic Compounds. Wiley: London, 1994.
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13. McMurry, J.E. Fundamentals of Organic Chemistry, 7th Ed. Cengage Learning India Edition, 2013.
14. Organic Chemistry, Paula Y. Bruice, 2nd Edition, Prentice-Hall, International Edition (1998).
15. A Guide Book of Reaction Mechanism by Peter Sykes.
16. Atkins, P. W. & Paula, J. de Atkin's Physical Chemistry 10th Ed., Oxford University Press (2014).
17. Ball, D. W. Physical Chemistry Thomson Press, India (2007).
18. Castellan, G. W. Physical Chemistry 4th Ed. Narosa (2004).
19. Mortimer, R. G. Physical Chemistry 3rd Ed. Elsevier: NOIDA, UP (2009).
20. Engel, T. & Reid, P. Physical Chemistry 3rd Ed. Pearson (2013).
21. Puri, B.R., Sharma, L. R. and Pathania, M.S., Principles of Physical Chemistry, Vishal Publishing Co., 47th Ed. (2016).
22. Bahl, A., Bahl, B.S. and Tuli, G.D. Essentials of Physical Chemistry, S Chand Publ. (2010).
23. Rakshit P.C., Physical Chemistry, Sarat Book House Ed. (2014).

The bottom of the page contains several handwritten signatures and initials. From left to right, there are: a signature that appears to be 'M', a signature that appears to be 'A', a signature that appears to be 'Rakshit', a signature that appears to be 'D. B.', and a signature that appears to be 'Nishi'. There are also some other scribbles and initials scattered around.

B. Sc. First Semester: BOTANY

Core Course -CCB – 01

[*Biodiversity (Microbes, Algae, Fungi and Archegoniate)*]

(Credits: Theory-3, Practicals-2)

THEORY: Lectures – 45 Hours / 68-70 Periods

Unit 1: Microbes (09 Hours / 14 Periods)

Viruses – Discovery, general structure, multiplication, DNA virus (T-phage); Lytic and lysogenic cycle, RNA virus (TMV); Economic importance; Bacteria – General characters and cell structure; Reproduction – vegetative, asexual and recombination (conjugation, transformation and transduction); General account of Actinomycetes; Economic importance.

Unit 2: Algae (09 Hours / 14 Periods)

General characteristics: Range of thallus organization and reproduction; Classification of algae; Morphology and life-cycles of the following: *Volvox*, *Oedogonium*, *Chara*, *Vaucheria*, *Sargassum*, *Polysiphonia*. General account of Cyanobacteria; Economic importance of algae

Unit 3: Fungi (09 Hours / 14 Periods)

General characteristics, range of thallus organization, nutrition, reproduction and classification; life cycle of *Rhizopus*, *Penicillium*, *Puccinia*, *Agaricus*, *Alternaria* & *Colletotrichum*; Symbiotic Associations-Lichens: General account, reproduction and significance; Mycorrhiza: ectomycorrhiza and endomycorrhiza and their significance

Unit 4: Amphibious and Early land plants (09 Hours / 14 Periods)

Bryophytes: General characteristics, adaptations to land habit, Classification, Range of thallus organization, Morphology, anatomy and reproduction of *Riccia*, *Marchantia*, *Anthoceros* and *Funaria* (Developmental details not to be included). Ecology and economic importance of bryophytes with special mention of *Sphagnum*.

Basic concept and types of fossil; modern techniques; Early land plants (*Rhynia* & *Cooksonia*)

Unit 5: Pteridophytes and Gymnosperms (09 Hours / 14 Periods)

Pteridophytes: General characteristics, classification, concept of heterospory, seed habit and stelar evolution. Morphology, anatomy and reproduction of *Lycopodium*, *Selaginella* and *Equisetum* (Developmental details not to be included).

Gymnosperms: General characteristics, classification, Classification, morphology, anatomy and reproduction of *Cycas* and *Pinus*. (Developmental details not to be included). Economic importance of Gymnosperms.

Signature of Convener & Members, Board of Studies:

Handwritten signatures of the Convener and members of the Board of Studies, including names like 'A. S.', 'M. S.', 'S. S.', and 'S. S.'.

Practical: Lab work (2 Credits=30 Hours /45 Periods)

1. Gram Staining of Bacteria
2. Plant disease symptoms
3. Algae
4. Fungi
5. Bryophyte
6. Pteridophyta
7. Gymnosperm

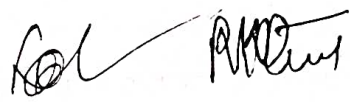
Suggested Readings

1. Kumar, H.D. (1999). Introductory phycology. Affiliated East-West Press Pvt. Ltd. Delhi. 2nd edition.
2. Tortora, G.J., Funke, B.R., Case, C.L. (2010). Microbiology: An Introduction, Pearson Benjamin Cummings, U.S.A. 10th edition.
3. Sethi, I.K. and Walia, S.K. (2011). Text book of Fungi & Their Allies, MacMillan Publishers Pvt. Ltd., Delhi.
4. Alexopoulos, C.J., Mims, C.W., Blackwell, M. (1996). Introductory Mycology, John Wiley and Sons (Asia), Singapore. 4th edition.
5. Raven, P.H., Johnson, G.B., Losos, J.B., Singer, S.R., (2005). Biology. Tata McGraw Hill, Delhi, India.
6. Vashishta, P.C., Sinha, A.K., Kumar, A., (2010). Pteridophyta, S. Chand, Delhi, India.
7. Bhatnagar, S.P. and Moitra, A. (1996). Gymnosperms. New Age International (P) Ltd Publishers, New Delhi, India.
8. Parihar, N.S. (1991). An introduction to Embryophyta. Vol. I. Bryophyta. Central Book Depot, Allahabad.

Signature of Convener & Members, Board of Studies:



Adar

Smoghe
09.10.2021

Govt. Bilasa Girls P.G. College Bilaspur (C.G.)

Session 2021-22
B.Sc. Semester I
SUBJECT ZOOLOGY
Paper (Pass Course)

(Cell Biology and Non-Chordata) LECTURES:45

Max. Marks : 60

Min. Pass Marks :21

Unit:I

1. The cell (Prokaryotic and Eukaryotic)
2. Organization of Cell: Extra-nuclear and nuclear Plasma membrane, Mitochondria, Endoplasmic reticulum, Golgi body, Ribosome and Lysosome).
3. Nucleus, Chromosomes, DNA and RNA

Unit:II

1. Cell division (Mitosis and Meiosis).
2. An elementary idea of Cancer cell And Cell transformation. Types of cancer & Causative agents of it
3. An elementary idea of Immunity: Innate & Acquired Immunity. Antigen, antibody and their interactions

Unit:III

1. General characters and classification of Phylum Protozoa, Porifera, and Coelenterata up to order.
2. Protozoa: Type study - Paramecium,
3. Porifera: Type study - Sycon.
4. Coelenterata: Type study - Obelia

Unit: IV

1. General characters and classification of Phylum Platyhelminthes, Nematelminthes, Annelida and Arthropoda up to order.
2. Platyhelminthes and Nematelminthes: Type Study - Fasciola, Ascaris
3. Annelida: Type Study - Pheretima.
4. Arthropoda: Type Study - Palaemone.

Unit:V

1. General characters and classification of Phylum Mollusca and Echinodermata up to order. Classification of Hemichordata
2. Mollusca: Type Study - Pila.
3. Echinodermata- Type Study- Asterias (Starfish).
4. Hemichordata- Type study - Balanoglossus

1. Dr. Rashmi Sao

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3. Sr. Kalashin

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SUGGESTED READINGS

1. Karp, G. (2010). *Cell and Molecular Biology: Concepts and Experiments*. VI Edition. John Wiley and Sons. Inc.
2. De Robertis, E.D.P. and De Robertis, E.M.F. (2006). *Cell and Molecular Biology*. VIII Edition. Lippincott Williams and Wilkins, Philadelphia.
3. Cooper, G.M. and Hausman, R.E. (2009). *The Cell: A Molecular Approach*. V Edition. ASM Press and Sunderland, Washington, D.C.; Sinauer Associates, MA.
4. Becker, W.M., Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. (2009). *The World of the Cell*. VII Edition. Pearson Benjamin Cummings Publishing, San Francisco.
5. Bruce Albert, Bray Dennis, Levis Julian, Raff Martin, Roberts Keith and Watson James (2008).
6. *Molecular Biology of the Cell*, V Edition, Garland publishing Inc., New York and London.
7. Barnes, R.D. (1982). *Invertebrate Zoology*, V Edition. Holt Saunders International Edition.
8. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002).
9. *The Invertebrates: A New Synthesis*, III Edition, Blackwell Science
3. Barrington, E.J.W. (1979). *Invertebrate Structure and Functions*. II Edition, E.L.B.S. and Nelson
4. Boradale, L.A. and Potts, E.A. (1961). *Invertebrates: A Manual for the use of Students*. Asia Publishing Home

PRACTICAL CELL BIOLOGY

1. Gram's staining technique for visualization of prokaryotic cells
2. Study various stages of mitosis from permanent slides
3. Study various stages of meiosis from permanent slides.
4. Study the presence of Barr body in human female blood cells/cheek cells. (Preparation of permanent slides)

PRACTICAL INVERTEBRATES

1. Dissection of Earthworm, Cockroach, Palaemon and Pila
2. Minor dissection—appendages of Prawn & hastate plate, mouth parts of insects, radulla of Pila. (Alternative methods: By Clay/Thermocol/drawing/Model etc.)

Kingdom Protista

1. Study of *Paramecium* W.M., Binary fission and Conjugation in *Paramecium*
2. Life stages of *Plasmodium vivax*, *Trypanosoma gambiense* and *Entamoeba histolytica* (Slides/Micro-photographs)
3. Examination of pond water for protists

Phylum Porifera

4. Study of *Sycon* (including T.S. and L.S.), *Hyalonema*, and *Euplectella*
5. Temporary mounts of spicules, gemmules and spongin fibres

Phylum Cnidaria

6. Study of *Obelia*, *Physalia*, *Millepora*, *Aurelia*, Ephyra larva, *Tubipora*, *Corallium*, *Alcyonium*, *Gorgonia*, *Metridium* (including T.S. and L.S.)

Phylum Ctenophora

7. Any one specimen/slide

Phylum Platyhelminthes

8. Study of adult *Schistosoma haematobium*, *Taenia solium* and their life stages (Slides/microphotographs)

Phylum Nematelminthes

9. Study of adult *Ascaris lumbricoides*, *Wuchereria bancrofti* and their life stages (Slides/micro-photographs)

Phylum Annelida

10. Study of *Aphrodite*, *Nereis*, *Heteronereis*, *Sabella*, *Serpula*, *Chaetopterus*, *Pheretima*, *Hirudinaria*

11. T.S. through pharynx, gizzard, and typhlosolar intestine of earthworm.

12. T.S. through crop of leech

13. Virtual/Demonstration of Earthworm.

Phylum Arthropoda

14. Study of *Limulus*, *Palaemon*, *Daphnia*, *Balanus*, *Sacculina*, *Cancer*, *Eupagurus*, *Scolopendra*, *Julus*, termite, louse, honeybee, silk moth, wasp

Phylum Onychophora

15. Any one specimen/slide

Phylum Mollusca

16. Study of *Chiton*, *Dentalium*, *Pila*, *Doris*, *Helix*, *Unio*, *Ostrea*, *Mytilus*, *Loligo*, *Sepia*, *Octopus* and *Nautilus*

Phylum Echinodermata

17. Study of Echinoderm larvae

18. Study of *Pentaceros/Asterias*, *Ophiura*, *Clypeaster*, *Echinus*, *Echinocardium*, *Cucumaria* and *Antedon*

B.Sc./B.Sc. (Home Science) Part - I
FOOD SCIENCE & QUALITY CONTROL- 1ST SEMESTER
BASIC NUTRITION & FOOD CHEMISTRY

TOTAL MARKS-60

UNIT - I

1. Introduction to nutrition - food as a source of nutrients, function of foods, definition of nutrition, nutrients, adequate optimum and good nutrition, malnutrition.
2. Inter-relationship between nutrition and health-visible symptoms of good health.
3. Food guide-Basic five food groups how to use food guide.
4. Water- as a nutrients, functions, sources, requirement, water, balance-effect of deficiency.

UNIT - II

1. Carbohydrates-composition, classification, food sources, functions, Digestion, absorption, storage in body.
2. Carbohydrates: functions of mono, oligo and polysaccharide in foods.
3. Other sweetening agents Changes on cooking .
4. Fat and oils composition, saturated, unsaturated fatty acids, classification, food sources, functions of fats. Digestion; absorption.
5. Lipid: Nomenclature, classification, Physical properties, Emulsion and emulsifiers.

UNIT - III

1. Proteins-composition, sources, essential, non essential amino acids sources of proteins, functions, protein deficiency (very brief).
2. Amino acids, Peptides, Physical properties of protein.
3. Denaturation.
4. Energy - unit of energy, food as sources of energy, energy value of food. The body's need for energy, B.M.R. activities for utilization of food, energy requirement.

UNIT - IV

1. Minerals- Functions, sources, and deficiency of following minerals-calcium, iron, iodine fluorine, sodium, potassium (in very brief)

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2. Enzymes: Nomenclature, definite specificity, catalysis regulations Factors influencing enzyme activity,
Enzyme inhibitors .

UNIT - V

1. Vitamins - classification, unit of measurement, sources, functions and deficiency (very brief) about following vitamins:
 - a) Fat soluble vitamins- vitamin A., Vitamin D, Vitamin E, Vitamin K.
 - b) Water soluble vitamins: Ascorbic acid, Thiamin, Riboflavin, Niacin, Other member of B-complex such as Folic acid.

REFERENCES:

1. Guthrie, Hele, Andrews, Introductory Nutrition. 6th ed. St. Louis, Times Mirror Mosby College- 1988.
2. Mudambi S.R., M.V. Rajgopal, Fundamentals of Foods and Nutrition (2nd ed.) Wiley Eastern Ltd. 1990.
3. Swaminathan S : Advanced text book of Foods Nutrition Vol. I, II (2nd ed. Revised & Engarged) B. app. C. 1985.
4. Willson EVAD Principles of Nutrition, 4th ed. New York John Villy & Sons.

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GOVT. BILASA GIRLS' P.G. (AUTO.) COLLEGE
BILASPUR (C.G)
FOUNDATION COURSE
ENGLISH LANGUAGE
SYLLABUS2021-2022

CLASS: B.A./B.SC/B.COM/B.SC. (H.Sc.)/BCA/BBA

SEMESTER- II

Max. M - 80
Min. M - 29

UNIT-ITEN QUESTIONS TO BE SET (one from each chapter) AND FIVE TO BE ATTEMPTED

LESSONS

5 X 4 = 20

1. Where the Mind is without Fear – Rabindranath Tagore
2. The Ideals of Indian Art – K.BharathaIyer
3. The Wonder that was India- A.L. Basham
4. The Heritage of Indian Art – KapilaVatsyayan
5. Life in Vedic Literature – Krishna Chaitany
6. The Ramayana and the Mahabharata
7. Freedom Movement in India – Sudhir Chandra

UNIT-II COMPREHENSION- Unseen Passage 10

UNIT-III COMPOSITION – PARAGRAPH WRITING (Four to be set one to be attempted) 10

UNIT-IV LETTER WRITING (with internal choice)

- Formal letter 05
- Informal letter 05

UNIT-VA. LANGUAGE SKILLS BASED ON TEXT BOOK: 10

Synonyms, Antonyms, Match the column, suffix and prefix

B. GRAMMAR(25 to be set and 20 to be attempted) 20

- Articles and Determiners
- The Tense forms
- Verbs
- Conditional Sentences
- Modals

BOOK: ENGLISH LANGUAGE AND INDIAN CULTURE – MADHYA PRADESH HINDI GRANTH ACADEMY.

R. Mulhankar
24.8.21

Reshmi
Shanti
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ha
24.8.2021

NEW CURRICULUM OF B.Sc. CHEMISTRY
SEMESTER II (2021-2022)
MM-60, HOURS-45, CREDIT-3

The new curriculum will comprise of one theory paper OF 60 marks in each semester and practical work of 50 mark per year. The curriculum is as per the UGC norms & conforming to the directives of the Govt. of Chhattisgarh.

UNIT-I

A. s-BLOCK ELEMENTS

General concepts on group relationships and gradation properties, Comparative study, salient features of hydrides, solvation & complexation tendencies including their function in biosystems and introduction to alkyl & aryls, Derivatives of alkali and alkaline earth metals

B. p-BLOCK ELEMENTS

General concepts on group relationships and gradation properties. Halides, hydrides, oxides and oxyacids of Boron, Aluminum, Nitrogen and Phosphorus. Boranes, borazines, fullerenes, graphene and silicates, interhalogens and pseudohalogens.

C. CHEMISTRY OF NOBLE GASES

Chemical properties of the noble gases, chemistry of xenon, structure, bonding in xenon compounds

D. THEORETICAL PRINCIPLES IN QUALITATIVE ANALYSIS (H2S SCHEME)

Basic principles involved in the analysis of cations and anions and solubility products, common ion effect. Principles involved in separation of cations into groups and choice of group reagents. Interfering anions (fluoride, borate, oxalate and phosphate) and need to remove them after

Group II.

UNIT-II CHEMISTRY OF ALIPHATIC HYDROCARBONS

A. Carbon-Carbon sigma (σ) bonds

Chemistry of alkanes: Formation of alkanes, Wurtz Reaction, Wurtz-Fittig Reaction, Free radical substitutions: Halogenation-relative reactivity and selectivity.

B. Carbon-Carbon Pi (π) bonds:

Formation of alkenes and alkynes by elimination reactions, Mechanism of E1, E2, E1cb reactions. Saytzeff and Hofmann eliminations.

Reactions of alkenes: Electrophilic additions and mechanisms (Markownikoff/ Anti - Markownikoff addition), mechanism of oxymercuration-demercuration, hydroboration-oxidation, ozonolysis, reduction (catalytic and chemical), syn and anti-hydroxylation (oxidation). 1,2-and 1,4-addition reactions in conjugated dienes and, Diels-Alder reaction; Allylic and benzylic bromination and mechanism, e.g. propene, 1-butene, toluene, ethyl benzene.

Reactions of alkynes: Acidity, Electrophilic and Nucleophilic additions. Hydration to form carbonyl compounds, Alkylation of terminal alkynes.

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UNIT-III AROMATIC HYDROCARBONS

Aromaticity: Hückel's rule, aromatic character of arenes, cyclic carbocations/ carbanions and heterocyclic compounds with suitable examples. Electrophilic aromatic substitution: halogenation, nitration, sulphonation and Friedel-Craft's alkylation/acylation with their mechanism. Directive effects of the groups.

UNIT-IV**A. LIQUID STATE CHEMISTRY**

Intermolecular forces, magnitude of intermolecular force, structure of liquids, Properties of liquids, viscosity and surface tension.

B. COLLOIDS & SURFACE CHEMISTRY

Classification, Optical, Kinetic and Electrical Properties of colloids, Coagulation, Hardy Schulze law, flocculation value, Protection, Gold number, Emulsion, micelles and types, Gel, Syneresis and thixotrophy, Application of colloids.

Physical adsorption, chemisorption, adsorption isotherms (Langmuir and Freundlich).

Nature of adsorbed state. Qualitative discussion of BET.

C. SOLID STATE CHEMISTRY

Nature of the solid state, law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry, symmetry elements and symmetry operations, qualitative idea of point and space groups, seven crystal systems and fourteen Bravais lattices; X-ray diffraction, Bragg's law, a simple account of rotating crystal method and powder pattern method.

Crystal defects.

UNIT-V**A. CHEMICAL KINETICS**

Rate of reaction, Factors influencing rate of reaction, rate law, rate constant, Order and molecularity of reactions, rate determining step, Zero, First and Second order reactions, Rate and Rate Law, methods of determining order of reaction, Chain reactions.

Temperature dependence of reaction rate, Arrhenius theory, Physical significance of Activation energy, collision theory, demerits of collision theory, non mathematical concept of transition state theory.

B. CATALYSIS

Homogeneous and Heterogeneous Catalysis, types of catalyst, characteristic of catalyst, Enzyme catalysed reactions, Micellar catalysed reactions, Industrial applications of Catalysis

REFERENCE BOOKS:

1. Lee, J. D. Concise Inorganic Chemistry ELBS, 1991.
2. Douglas, B.E. and McDaniel, D.H. Concepts & Models of Inorganic Chemistry Oxford, 1970
3. Atkins, P.W. & Paula, J. Physical Chemistry, 10th Ed., Oxford University Press, 2014.
4. Day, M.C. and Selbin, J. Theoretical Inorganic Chemistry, ACS Publications, 1962.
5. Rodger, G.E. Inorganic and Solid State Chemistry, Cengage Learning India Edition, 2002.

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Dr. Prasad

G. K.

A. B.

N. K.

P. R.

6. Puri, B. R., Sharma, L. R. and Kalia, K. C., Principles of Inorganic Chemistry, Milestone Publishers/ Vishal Publishing Co.; 33rd Edition 2016
7. Madan, R. D. Modern Inorganic Chemistry, S Chand Publishing, 1987.
8. Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd.(Pearson Education).
9. Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
10. Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
11. Eliel, E. L. & Wilen, S. H. Stereochemistry of Organic Compounds, Wiley: London, 199
12. Kalsi, P. S. Stereochemistry Conformation and Mechanism, New Age International, 200
13. McMurry, J.E. Fundamentals of Organic Chemistry, 7th Ed. Cengage Learning India Edition, 2013.
14. Organic Chemistry, Paula Y. Bruice, 2nd Edition, Prentice-Hall, International Edition (1998).
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17. Ball, D. W. Physical Chemistry Thomson Press, India (2007).
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19. Mortimer, R. G. Physical Chemistry 3rd Ed. Elsevier: NOIDA, UP (2009).
20. Engel, T. & Reid, P. Physical Chemistry 3rd Ed. Pearson (2013).
21. Puri, B.R., Sharma, L. R. and Pathania, M.S., Principles of Physical Chemistry, Vishal Publishing Co., 47th Ed. (2016).
22. Bahl, A., Bahl, B.S. and Tuli, G.D. Essentials of Physical Chemistry, S Chand Publ. (2010).
23. Rakshit P.C., Physical Chemistry, Sarat Book House Ed. (2014).
24. Singh B., Mathematics for Chemist, Pragati Publications.

LABOBATORY COURSE

INORGANIC CHEMISTRY

A. Semi-micro qualitative analysis (using H₂S or other methods) of mixtures - not more than four ionic species (two anions and two cations, excluding interfering, insoluble salts) out of the following:

Cations : NH₄⁺, Pb²⁺, Bi³⁺, Cu²⁺, Cd²⁺, Fe³⁺, Al³⁺, Co²⁺, Ni²⁺, Mn²⁺, Zn²⁺, Ba²⁺, Sr²⁺, Ca²⁺, Na⁺ Anions : CO₃²⁻, S²⁻, SO₃²⁻, S₂O₃²⁻, NO₂⁻, CH₃COO⁻, Cl⁻, Br⁻, I⁻, NO₃⁻, SO₄²⁻

(Spot tests may be carried out wherever feasible)

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Dr. Anil

Dr. Anil

P.B.C.

6. Puri, B. R., Sharma, L. R. and Kalia, K. C., Principles of Inorganic Chemistry, Milestone Publishers/ Vishal Publishing Co.; 33rd Edition 2016
7. Madan, R. D. Modern Inorganic Chemistry, S Chand Publishing, 1987.
8. Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd.(Pearson Education).
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10. Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
11. Eliel, E. L. & Wilen, S. H. Stereochemistry of Organic Compounds, Wiley: London, 1994.
12. Kalsi, P. S. Stereochemistry Conformation and Mechanism, New Age International, 2005.
13. McMurry, J.E. Fundamentals of Organic Chemistry, 7th Ed. Cengage Learning India Edition, 2013.
14. Organic Chemistry, Paula Y. Bruice, 2nd Edition, Prentice-Hall, International Edition (1998).
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24. Singh B., Mathematics for Chemist, Pragati Publications.

LABORATORY COURSE

INORGANIC CHEMISTRY

A. Semi-micro qualitative analysis (using H₂S or other methods) of mixtures - not more than four ionic species (two anions and two cations, excluding interfering, insoluble salts) out of the following:

Cations : NH₄⁺, Pb²⁺, Bi³⁺, Cu²⁺, Cd²⁺, Fe³⁺, Al³⁺, Co²⁺, Ni²⁺, Mn²⁺, Zn²⁺, Ba²⁺, Sr²⁺, Ca²⁺, Na⁺ Anions : CO₃²⁻, S²⁻, SO₃²⁻, S₂O₃²⁻, NO₂⁻, CH₃COO⁻, Cl⁻, Br⁻, I⁻, NO₃⁻, SO₄²⁻

(Spot tests may be carried out wherever feasible)

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B. Acid-Base Titrations

- Standardization of sodium hydroxide by oxalic acid solution.
- Determination of strength of HCl solution using sodium hydroxide as intermediate.
- Estimation of carbonate and hydroxide present together in mixture.
- Estimation of carbonate and bicarbonate present together in a mixture.
- Estimation of free alkali present in different soaps/detergents

C. Redox Titrations

- Standardization of KMnO_4 by oxalic acid solution.
- Estimation of Fe(II) using standardized KMnO_4 solution.
- Estimation of oxalic acid and sodium oxalate in a given mixture.
- Estimation of Fe(II) with $\text{K}_2\text{Cr}_2\text{O}_7$ using internal (diphenylamine, anthranilic acid) and external indicator.

D. Iodo / Iodimetric Titrations

- Estimation of Cu(II) and $\text{K}_2\text{Cr}_2\text{O}_7$ using sodium thiosulphate solution iodimetrically.
- Estimation of (a) arsenite and (b) antimony iodimetrically.
- Estimation of available chlorine in bleaching powder iodometrically.
- Estimation of Copper and Iron in mixture by standard solution of $\text{K}_2\text{Cr}_2\text{O}_7$ using sodium thiosulphate solution as titrants.

ORGANIC CHEMISTRY

1. Demonstration of laboratory Glasswares and Equipments.
2. Calibration of the thermometer. 80o–82o (Naphthalene), 113.5o–114o (Acetanilide), 132.5o–133o (Urea), 100o (Distilled Water).
3. Purification of organic compounds by crystallization using different solvents.
 - Phthalic acid from hot water (using fluted filter paper and stemless funnel).
 - Acetanilide from boiling water.
 - Naphthalene from ethanol.
 - Benzoic acid from water.
4. Determination of the melting points of organic compounds.
Naphthalene 80o–82o, Benzoic acid 121.5o–122o, Urea 132.5o–133o Succinic acid 184.5o–185o, Cinnamic acid 132.5o–133o, Salicylic acid 157.5o–158o, Acetanilide 113.5o–114o, m-Dinitrobenzene 90o, p-Dichlorobenzene 52o, Aspirin 135o.
5. Effect of impurities on the melting point – mixed melting point of two unknown organic compounds.
 - Urea – Cinnamic acid mixture of various compositions (1:4, 1:1, 4:1).
6. Determination of boiling point of liquid compounds. (boiling point lower than and more than 100 °C by distillation and capillary method).
 - Ethanol 78o, Cyclohexane 81.4o, Toluene 110.6o, Benzene 80o.

i. Distillation (Demonstration)

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- Simple distillation of ethanol-water mixture using water condenser.
- Distillation of nitrobenzene and aniline using air condenser.

ii. Sublimation

- Camphor, Naphthalene, Phthalic acid and Succinic acid.

iii. Decolorisation and crystallization using charcoal.

- Decolorisation of brown sugar with animal charcoal using gravity filtrations crystallization and decolorisation of impure naphthalene (100 g of naphthalene mixed with 0.3 g of Congo red using 1 g of decolorizing carbon) from ethanol.

7. Qualitative Analysis

Detection of elements (N, S and halogens) and functional groups (Phenolic, Carboxylic, Carbonyl, Esters, Carbohydrates, Amines, Amides, Nitro and Anilide) in simple organic compounds.

PHYSICAL CHEMISTRY

1. Surface tension measurements.

- Determine the surface tension by (i) drop number (ii) drop weight method.
- Surface tension composition curve for a binary liquid mixture.

2. Viscosity measurement using Ostwald's viscometer.

- Determination of viscosity of aqueous solutions of (i) sugar (ii) ethanol at room temperature.
- Study of the variation of viscosity of sucrose solution with the concentration of solute.
- Viscosity Composition curve for a binary liquid mixture.

3. Chemical Kinetics

- To determine the specific rate of hydrolysis of methyl/ethyl acetate catalysed by hydrogen ions at room temperature.
- To study the effect of acid strength on the hydrolysis of an ester.
- To compare the strengths of HCl & H₂SO₄ by studying the kinetics of hydrolysis of ethyl acetate.

4. Colloids

- To prepare colloidal solution of silver nanoparticles (reduction method) and other metal nanoparticles using capping agents.

Note: Experiments may be added/ deleted subject to availability of time and facilities

PRACTICAL EXAMINATION
5HRS
M.M. 50

Three experiments are to be performed

1. Inorganic Mixture Analysis, four radicals two basic & two acid (excluding insoluble, Interfering & combination of acid radicals) OR Two Titrations (Acid-Bases, Redox and Iodo/Iodimetry) 12 marks

2. Detection of functional group in the given organic compound and determine its MPt/BPt.

8 marks

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Crystallization of any one compound as given in the prospectus along with the determination of mixed MPt.

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Decolorisation of brown sugar along with sublimation of camphor/ Naphthlene.

3. Any one physical experiment that can be completed in two hours including calculations.

14 marks

4. Viva 10 marks

5. Sessionals 06 marks

In case of Ex-Students two marks will be added to each of the experiments

REFERENCE TEXT:

1. Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6th Ed., Pearson, 2009.

2. Ahluwalia, V. K., Dhingra, S. and Gulati, A. College practical Chemistry, University Press.

3. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)

4. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5th Ed., Pearson (2012)

5. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011).

6. Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. Experiments in Physical Chemistry 8th Ed.; McGraw-Hill: New York (2003).

7. Halpern, A. M. & McBane, G. C. Experimental Physical Chemistry 3rd Ed.; W.H. Freeman & Co.: New York (2003).

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Core Course -CCB – 02

[Cytology, Genetics and Molecular Biology]

(Credits: Theory-3, Practicals-2)

THEORY: Lectures – 45 Hours / 68-70 Periods

Unit 1: Cytology: Plant cell structure(09 Hours/ 14 Periods)

The Cell Theory; Prokaryotic and eukaryotic cells; Cell size and shape; Ultra structure- Plant Cell components Cell Organelles – Mitochondria, Chloroplast, ER, Golgi body & Lysosomes Peroxisomes and Glyoxisomes (Structure, Function and Biogenesis). Cell Membrane and Cell Wall – Chemical composition, latest concept of structure and function.

Unit 2: Cytology: Nucleus and Cell Cycle:(09 Hours/ 14 Periods)

Nucleus: Nuclear Envelope- structure of nuclear pore complex; chromatin; molecular organization, DNA packaging in eukaryotes. euchromatin and heterochromatin, nucleolus and ribosome structure (brief). DNA as a Genetic material: Miescher, Watson and Crick Experimental evidences. Overview of Cell cycle. Mitosis and Meiosis: Molecular controls.

Unit 3: Genetics -I:(09 Hours/ 14 Periods)

Brief life history of Mendel. Terminologies; Laws of Inheritance; Modified Mendelian Ratios: 2:1-lethal Genes; 1:2:1- Co- dominance, incomplete dominance; 9:7; 9:4:3; 13:3; 12:3:1. Cytoplasmic Inheritance: Shell Coiling in Snail, Kappa particles in Paramecium, leaf variegation in Mirabilis Male sterility. Linkage: concept & history, complete & incomplete linkage, bridges experiment, coupling & repulsion, recombination frequency, linkage maps based on two and three factor crosses. Crossing over: concept and significance.

Unit 4: Genetics -II: Mutations and Chromosomal Aberrations:(09 Hours/ 14 Periods)

Structural chromosomal changes: Deletions, Duplications, Inversions & Translocations. Numerical chromosomal changes: Euploidy, Polyploidy and Aneuploidy; Mutation – concept and molecular basis. Types of mutations, effects of physical & chemical mutagens. Role of mutation and polyploidy in evolution.

Unit 5: Molecular biology:(09 Hours/ 14 Periods)

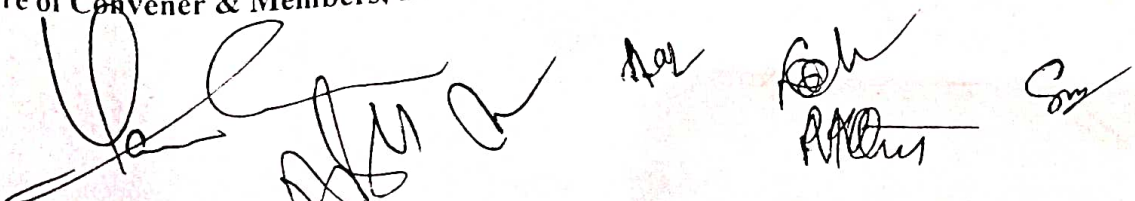
DNA structure, types of DNA, DNA replication (Prokaryotes and eukaryotes), Transcription (Prokaryotes and Eukaryotes): Types of structures of RNA (mRNA, tRNA, rRNA). RNA polymerase- various types; Translation (Prokaryotes and eukaryotes), genetic code. Regulation of gene expression: Prokaryotes: Lac operon and Tryptophan operon ; and in Eukaryotes.

Practical: Lab work (2 Credits=30 Hours /45 Periods)

Suggested Readings

1. Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wiley & Sons. Inc.
2. De Robertis, E.D.P. and De Robertis, E.M.F. 2006. Cell and Molecular Biology. 8th edition. Lippincott Williams and Wilkins, Philadelphia.
3. Cooper, G.M. and Hausman, R.E. 2009. The Cell: A Molecular Approach. 5th edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.
4. Becker. W.M., Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. 2009. The World of the Cell. 7th edition. Pearson Benjamin Cummings Publishing, San Francisco.

Signature of Convener & Members, Board of Studies:



Handwritten signatures of the board members, including the convener and several members, in black ink.

Laboratory work
2021-2022
 (B.Sc. – I & II semester)
 (CORE COURSE – CCB- 01 & 02)

TIME: 3 Hrs.

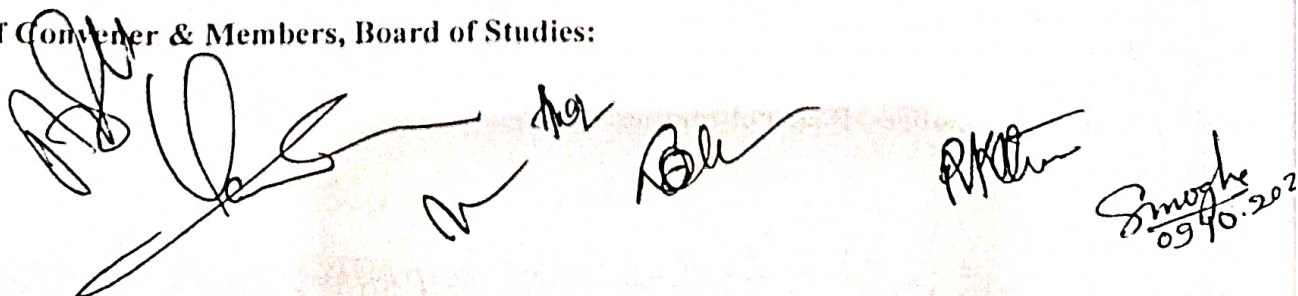
Marks – 50


1. Gram Staining of Bacteria / Plant disease symptoms	04
2. Algae / Fungi	07
3. Bryophyte / Pteridophyta	07
4. Gymnosperm	07
5. Cytology / Genetics	05
6. Spots	10
7. Viva – Voce	05
8. Sessional	05

Suggested Laboratory Exercises

- EMS Models of Viruses – T phage and TMV.
- Study of different forms of Bacteria. Gram staining of Bacteria.
- Preparation of temporary slides and study of permanent slides of Algae. mention in syllabus.
- Preparation of temporary slides from culture and study of permanent slides of Fungi mention in syllabus.
- Study of Plant disease symptoms and preparation of suitable slides of infected area of mention in syllabus.
- Lichen: Study of specimens and permanent slides of Foliose, Crustose, and Fruticose Lichens.
- Mycorrhiza :Ectomycorrhiza and endomycorrhiza (photographs).
- Monographic study of Bryophytes mentions in syllabus.
- External and internal structure of early land plants: Rhynia&Cooksonia (Photographs).
- Preparation of double stained temporary slides and study of permanent slides of Pteridophyta mentioned in syllabus.
- Preparation of double stained temporary slides and study of permanent slides of Gymnosperms mentioned in syllabus.
- Study different types of Plant cells.
- Techniques of different staining methods of Cell organelles.
- Study different stages of Mitosis.
- Study different stages of Meiosis.
- Exercises on Genetics (Mendelian ratios and Test crosses).
- Karyotypes of Chromosomes.
- Study of bar bodies.
- Study of Polytene Chromosomes and lampbrush chromosome.

Signature of Convener & Members, Board of Studies:




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 09/10/2022

Govt. Bilasa Girls P.G. College Bilaspur (C.G.)

Session 2021-22
B.Sc. Semester II
SUBJECT ZOOLOGY
Paper (Pass Course)

(VERTEBRATES, EMBRYOLOGY, ECOLOGY, & ENVIRONMENTAL BIOLOGY)

LECTURES:45

Max. Marks: 60

Min. Pass Marks :21

I

1. Classification of Chordates upto orders.
2. Protochordata-Type study -Amphioxus.
3. A comparative account of Petromyzon and Myxine.
4. Fishes-Skin & Scales, migration in fishes, Parental care infish.

II

1. Amphibia-Parental care and Neoteny.
2. Reptilia- Poisonous & Non-poisonous Snakes. Poison apparatus, snake venom
3. Birds- Flight Adaptation, Migration, and Perching mechanism, Discuss-Birds are glorified reptiles.
4. Mammals-Comparative account of Prototheria, Metatheria, Eutheria and Affinities.
5. Aquatic Mammals and their Adaptations.

III

1. Structure of gamete and Types of eggs
2. Fertilization
3. Cleavage
4. Development of Frog up to formation of three germlayers,
5. Development of Chick up to formation of three germ layers,
6. Embryonic induction, Differentiation and Regeneration.
7. Parthenogenesis
8. Placenta in mammals.

IV

1. Aims and scopes of ecology.
2. Major ecosystems of the world brief introduction.
3. Population characteristics and regulation of densities.
4. Communities and Ecosystem.
5. Biogeochemical cycle.
6. Ecological succession.

V

1. Laws of limiting factors.
2. Food chain in a fresh water ecosystem.
3. Energy flow in ecosystem -Trophic levels.
4. Conservation of Natural resources.
5. Environmental impact Assessment
6. Air and water pollution.

Handwritten notes and signatures at the bottom of the page:

- Signature: *RS*
- Date: *16.9.21*
- Signature: *SR*
- Signature: *R*

SUGGESTED READINGS

1. Young, J. Z. (2004). *The Life of Vertebrates*. III Edition. Oxford university press.
2. Pough H. *Vertebrate life*, VIII Edition, Pearson International.
3. Darlington P.J. *The Geographical Distribution of Animals*, R.E. Krieger Pub. Co.
4. Hall B.K. and Hallgrímsson B. (2008). *Strickberger's Evolution*. IV Edition. Jones and Bartlett Publishers Inc.
5. Gilbert, S. F. (2010). *Developmental Biology*, IX Edition, Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts, USA.
6. Balinsky B. I. and Fabian B. C. (1981). *An Introduction to Embryology*, V Edition, International Thompson Computer Press.
7. Kalthoff (2008). *Analysis of Biological Development*, II Edition, McGraw-Hill Publishers.
8. Lewis Wolpert (2002). *Principles of Development*. II Edition, Oxford University Press
9. Colinvaux, P. A. (1993). *Ecology*. II Edition. Wiley, John and Sons, Inc.
10. Krebs, C. J. (2001). *Ecology*. VI Edition. Benjamin Cummings.
11. Odum, E.P., (2008). *Fundamentals of Ecology*. Indian Edition. Brooks/Cole
12. Robert Leo Smith Ecology and field biology Harper and Row publisher
13. Ricklefs, R.E., (2000). *Ecology*. V Edition. Chiron Pres

PRACTICAL (VERTEBRATES.)**1. Protochordata**

Balanoglossus, *Herdmania*, *Branchiostoma*. Colonial Urochordata
 Sections of *Balanoglossus* through proboscis and branchiogenital regions
 Sections of *Amphioxus* through pharyngeal, intestinal and caudal regions
 Permanent slide of *Herdmania* spicules

2. Agnatha

Petromyzon

3. Fishes

Sphyrna, *Pristis*, *Torpedo*, *Chimaera*, *Notopterus*, *Mystus*, *Heteropneustes*, *Labeo*, *Exocoetus*,
Echeneis, *Anguilla*, *Tetrodon/ Diodon*, *Anabas*, Flat fish

4. Amphibia

Ichthyophis/Ureotyphlus, *Necturus*, *Bufo*, *Hyla*, *Alytes*, *Salamandra*

5. Reptiles

Chelone, *Trionyx*, *Hemidactylus*, *Varanus*, *Uromastix*, *Chamaeleon*, *Draco*, *Ophiosaurus*,
Bungarus, *Vipera*, *Naja*, *Hydrophis*, *Zamenis*, *Crocodylus*
 Key for Identification of poisonous and non-poisonous snakes

6. Aves

Study of six common birds from different orders
 Types of beaks and claws

7. Mammalia

Sorex, Bat (Insectivorous and Frugivorous), *Funambulus*, *Loris*, *Herpestes*, *Hemiechenis*

PRACTICAL (EMBRYOLOGY)

1. Study of whole mounts and sections of developmental stages of frog through permanent slides: Cleavage stages, blastula, gastrula, neurula, tail-bud stage, tadpole (external and internal gill stages)
2. Study of whole mounts of developmental stages of chick through permanent slides: Primitive streak (13 and 18 hours), 21, 24, 28, 33, 36, 48, 72, and 96 hours of incubation (Hamilton and Hamburger stages)
3. Study of different types of placenta

PRACTICAL (ECOLOGY)

1. Estimation of population density, percentage frequency, relative density.
2. Analysis of producers and consumers in grassland/aquatic Ecosystem.

Govt. Bilasa Girls P.G. College Bilaspur (C.G.)

Session 2021-2022
Zoology Practical
B.Sc. Semester I +II
Scheme of Practical Exam.

(M.M. 50)
Time; 3 Hrs.

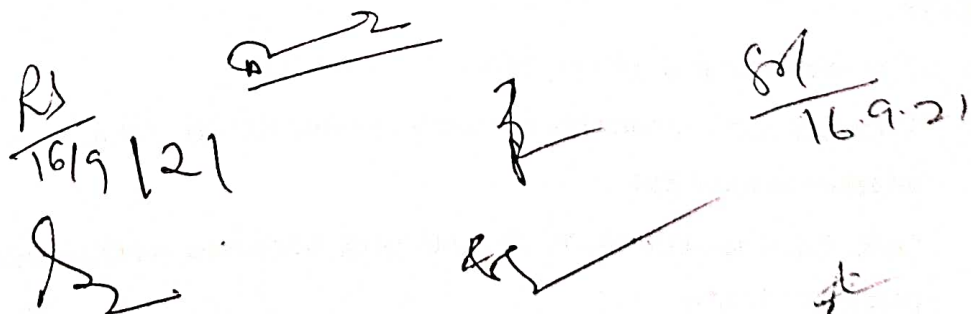
practical work will, in general be based on the syllabus prescribed in theory and the candidates will be required to show knowledge of the following:-

1. Dissection of Earthworm, Cockroach, Palaemon and Pila
2. Minor dissection—appendages of Prawn & hastate plate, mouth parts of insects, radulla of Pila.(Alternative methods: By Clay/Thermacol/drawing/Model etc.)
3. Adaptive characters of Aquatic, terrestrial, aerial and desert animals.
4. Museum specimen invertebrate
5. Slides- Invertebrates, frog embryology, Chick embryology and cytology.

Scheme of Practical Exam

Time: 3hrs

1. Major Dissection	6 Marks
2. Minor Dissection	03 Marks
3. Spots-8 (Slides-4. Specimens-4)	16 Marks
4. Exercise based on embryology	04 Marks
5. Cytological Preparation	04 Marks
6. Ecology	08 Marks
7. Viva	04 Marks
8. Sessional	05 Marks
	Total 50



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B.Sc./B.Sc. (Home Science) Part - I
FOOD SCIENCE & QUALITY CONTROL- 2ND SEMESTER
FOOD MICROBIOLOGY AND SANITATION

TOTAL MARKS-60

UNIT - I

1. Introduction to microbiology & its relevance to everyday life-General morphology of microorganisms; General characteristics of fungi, virus, protozoa, algae.
2. Control of microorganisms- Effects of environmental factors on growth of microorganisms- pH, Water activity, oxygen available.

UNIT-II

1. Microbiology of different foods spoilage and Contamination: Sources, types effects on the following -
Cereals & Cereal products, Sugar & Sugar products, Vegetable & fruits, Meat & Meat products, Fish & other sea foods, Eggs & poultry, Milk & Milk products, Canned foods.
2. Environmental microbiology water, air, soil and sewage.

UNIT-III

1. Microbial intoxications & Infections-sources of contamination of foods. Toxin production and physiological action. Sources of Infection of foods by pathogenic organisms- symptoms & method of control.
2. Beneficial effect of microorganisms.
3. Relevance of microbiological standards for food safety.

UNIT-IV

1. The relationship of micro organisms to sanitation.
Effects of micro organisms on food borne illnesses- Bacteria, virus, molds, yeasts and parasites.
2. Other Food hazards-chemicals, antibiotics, hormones, metals contamination poisonous foods.

UNIT-V

1. Importance of personal hygiene of food handler-Habits-clothes, illness education of food handler in handing and serving food.
2. Safety in food processing, storage, handling and preparation control of spoilage-safety of left to left -over food.

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3. Cleaning methods sterilization and disinfection-products and methods use of detergents, heat, chemicals,
4. Sanitation -kitchen design equipment and systems, structure and layout of food premises, maintaining clean environment, Selecting and installing cleaning equipment.
5. Waste product handling planning for waste disposal.

REFERENCES:

1. Frazier, W.C. "Food Microbiology" 4th ed. 1988. McGraw Hill, New York.
2. Kawata K. "Environmental Sanitation in India" 1963. Lucknow Publ. House.
3. Pleezar H.J. and Rober D. "Microbiology" 2nd ed. 1968 Mcgraw Hill, New York.
4. Banwart G.T. "Basic Food Microbiology" 1987 CBS Publ. New delhi.
5. Jay, JH. "Modern Food Microbiology". CBS Pub. New Delhi.

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B.Sc./B.Sc. (Home Science) Part - I
FOOD SCIENCE & QUALITY CONTROL
PRACTICAL

TOTAL MARKS-50

1. Use and care of Kitchen equipment
2. Controlling Techniques A) Weights and Measures standard and household measures for raw and cooked food.
- b) Cereal and flour mixtures-basic preparation- Boiled rice and rice pulao, Chapati, puri, paratha, Sandwiches, Pastas, Pancake, biscuits, cakes, cookies.
3. Pulses and legumes- using whole de-husked and sprouted.
4. Vegetables-Simple salads, Dry Vegetables, Curries
5. Fruits-Fruit preparations using fresh and dried-stewed fruit, fruit salad.
6. Milk-Curds, paneer and their commonly made preparation, Milk based simple desserts and puddings-custards, kheer, ice-cream.
7. Meat-cuts of meat, Meat preparations, Poultry, Fish.
8. Hard and soft cooked poached, scrambled, fried, omelets.
9. Soups-Basic, clear and cream soups.
10. Snacks-Pakorras, cheese toast, upma, poha
11. Peanut, chikki, til ladoo
12. Demonstration of the different parts of microscope their use & care.
13. Preparation of Bacterial smears simple staining. Spore staining, Staining of moulds & yeast.
14. Preparation of common laboratory media for cultivation of Bacteria yeast & fungus, moulds.

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