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

Link Road, Bilaspur (C.G.)

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



SYLLABUS

B.Sc.

Semester - III & IV

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 in only one subject, she is allowed to appear in the back paper of the 5th Semester with the examination of 6th Semester.

- (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 cleaning 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।

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GOVT. BILASA GIRLS' P.G. (AUTO.) COLLEGE
BILASPUR (C.G)
FOUNDATION COURSE
ENGLISH LANGUAGE
SYLLABUS 2021-2022
CLASS: B.A./B.SC/B.COM/B.SC.(H.Sc.)/BCA/BBA

Max. M - 80
Min. M - 29

SEMESTER- III

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

LESSONS

5 X 4 = 20

1. Dandi Salt March – Louis Fischer
2. Aspects of Indian Constitution – M.C. Chagla
3. Individual Freedom – Jawaharlal Nehru
4. Fundamental Duties
5. Delhi in 1857 – MirzaGhalib
6. Raja's Diamond – R.L Stevenson
7. Tree – Tina Morris

UNIT-II-COMPREHENSION- Unseen Passage 10

UNIT-III-PRECIIS WRITING 10

UNIT-IV-ESSAY WRITING

Four to be set and one to be attempted 10

UNIT-V A. GRAMMAR (25 to be set and 20 to be attempted).- 20

- Articles
- Prepositions
- Gerunds
- Self Forms & Possessives
- Narration (Direct & Indirect)
- Voice (Active & Passive)

B. VOCABULARY (from the text) 15 to be set 10 to be attempted. 10

Synonyms, Antonyms, Match the Column, combined the sentences

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

R. Mishra
24.5.21

Security

24.5.2021

THERMODYNAMICS, KINETIC THEORY AND STATISTICAL PHYSICS

Unit-1 The laws of thermodynamics : The Zeroth law, first law of thermodynamics, internal energy as a state function, reversible and irreversible change, Carnot's cycle, Carnot theorem, second law of thermodynamics. Clausius theorem inequality. Entropy, Change of entropy in simple cases (i) Isothermal expansion of an ideal gas (ii) Reversible isochoric process (iii) Free adiabatic expansion of an ideal gas. Concept of entropy, Entropy of the universe. Entropy change in reversible and irreversible processes, Entropy of Ideal gas, Entropy as a thermodynamic variable, S-T diagram, Principle of increase of entropy. The thermodynamic scale of temperature, Third law of thermodynamics, Concept of negative temperature.

Unit-2 Thermodynamic functions, Internal energy, Enthalpy, Helmholtz function and Gibb's free energy, Maxwell's thermodynamical equations and their applications, TdS equations, Energy and heat capacity equations Application of Maxwell's equation in Joule-Thomson cooling, adiabatic cooling of a system, Van der Waals gas, Clausius-Clapeyron heat equation. Blackbody spectrum, Stefan-Boltzmann law, Wien's displacement law, Rayleigh-Jean's law, Planck's quantum theory of radiation.

Unit-3 Maxwellian distribution of speeds in an ideal gas: Distribution of speeds and velocities, experimental verification, distinction between mean, rms and most probable speed values. Doppler broadening of spectral lines. Transport phenomena in gases: Molecular collisions mean free path and collision cross sections. Estimates of molecular diameter and mean free path. Transport of mass, momentum and energy and interrelationship, dependence on temperature and pressure.
Behaviour of Real Gases: Deviations from the Ideal Gas Equation. The Virial Equation. Andrew's Experiments on CO₂ Gas. Critical Constants.

Unit-4 The statistical basis of thermodynamics: Probability and thermodynamic probability, principle of equal a priori probabilities, statistical postulates. Concept of Gibb's ensemble, accessible and inaccessible states. Concept of phase space, γ phase space and μ phase space. Equilibrium before two systems in thermal contact, probability and entropy, Boltzmann entropy relation. Boltzmann canonical distribution law and its applications, law of equipartition of energy.

Aswam

by

10/11

Transition to quantum statistics: 'h' as a natural constant and its implications, cases of particle in a one-dimensional box and one-dimensional harmonic oscillator.

Unit-5 Indistinguishability of particles and its consequences, Bose-Einstein & Fermi-Dirac conditions, Concept of partition function, Derivation of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics, Limits of B-E and F-D statistics to M-B statistics. Application of B-E statistics to black body radiation, Application of F-D statistics to free electrons in a metal.

TEXT AND REFERENCE BOOKS:

1. B.B. Laud, "Introduction to Statistical Mechanics" (McMillan 1981)
2. F. Reif: "Statistical Physics" (McGraw-Hill, 1998).
3. K. Haug: "Statistical Physics" (Wiley Eastern, 1988).
4. Thermal and statistical Physics: R.K. Singh, Y.M. Gupta and S. Sivraman.
5. Statistical Physics: Berkeley Physics Course, Vol. 5
6. Physics (Part-2): Editor, Prof. B.P. Chandra, M.P. Hindi Granth Academy.
7. Heat and Thermodynamics: K.W. Zeemansky.
8. Thermal Physics: B.K. Agarwal.
9. Heat and Thermodynamics: Brij Lal and N. Subramanyam.
10. Heat and Thermodynamics: Dayal, Verma and Pandey.
11. A Treatise on Heat: M.N. Saha and B.N. Srivastava.

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Sivraman

G. B. 1

Session 2021-22

GOVT. BILASA GIRLS' P.G. COLLEGE BILASPUR (C.G.)**B.Sc. Semester III****COMPUTER SCIENCE****COMPUTER ARCHITECTURE****UNIT-I: Data Representation:**

Number Systems - Decimal, Binary, Hexadecimal, Octal. BCD, Conversion from one number system to another number system, binary arithmetic, complements ($n-1$'s and n 's), Signed and Unsigned numbers, Addition and Subtraction, Multiplication, representation of negative numbers. Fixed point representation & floating point representation.

UNIT-II: Logic gates, Boolean algebra & Switching functions:

Fundamental postulates of Boolean algebra, Basic theorems and properties, Canonical and Standard forms, Truth Tables, OR, AND, NOT, XOR, Universal (NOR and NAND Gates, Multilevel NAND/NOR realizations, properties of logic gates, Algebraic simplification digital logic gates. DeMorgan's theorem. Standard representation of logic function (SOP and POS), Minimization technique- K Map method, Prime implicants, don't care combinations. Minimal SOP and POS forms, Tabular Method.

UNIT-III: Combinational & Sequential Circuits:

Design using conventional logic gates, Encoder, Decoder, Full Adders, Half Adders, Subtractors, Multiplexer, De-Multiplexers. Basic flip-flops- SR FF, JK-FF, T and D Type FF, Master slave FF, clocked Flip Flop; Triggering and excitation tables.

UNIT-IV: Basic Computer Organization & Design:

Instruction Codes, Computer registers, Common Bus system, instruction cycle, I/O & interrupt.

Programming The Basic Computer

Machine language, Assembly language. One pass and Two pass assemblers, Instruction format, Addressing modes, Type of interrupts, RISC versus CISC architectures.

UNIT-V : Input-Output and Memory Organization:

Peripheral devices, I/O interfaces, asynchronous data transfer, modes of transfer, priority interrupt, DMA, I/O processor. Memory hierarchy, Main and auxiliary memory, Associative memory, cache memory, virtual memory.

TEXT BOOKS:

1. "Computer System Architecture", M. Morris Mano, 3rd Edition, PHI / Pearson, 2006.
2. "Computer Organization and Architecture", William Stallings 7th Edition, PHI/Pearson, 2006.
3. "Switching & Finite Automata theory", Zvi Kohavi, TMH, 2nd Edition.
4. "Digital Design", Morris Mano, PHI, 3rd Edition, 2006.

REFERENCE BOOKS:

1. "Computer Organization", Car Hamacher, Zvonks Vranesic & Safwat Zaky, 5th Edition, TMH, 2002.
2. "Computer Architecture and Organization", John P. Hayes, TMH International Editions, 1998.
3. "Computer Architecture and Organization", Raj Kamal, Nicholas Carter, 2nd Edition, TMH Education, 2009
4. "Introduction to computer architecture", Stones S. Galgotia Publication
5. "Computer Organization and Architecture design for Performance", 4th edition - W. Stallings, PHI
6. "Computer Engineering - Hardware Design", M. Morris Mano, PHI
7. "Computer Architecture and parallel processing", Kai Hwang & Faye Briggs, McGraw hill, 1985
8. An Engineering Approach To Digital Design - Fletcher, PHI.
9. Malvino A.P, Digital Principles and Applications, Tata McGraw Hill.

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GOVT. BILASA GIRLS' P.G. COLLEGE BILASPUR(C.G.)

Session 2021-22

B.Sc. MATHEMATICS

SEMESTER :III

**PAPER - I : ADVANCED CALCULUS AND DIFFERENTIAL
EQUATIONS -I**

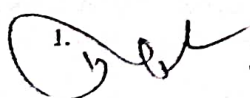
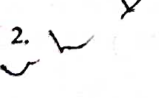
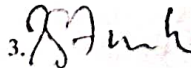
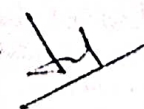
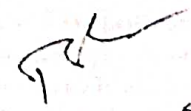

Max. Marks: 80;Min.Marks:28

Hours 45;Credit-3

- UNIT I** Definition of a sequence. Theorms on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion. Series of non-negative terms. Comparison test. Cauchy's integral test. Ratio test. Raabe's, logarithmic, De-Morgan and Bertrand's test.
- UNIT II** Continuity. Sequential continuity. Properties of continuous functions. Uniform continuity. Chain rule of differentiability. Mean value theorems and their geometrical interpretations. Darboux's intermediate value theorem for derivatives. Taylor's theorem with various forms of remainders.
- UNIT III** Limit and continuity of functions of two variables. Partial differentiation change of varibles. Euler's theorem on homogeneous functions. Taylor's theorem for function of two variables.Mean value theorems for functions of two variables
- UNIT IV** Series solutions of differential equations. Power series method. Bessel and Legendre function and their properties, Convergence, recurrence and generating relations. Orthogonality of functions. Sturm - Liouville problem.
- UNIT V** Laplace transformation - Linearity of the Laplace transformation. Existence theorem for Laplace transforms. Laplace transforms of derivatives and integrals.Shifting theorems. Differentiation and integration of transforms.

REFERENCES:

1. Gorakh Prasad: Differential Calculus, Pothishalas Pvt Ltd, Allahabad.
2. Gorakh Prasad: Integral Calculus, Pothishalas Pvt Ltd, Allahabad.
3. Shanti Narayan: Differential Calculus, S. Chand & Co. New Delhi
4. Shanti Narayan: Integral Calculus, S. Chand & Co. New Delhi
5. Khalil Ahmad: Text Book of Calculus, World Education Publishers, 2012.
6. S.C.Malik: Mathematical Analysis, Wiley Eastern Ltd., New Delhi

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Session: 2021-22

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

BIOTECHNOLOGY

B. Sc. Third Semester

(Genetics, Molecular Biology & Biostatistics)

THEORY: Lectures – 45 Hours / 68-70 Periods

Max. Marks – 60
Passing marks - 21
Time of Exam. – 2.5 Hrs.

Maximum Marks: 75
Internal assessment marks: 15
Term end examination marks: 60

- Unit – 1: Basic concept of Genetics:** (9 Hours/14 Periods)
Historical background. Mendel's law of inheritance, gene interactions, linkage & crossing over, sex determination, recombination and gene mapping. Extra chromosomal Inheritance.
- Unit – 2: Chromosome:** (9 Hours/14 Periods)
Chromosome structure and behaviour through cell cycle. Chromosome organization; Lamprush and polygene chromosome. Chromatin organization (solenoid model). Nucleic Acid: Experimental evidence for nucleic acid as genetic material, structure and types of DNA & RNA.
- Unit – 3: Replication & expression of Gene:** (9 Hours/14 Periods)
Concept of Gene: Features, enzymes involved and mechanism of Prokaryotic DNA replication, central dogma: Transcription (feature, mechanism and inhibition). Translations: initiation elongation, termination and inhibition.
- Unit – 4: Regulation of Gene Expression:** (9 Hours/14 Periods)
Operon concept, negative and positive regulation, instability of bacterial mRNA, inducer and co repressor, catabolic repression. Regulation by attenuation (trp operon). Molecular basis of Mutation, DNA damage and DNA repair.
- Unit – 5: Biostatistics:** (9 Hours/14 Periods)
Objective, Statistical term, data types and collection, frequency distribution, central tendency (Mean, Median and Mode), Standard deviation and standard error. Probability calculations, ANOVA and test of significance (χ^2 test) method of sampling.

Suggested Books:

1. Lehninger Principles of Biochemistry; 5th Edition; Michael M. Cox, David L Nelson; W H Freeman and Company.
2. Principles of Genetics; 8th Edition; Eldon Gardner, Michael Simmons and Peter Snustad, John Wiley & Sons, Inc
3. Molecular Biology of the Cell; 3rd Edition; Bruce Alberts, Dennis Bray, Julian Lewis, Martin Raff, Keith Roberts, James Watson; Garland Publishing.
4. Statistical Methods; S. P. Gupta; Sultan Chand & Sons.
5. Bio statistics; Sunder Rao

Signature of Members, Board of Studies:

Session: 2021-22

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

BIOTECHNOLOGY**Third Semester****Laboratory Work**

1. Isolation of DNA from human blood and karyotyping.
2. Isolation of genomic DNA from bacteria and purification by column chromatography.
3. Isolation of genomic DNA from plant.
4. Isolation and separation of plasmid DNA.
5. Representation of statistical data by: a) Histograms b) O give curve c) Pie diagram.
6. Determination of statistical averages of arithmetic mean, median and mode by computers and by manually.
7. Determination of measures of dispersion: a) chi square test b) Standard deviation.
8. Test of significance application of following a) chi- square test b) t- Test

Scheme of Practical Examination:

- ❖ Schedule of Examination – In Second semester only [CCBT-03+CCBT-04]
- ❖ Total Marks - 50
- ❖ Marks distribution –
 - Lab. Task - 30 marks[15 from each course-CCBT-03 & CCBT-04]
 - Question of 20 marks - [two questions (10+5)] from course
 - Question of 20 marks - [two questions (10+5)] from course
 - Spotting-5 spots -10 marks [at least two spots from each course [CCBT-03 & CCBT-04]
 - Viva-voce - 05 marks
 - Sessional - 05 marks

=====*******=====**Signature of Members, Board of Studies:**

NEW CURRICULUM OF B.Sc.CHEMISTRY

SEMESTER III (2021-22)

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.

INORGANIC CHEMISTRY

UNIT-I A. CHEMISTRY OF TRANSITION SERIES ELEMENTS

Transition Elements: Position in periodic table, electronic configuration, General Characteristics, viz., atomic and ionic radii, variable oxidation states, ability to form complexes, formation of coloured ions, magnetic moment μ_{so} (spin only) and μ_{eff} and catalytic behaviour. General comparative treatment of 4d and 5d elements with their 3d analogues with respect to ionic radii, oxidation states and magnetic properties.

B. Oxidation and Reduction: Redox potential, electrochemical series and its applications, Principles involved in extraction of the elements.

UNIT-II A. COORDINATION COMPOUNDS: Werner's theory and its experimental verification, IUPAC nomenclature of coordination compounds, isomerism in coordination compounds. Stereochemistry of complexes with 4 and 6 coordination numbers. Chelates, polynuclear complexes.

B.COORDINATION CHEMISTRY: Valence bond theory (inner and outer orbital complexes), electroneutrality principle and back bonding. Crystal field theory, Crystal field splitting and stabilization energy, measurement of $10 Dq$ (Δ_o), CFSE in weak and strong fields, pairing energies, factors affecting the magnitude of $10 Dq$ (Δ_o , Δ_t). Octahedral vs. tetrahedral coordination.

ORGANIC CHEMISTRY

UNIT-III A. CHEMISTRY OF ORGANIC HALIDES

Alkyl halides: Methods of preparation, nucleophilic substitution reactions – SN_1 , SN_2 and SN_i mechanisms with stereochemical aspects and effect of solvent etc.; nucleophilic substitution, elimination reactions.

Aryl halides: Preparation, including preparation from diazonium salts, Nucleophilic Aromatic Substitution; SN_{Ar} , Benzyne mechanism. Relative reactivity of alkyl, allyl/benzyl, vinyl and aryl halides towards nucleophilic substitution reactions.

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B. ALCOHOLS & PHENOLS

(i) Trihydric alcohols - Nomenclature, methods of formation, chemical reactions of glycerol. (ii) Structure and bonding in phenols, physical properties and acidic character, Comparative acidic strength of alcohols and phenols, acylation and carboxylation.

(iii) Mechanism of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Hauben-Hoesh reaction, Lederer-Manasse reaction and Reimer-Tiemann reaction.

UNIT-IV ALDEHYDES AND KETONES

A. Nomenclature, structure and reactivity of carbonyl group. General methods of preparation of aldehydes and ketones. Mechanism of nucleophilic addition to carbonyl groups: Benzoin, Aldol, Perkin and Knoevenagel condensation. Condensation with ammonia and its derivatives, Wittig reaction, Mannich reaction, Beckmann and Benzil-Benzilic rearrangement.

B. Use of acetate as protecting group, Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizzaro reaction, MPV, Clemmensen reduction, Wolf-Kishner reaction, LiAlH_4 and NaBH_4 reduction. Halogenation of enolizable ketones, An introduction to α, β -unsaturated aldehydes and ketones.

PHYSICAL CHEMISTRY

UNIT-V A. THERMODYNAMICS-I Intensive and extensive variables; state and path functions; isolated, closed and open systems; Zeroth law of thermodynamics. First law: Concept of heat, work, internal energy and statement of first law; enthalpy, Relation between heat capacities, calculations of q , w , U and H for reversible, irreversible and free expansion of gases under isothermal and adiabatic conditions. Joule-Thompson expansion, inversion temperature of gases, expansion of ideal gases under isothermal and adiabatic condition

B. THERMO CHEMISTRY Thermochemistry, Laws of Thermochemistry, Heats of reactions, standard states; enthalpy of formation of molecules and ions and enthalpy of combustion and its applications; calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data, effect of temperature (Kirchhoff's equations) and pressure on enthalpy of reactions, Adiabatic flame temperature, explosion temperature.

C. THERMODYNAMICS-II

Second Law of Thermodynamics: Spontaneous process, Second law, Statement of Carnot cycle and efficiency of heat engine, Carnot's theorem, thermodynamic state of temperature. Concept of entropy: Entropy change in a reversible and irreversible process, entropy change in isothermal reversible expansion of an ideal gas, entropy change in isothermal mixing of ideal gases, physical signification of entropy, Molecular and statistical interpretation of entropy.

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D. THERMODYNAMICS-III Elementary idea of Third law of Thermodynamics, calculation of absolute entropy of molecule.

REFERENCE BOOKS

1. Physical Chemistry, G. M. Barrow, International student edition, Mc Graw Hill.
2. University General Chemistry, C. N. R. Rao, Macmillan.
3. Physical Chemistry, R. A. Alberty, Wiley Eastern.
4. The elements of physical chemistry, Wiley Eastern.
5. Physical Chemistry through problems, S. K. Dogra & S. Dogra, Wiley Eastern.
6. Physical Chemistry, B. D. Khosla
7. Physical Chemistry, Puri & Sharma.
8. Bhautik Rasayan, Puri, Sharma and Pathania, Vishal Publishing Company.
9. Bhautik Rasayan, P. L. Soni.
10. Bhautik Rasayan, Bahl and Tuli.
11. Physical Chemistry, R. L. Kapoor, Vol I-IV .
12. Chemical kinetics, K. J. Laidler, Pearson Educations, New Delhi (2004).

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B. Sc. Third Semester: BOTANY
Choice Based Course -CBCB – 03(E1)
[Ethnobotany and Herbal Technology]

THEORY: Lectures – 45 Hours / 68-70 Periods (Credits: Theory-3, Practicals-2)

Maximum Marks: 75

Internal assessment marks: 15 Term end examination marks: 60

Unit 1: Ethnobotany (concept and Studies) : (09 Hours / 14 Periods)

Introduction, concept, scope and objectives; Ethnobotany as an interdisciplinary science. The relevance of ethnobotany in the present context: Major and minor ethnic groups (Tribals of India, and their life styles). Plants used by the tribal: a) Food plants b) Intoxicants and beverages c) Resins and oils and other uses.

Methodology of Ethno-botanical studies: a) Field work b) Herbarium c) Archaeological findings d) Ancient Literature e) temples and sacred places.

Unit 2: Ethnobotany (Role in modern Medicine and Legal aspect) (09 Hours / 14 Periods)

Medico-ethnobotanical sources in India; Significance and ethno botanical practices (with habitat and morphology) i. *Azadirachta indica* ii. *Ocimum sanctum* iii. *Vitex negundo* iv. *Gloriosa superba* v. *Tribulus terrestris* vi. *Pongamia pinnata* vii. *Cassia auriculata* viii. *Indigofera tinctoria*. Role of ethnobotany in modern medicine with special example *Rauwolfia serpentina*, *Trichopus zeylanicus*, *Artemisia*, *Withania*. Role of ethnic groups in conservation of plant genetic resources. Ethnobotany as a tool to protect interests of ethnic groups. Sharing of wealth concept with few examples from India. Biopiracy, Intellectual Property Rights and Traditional Knowledge.

Unit 3: Ethnobotany and Folk medicines (09 Hours / 14 Periods)

Definition: Ethnobotany in India: Methods to study ethnobotany; Applications of Ethnobotany: National interacts. Palaeo-ethnobotany. Folk medicines of ethnobotany, ethnomedicine, ethnoecology, ethnic communities of India. Application of natural products to certain diseases- Jaundice, cardiac, infertility, diabetics, Blood pressure and skin diseases. Propagation of Medicinal Plants: Objectives of the nursery, its classification, important components of a nursery, sowing, pricking, use of green house for nursery production, propagation through cuttings, layering, grafting and budding.

Unit 4: Herbal medicines and Pharmacognosy (09 Hours / 14 Periods)

Herbal medicines: history and scope - definition of medical terms - role of medicinal plants in Siddha systems of medicine; cultivation -harvesting -processing -storage -marketing and utilization of medicinal plants. **Pharmacognosy:** systematic position medicinal uses of the following herbs in curing various ailments; Tulsi, Ginger, Fenugreek, Indian Goose berry and Ashoka. Medicinal plant banks, micro propagation of important species (*Withania somnifera*, neem and tulsi- Herbal foods-future of pharmacognosy).

Unit 5: Phytochemistry and Analytical pharmacognosy (09 Hours / 14 Periods)

Phytochemistry - active principles and methods of their testing - identification and utilization of the medicinal herbs; *Catharanthus roseus* (cardiotonic), *Withania somnifera* (drugs acting on nervous system), *Clerodendron phlomoides* (anti-rheumatic) and *Centella asiatica* (memory booster).

Analytical pharmacognosy: Drug adulteration - types, methods of drug evaluation - Biological testing of herbal drugs - Phytochemical screening tests for secondary metabolites (alkaloids, flavonoids, steroids, triterpenoids, phenolic compounds)

Suggested Readings:

- 1) S.K. Jain, Manual of Ethnobotany, Scientific Publishers, Jodhpur, 1995.
- 2) S.K. Jain (ed.) 1989 Methods and approaches in ethnobotany. Society of ethnobotanists, Lucknow, India.
- 3) S.K. Jain, 1990 Contributions of Indian ethnobotany, Scientific publishers, Jodhpur
- 4) Colton C.M. 1997. Ethnobotany - Principles and applications. John Wiley and sons - Chichester
- 5) Rama Rao, N and A N. Henry (1996). The Ethnobotany of Eastern Ghats in A. P., India. Bot. Survey of India, Howrah
- 6) Rajiv K. Sinha - Ethnobotany The Renaissance of Traditional Herbal Medicine - INA - SHREE Publishers, Jaipur-1996
8. Herbal plants and Drugs Agnes Arber, 1999. Mangal Deep Publications.
9. Ayurvedic drugs and their plant source. V.V. Sivarajan and Balachandran Indra 1994 Oxford IBH pub.Co.
10. Ayurveda and Aromatherapy. Miller, Light and Miller, Bryan, 1998. Banarsidass, Delhi
11. Principles of Ayurveda, Anne Green, 2000. Thomsons, London.
12. Pharmacognosy, Dr.C.K.Kokate et al. 1999. Nirali Prakashan

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

Signature of BOS: -

B. Sc. Third Semester: BOTANY
Choice Based Course -CBCB – 03(E2)
[Agro-services and Organic farming]

THEORY: Lectures – 45 Hours / 68-70 Periods (Credits: Theory-3, Practicals-2)

Maximum Marks: 75

Internal assessment marks: 15 Term end examination marks: 60

Unit 1: General Concept of Agro-services and Agro-soil : (09 Hours / 14 Periods)

Scope and importance of Agro-services in India. Land and Water resources for agriculture. Soil, classification soil formation, soil composition, physical and biological properties of soil and use pattern- a brief account, major soil types of India. Rapid tests for analysis of soil and water samples. Concept of soil productivity and fertility. Sources of water for agriculture, water harvest techniques, utilization of water for irrigation.

Unit 2: Soil Management and Irrigation (09 Hours / 14 Periods)

Concept of total and available nutrients. Soil testing and sampling; Visual diagnosis of deficiency symptoms in plants; Management practices for nutrient elements, nutrients toxicity especially minor nutrients elements. Methods of application of irrigation water and irrigation channels, surface and sub-surface irrigation method. Sprinkler and drip irrigation methods.

Unit 3: Irrigation Management: (09 Hours / 14 Periods)

Irrigation management- terminology, concept and importance towards Crop production. Water resources- surface and ground water resources. Factors affecting Water resources-climatic factors. Quality of irrigation water. management of poor quality irrigation water. Conductive use of poor and good quality water and influence of poor quality water on soil properties. Concept of irrigation scheduling Time of irrigation based on phenological stages and soil moisture status of the crop. Amount of water to be irrigated Irrigation schedules for different important crops.

Unit 4: Fertilizers and Organic Manures: (09 Hours / 14 Periods)

Macro and Micro-elements essential for plant growth. Fertilizers - importance and types (simple, complex and mixed fertilizers). Available forms of nitrogen, phosphorous and potassium in soil, types of N.P. and K. fertilizers used for increasing production of crops and fruit in the orchards. Fertilizer application techniques in the field. Importance of soil organic matter on soil humans. Organic manures and their method of application. Preparation of organic manures- composting rapid composition, phosphor compost, vermi compost. Green-manuring and biofertilisers - a general account.

Unit 5: Organic Farming: (09 Hours / 14 Periods)

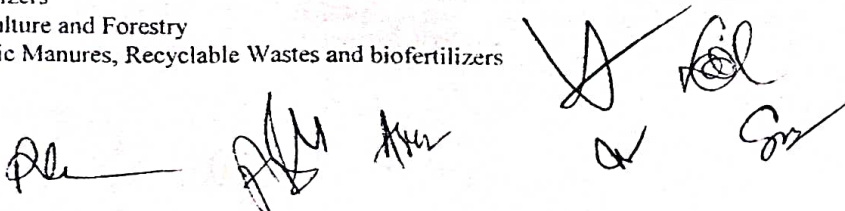
Scope, definition and Concept of organic farming. Objectives of organic farming. Importance of organic farming. Component of organic farming and their role in sustainable crop production. Principles of organic farming. Organic farming in relation to soil health and quality production. Nutrient management in organic farming. Disease and pest management in organic farming. Certification and accreditation process of organic product.

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

Suggested Readings:

1. ICAR Handbook of Manures and Fertilizers
2. Tamhune, R.V. Motiamani, D.P. Soils: Their Chemistry and Fertility in Bali, Y.P. and Donahue, R.L. Tropical Asia.
3. Miller, R.W. and Donahue, R.L. Soils- An introduction to soils and Plant Growth
4. Das, P.K. Introduction to Soil Science
5. Brady, N.C. The nature and properties of soil
6. Mukherjee, S.K. and Biswas, T.D. An introduction to soil science
7. Mostara, M.R. Bhattacharya, P. Biofertilizers Technology, Marketing And Srivastava, D. and usage
8. ICAR Handbook of Manures and Fertilizers
9. Subla Rao, N.S. Biofertilisers in Agriculture and Forestry
10. Tandon, H.L.S. (ed.) Fertilizers Organic Manures, Recyclable Wastes and biofertilizers
11. Tilak, K.V.B.R. Bacteria Fertilizers

Signature of BOS: -



B. Sc. Third Semester: BOTANY
Choice Based Course -CBCB – 03(E3)
[Basic Computers and its Application]

THEORY: Lectures – 45 Hours / 68-70 Periods (Credits: Theory-3, Practicals-2)

Maximum Marks: 75

Internal assessment marks: 15 Term end examination marks: 60

Unit 1: (09 Hours / 14 Periods)
 Characteristics of computers, basic applications. Components of computer system; central processing unit, VDU, keyboard and mouse, input and output devices, computer memory, concepts of hardware and software. Concept of file, folder and directories, commonly used command.

Unit 2: (09 Hours / 14 Periods)
 Number System: Binary, Octal, and Hexadecimal; Fixed and Floating Point Number Representations, Complements. Binary Arithmetic: Addition, Subtraction, Multiplication and Division, Binary Codes.

Unit 3: (09 Hours / 14 Periods)
Computer fundamentals: Basic concept of computer organization, generations of computer, basic data and information, basic data types, flow chart and basic of operating system (windows, unix). Classification of computers: mainframe computers and super computers. computer language. Introduction in MS office software concerning word processing; spreadsheets and presentation software.

Unit 4: (09 Hours / 14 Periods)
Internet & Web: internet - introduction, importance, requirements for internet, LAN, WAN, www. Electronic mailing, chatting, search engine, web pages. Application of Computers in the field of Biology

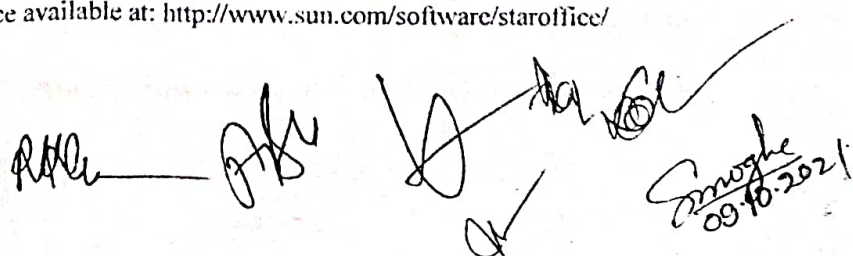
Unit 5: (09 Hours / 14 Periods)
 Applications of computers; Protein structure prediction, drug designing, evaluation by ramachandran plot, domain and motifs. Cluster analysis; phylogenetic clustering by simple matching coefficient, sequence comparison

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

Suggested Readings:

- V Rajaraman, Fundamentals of Computers, Fourth Edition, PHI.
- Anita Goel, Fundamentals of Computers; Forthcoming title in Pearson-Education
- ❖ Note: Use of Open Office/Star Office is recommended, as they are freely downloadable.
- ❖ Reference manual for Open Office available at: <http://www.openoffice.org>
- ❖ Reference manual for Star Office available at: <http://www.sun.com/software/staroffice/>

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Core Course -CCB – 04 [Ecology and Systematic Botany]

(Credits: Theory-3, Practicals-2)

THEORY: Lectures – 45 Hours / 68-70 Periods

Unit 1: Ecological factors and Ecosystem(09 Hours/ 14 Periods)

Soil: Origin, formation, composition, soil profile. Water: States of water in the environment, precipitation types. Light and temperature: Variation (Optimal and limiting factors); Shelford law of tolerance. Adaptation of hydrophytes and xerophytes. Structure; energy flow trophic organisation; Food chains and food webs, Ecological pyramids production and productivity; Biogeochemical cycling: Cycling of carbon, nitrogen and Phosphorous.

Unit 2: Plant communities, Phytogeography and Pollution (09 Hours/ 14 Periods)

Community concept; community Characters – Qualitative and quantitative; Ecotone and edge effect; Succession; Processes and types. Principle of Phytogeography; Endemism; Hotspot; Phyto-geographical zones in India: Pollution – Air, Water and Soil – cause and remedies. Global warming.

Unit 3: Introduction to plant taxonomy (09 Hours/ 14 Periods)

Identification, Classification, Nomenclature. Functions of Herbarium, important herbaria and botanical gardens of the world and India. Principles and rules (ICN); ranks and names; binominal system, typification, author citation, valid publication, rejection of names, principle of priority and its limitations. Types of classification-artificial, natural and phylogenetic. Bentham and Hooker (upto series), Engler and Prantl (upto series) and its merits and demerits.

Unit 4: Taxonomic description and Identification (09 Hours/ 14 Periods)

Dicotyledonous order and family – Characteristics and economic importance of following - Parietales (Brassicaceae), Malvales (Malvaceae), Geraniales (Rutaceae), Rosales (Fabaceae), Umbellales (Apiaceae), Gentianales (Apocyanaceae) Unisexuales (Euphorbiaceae), Lamiales (Lamiaceae), Astrales (Astraceae).

Unit 5: Taxonomic description and Modern taxonomy (Systematics) (09 Hours/ 14 Periods)

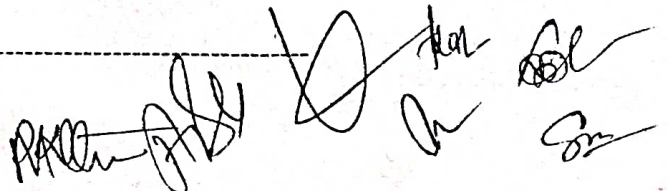
Monocotyledonous order and family- Characteristics and economic importance of following - Microspermae (Orchidaceae), Coronarieae (Liliaceae), Glumales (Cyperaceae and Poaceae).

Modern trends of taxonomy - Relation with other branches – Embryology, Anatomy Biochemistry and Cytology.

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

Suggested Readings

1. Kormondy, E.J. (1996). Concepts of Ecology. Prentice Hall, U.S.A. 4th edition.
2. Sharma, P.D. (2010) Ecology and Environment. Rastogi Publications, Meerut, India. 8th edition.
3. Simpson, M.G. (2006). *Plant Systematics*. Elsevier Academic Press, San Diego, CA, U.S.A.
4. Singh, G. (2012). *Plant Systematics: Theory and Practice*. Oxford & IBH Pvt. Ltd., New Delhi. 3rd edition.



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

Session 2021-2022
B.Sc. Semester III
SUBJECT ZOOLOGY
Paper (Pass Course)

Max. Marks: 60
Min. Pass Marks: 21

ANATOMY – PHYSIOLOGY AND EVOLUTION LECTURES: 45

UNIT-I Comparative Anatomy of various organs systems of Vertebrates.

1. Endoskeleton – Limbs, girdles and vertebrae.
2. Integument and its derivatives: structure of Scales, hair and feathers.
3. Alimentary canal and digestive glands in vertebrates.
4. Respiratory organs: Gills lung, Air sacs in birds.

UNIT-II 1. Circulatory system- Evolution of heart and ducts.

2. Urinogenital system –Kidney and excretory ducts.
3. Gonads and genital ducts.
4. Nervous System –General plan of brain and spinal cord.

UNIT- III 1. Digestion and absorption of dietary components.

2. Physiology of heart, Cardiac cycle and ECG.
3. Blood coagulation.
4. Respiration-Mechanism and control of breathing.

UNIT- IV 1. Excretion- Physiology of excretion, Osmoregulation,

2. Physiology of Muscle contraction.
3. Physiology of nerve impulse, Synaptic transmission.
4. Ear and Eye-structure and function.

UNIT-V Evolution

1. Evidences of organic evolution.
2. Theories of organic evolution.
3. Variation, Mutation, Isolation and Natural selection.
4. Evolution of Horse.

SUGGESTED READINGS

1. Kardong, K.V. (2005) *Vertebrates' Comparative Anatomy, Function and Evolution*. IV Edition. McGraw-Hill Higher Education.
2. Kent, G.C. and Carr R.K. (2000). *Comparative Anatomy of the Vertebrates*. IX Edition. The McGraw-Hill Companies.
3. Weichert C.K and William Presch (1970). *Elements of Chordate Anatomy*, Tata McGraw Hills
4. Hilderbrand, M and Gaslow G.E. *Analysis of Vertebrate Structure*, John Wiley and Sons.
5. Walter, H.E. and Sayles, L.P; *Biology of Vertebrates*, Khosla Publishing House
6. Guyton, A.C. & Hall, J.E. (2006). *Textbook of Medical Physiology*. XI Edition. Hercourt AsiaPTE Ltd. /W.B. Saunders Company.
7. Tortora, G.J. & Grabowski, S. (2006). *Principles of Anatomy & Physiology*. XI Edition John Wiley & sons.
8. Victor P. Eroschenko. (2008). *diFiore's Atlas of Histology with Functional correlations*. XII Edition. Lippincott W. & Wilkins.

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9. Arey, L.B. (1974). Human Histology. IV Edition. W.B. Saunders.
10. DeFiore Atlas of Human histology Physiology Vander
11. Ridley, M. (2004). *Evolution*. III Edition. Blackwell Publishing
12. Barton, N. H., Briggs, D. E. G., Eisen, J. A., Goldstein, D. B. and Patel, N. H.
13. (2007). *Evolution*. Cold Spring. Harbour Laboratory Press.
14. Hall, B. K. and Hallgrimsson, B. (2008). *Evolution*. IV Edition. Jones and Bartlett Publishers
15. Pevsner, J. (2009). *Bioinformatics and Functional Genomics*. II Edition. Wiley-Blackwell.
16. Campbell, N. A. and Reece J. B. (2011). *Biology*. IX Edition, Pearson. Benjamin, Cummings.
17. Douglas, J. Futuyma (1997). *Evolutionary Biology*. Sinauer Associates.
18. Minkoff, E. (1983). *Evolutionary Biology*. Addison-Wesley.

PRACTICAL (COMPARATIVE ANATOMY)

1. Study of placoid, cycloid and ctenoid scales through permanent slides/photographs.
2. Disarticulated skeleton of Frog, *Varanus*, Fowl, Rabbit
3. Carapace and plastron of turtle /tortoise
4. Mammalian skulls: One herbivorous and one carnivorous animal.
5. Study of permanent histological slides as per theory.

PRACTICAL (PHYSIOLOGY)

1. Recording of blood pressure using a sphygmomanometer
2. Examination of sections of mammalian oesophagus, stomach, duodenum, ileum, rectum, liver, trachea, lung, kidney
3. Demonstration of the unconditioned reflex action (Deep tendon reflex such as knee jerk reflex)
4. Preparation/Examination of mounts: Squamous epithelium, Striated muscle fibres and nerve cells
5. Examination of sections of Mammalian skin, Cartilage, Bone, Spinal cord, Nerve cell, Pituitary, Pancreas, Testis, Ovary, Adrenal, Thyroid and Parathyroid

PRACTICAL (EVOLUTION)

1. Study of fossil evidences from plaster cast models and pictures
2. Study of homology and analogy from suitable specimens/ pictures
3. Demonstration of changing allele frequencies with and without selection
4. Construction of cladogram based on morphological characteristics
5. Construction of phylogenetic tree with bioinformatics tools (Clustal X and Phylip)
6. Interpretation of phylogenetic trees

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सामान्य हिन्दी
चतुर्थ सत्र (सेमेस्टर)
सत्र : 2021-22
अनिवार्य प्रश्न पत्र
बी.ए./बी.एस-सी./बी.कॉम./बी.एच.एस-सी.

अंक योजना पूर्णांक : 100
मुख्य परीक्षा : 80
आंतरिक मूल्यांकन : 20

- इकाई - 1
1. पल्लवन, पारिभाषिक शब्दावली ।
 2. भारत वंदना (कविता)
- इकाई - 2
1. पत्र लेखन (निजी पत्र, व्यावहारिक पत्र, शासकीय पत्र, अर्द्ध शासकीय पत्र, आवेदन पत्र।)
 2. शिकागो से स्वामी विवेकानंद का पत्र ।
- इकाई - 3
- पर्यायवाची, युग्म शब्द, शब्द शुद्धि, उपसर्ग, प्रत्यय, तत्सम, तद्भव शब्द, मुहावरे-लोकोक्ति ।
- इकाई - 4
- देवनागरी लिपि, नामकरण, वैज्ञानिकता एवं विशेषताएं, कम्प्यूटर में हिन्दी का अनुप्रयोग, मानक हिन्दी स्वरूप, विशेषताएं और प्रकार ।
- इकाई - 5
1. हिन्दी अपठित, संक्षेपण ।
 2. ईदगाह (कहानी) प्रेमचंद ।

:: सहायक पुस्तकें ::

- | | |
|------------------------------|------------------------|
| 1. भारतीयता के अमर स्वर | - डॉ. धनंजय वर्मा |
| 2. प्रयोजनमूलक हिन्दी | - विनोद गोदरे |
| 3. कम्प्यूटर भाषिक अनुप्रयोग | - विजय कुमार मल्होत्रा |
| 4. हिन्दी संक्षिप्तलेखन | - रामप्रसाद किचलू |
| 5. हिन्दी शब्द सामर्थ्य | - शिवनारायण चतुर्वेदी |
| 6. हिन्दी व्याकरण एवं रचना | - डॉ. प्रभा व्योहार |
- म.प्र. हिन्दी ग्रंथ अकादमी

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NEW CURRICULUM OF B.Sc. CHEMISTRY

SEMESTER IV(2021-22) 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.

INORGANIC CHEMISTRY

UNIT-I A. CHEMISTRY OF LANTHANIDE ELEMENTS Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds.

B. CHEMISTRY OF ACTINIDES General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from uranium, similarities between the later actinides and the later lanthanides

UNIT-II A. ACIDS BASES : Arrhenius, Bronsted-Lowry, conjugate acids and bases, relative strengths of acids and bases, the Lux-flood, solvent system and Lewis concepts of acids and bases.

B. NON-AQUEOUS SOLVENTS : Physical properties of a solvent, types of solvents and their general characteristics, reaction in non-aqueous solvents with reference to liquid ammonia and liquid sulphur dioxide, HF, H₂SO₄, Ionic liquids

UNIT-III A. CARBOXYLIC ACIDS&DERIVATIVES

Preparation, Structure and bonding, Physical and chemical properties including, acidity of carboxylic acids, effects of substituents on acid strength, Hell-Volhard Zéilinsky reaction. Reduction of carboxylic groups, Mechanism of decarboxylation. Di carboxylic acids: Methods of formation and effect of heat and dehydrating agents, Hydroxyacids.

Structure of acid chlorides, esters, amides and acid anhydrides, Relative stability of acyl derivatives. Physical properties, inter-conversion of acid derivatives by nucleophilic acyl substitution. Mechanism of acid and base catalyzed esterification and hydrolysis.

B. ORGANIC COMPOUNDS OF NITROGEN:

(i)Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanism of nucleophilic substitution in nitroarenes and their reduction in acidic, neutral and alkaline medium.

(ii) Reactivity, structure and nomenclature of amines, physical properties. Stereochemistry of amines. Separation of mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Preparation of alkyl and aryl amines (reduction of nitro compounds and nitriles), reductive amination of aldehydic and ketonic compounds. Gabriel-Phthalimide reaction, Hofmann Bromamide reaction, Reactions of amines, electrophilic aromatic substitution of aryl amines, Reaction of amines with nitrous acid. Synthetic transformations of aryl diazonium salts, Azo coupling.

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UNIT IV A CHEMICAL EQUILIBRIUM Criteria of thermodynamic equilibrium, Concept of Fugacity, Thermodynamic derivation of relation between Gibbs free energy of reaction and reaction quotient. Coupling of exergonic and endergonic reactions. Equilibrium constants and their quantitative dependence on temperature, pressure and concentration.

B. PHASE EQUILIBRIUM . Phase rule, Phase, component and degree of freedom, derivation of Gibbs phase rule, limitation of phase rule, applications of phase rule to one component system: Water system and sulphur system. Application of phase rule to two component system: Pb-Ag system, desilverization of lead, Zn-Mg system Ferric chloride-water system, congruent and incongruent, melting point and eutectic point. Three component system: Solid solution liquid pairs. Nernst distribution law, Henry's law, application, solvent extraction

UNIT V- A. IONIC EQUILIBRIA

Ionization of weak acids and bases, pH scale, common ion effect; dissociation constants of mono protic acids (exact treatment). Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions; derivation of Henderson equation and its applications. Solubility and solubility product of sparingly soluble salts – applications of solubility product principle.

B. PHOTOCHEMISTRY

Characteristics of electromagnetic radiation, Interaction of radiation with matter, difference between thermal and photochemical processes, Lambert-Beer's law and its limitations, physical significance of absorption coefficients. Laws of photochemistry: Grothus-Drapper law, StarkEinstein law, quantum yield, actinometry, examples of low and high quantum yields, Photochemical equilibrium and the differential rate of photochemical reactions, Quenching, Role of photochemical reaction in biochemical process. Jablonski diagram depicting various process occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), photosensitized reactions, energy transfer processes (simple examples), Chemiluminescence.

REFERENCE BOOKS

1. Physical Chemistry, G. M. Barrow, International student edition, McGraw Hill.
2. University General Chemistry, C. N. R. Rao, Macmillan.
3. Physical Chemistry, R. A. Alberty, Wiley Eastern.
4. The elements of physical chemistry, Wiley Eastern.
5. Physical Chemistry through problems, S. K. Dogra & S. Dogra, Wiley Eastern.
6. Physical Chemistry, B. D. Khosla,.
7. Physical Chemistry, Puri & Sharma.
8. Bhautik Rasayan, Puri, Sharma and Pathania, Vishal Publishing Company.

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9. Bhautik Rasayan, P. L. Soni.
10. Bhautik Rasayan, Bahl and Tuli.
11. Physical Chemistry, R. L. Kapoor, Vol I-IV .
12. Chemical kinetics, K. J. Laidler, Pearson Educations, New Delhi (2004).

Paper –IV LABORATORY COURSE

INORGANIC CHEMISTRY

Qualitative semimicro analysis of mixtures containing 5 radicals. Emphasis should be given to the understanding of the chemistry of different reactions. The following radicals are suggested: CO_3^{2-} , NO_2^- , S_2^{2-} , SO_3^{2-} , $\text{S}_2\text{O}_3^{2-}$, CH_3COO^- , F^- , Cl^- , Br^- , I^- , NO_3^- , BO_3^{3-} , $\text{C}_2\text{O}_4^{2-}$, PO_4^{3-} , NH_4^+ , K^+ , Pb^{2+} , Cu^{2+} , Cd^{2+} , Bi^{3+} , Sn^{2+} , Sb^{3+} , Fe^{3+} , Al^{3+} , Cr^{3+} , Zn^{2+} , Mn^{2+} , Co^{2+} , Ni^{2+} , Ba^{2+} , Sr^{2+} , Ca^{2+} , Mg^{2+} . Mixtures should preferably contain one interfering anion, or insoluble component (BaSO_4 , SrSO_4 , PbSO_4 , CaF_2 or Al_2O_3) or combination of anions e.g. CO_3^{2-} and SO_3^{2-} , NO_2^- and NO_3^- , Cl^- , Br^- , I^- .

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 permanganometry. (d) Estimation of hardness of water by EDTA. (e) Estimation of ferrous & ferric by dichromate method. (f) Estimation of copper using thiosulphate. • Principles involved in chromatographic separations. Paper chromatographic separation of following metal ions: i. Ni (II) and Co (II) ii. Fe (III) and Al (III)

ORGANIC CHEMISTRY • Detection of elements (X, N, S). • Qualitative analysis of unknown organic compounds containing simple functional groups (alcohols, carboxylic acids, phenols, nitro, amine, amide, and carbonyl compounds, carbohydrates) • Preparation of Organic Compounds: (i) m-dinitrobenzene, (ii) Acetanilide, (iii) Bromo/Nitro-acetanilide, (iv) Oxidation of primary alcohols-Benzoic acid from benzylalcohol, (v) azo dye.

PHYSICAL CHEMISTRY Transition Temperature • Determination of the transition temperature of the given substance by thermometric/ dilatometric method (e.g. $\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$ / $\text{SrBr}_2 \cdot 2\text{H}_2\text{O}$). Thermochemistry • Determination of heat capacity of a calorimeter for different volumes using change of enthalpy data of a known system (method of back calculation of heat capacity of calorimeter from known enthalpy of solution or enthalpy of neutralization). • Determination of heat capacity of the calorimeter and enthalpy of neutralization of hydrochloric acid with sodium hydroxide. • To determine the solubility of benzoic acid at different temperature and to determine ΔH of the dissolution process. • To determine the enthalpy of neutralization of a weak acid/ weak base versus strong base/ strong acid and determine the enthalpy of ionization of the weak acid/ weak base. • To determine the enthalpy of solution of solid calcium chloride and calculate the lattice energy of calcium chloride from its enthalpy data using Born Haber cycle. Phase Equilibrium • To study the effect of a solute (e.g. NaCl, Succinic acid) on the critical solution temperature of two partially miscible liquids (e.g. phenol-water system) and to determine the concentration of that solute in the given phenol-water system. • To construct the phase diagram of two component system (e.g. diphenylamine– benzophenone) by cooling curve method. •

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Distribution of acetic/ benzoic acid between water and cyclohexane. • Study the equilibrium of at least one of the following reactions by the distribution method: (i) $I_2(aq) + I^- \rightarrow I_3(aq)$ (ii) $Cu^{2+}(aq) + nNH_3 \rightarrow Cu(NH_3)_n$ Molecular Weight Determination Determination of molecular weight by Rast Camphor and Landsburger method. Note: Experiments may be added/ deleted subject to availability of time and facilities.

Reference Books 1. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
2. Furniss, B.S., Hannaford, A.J., Smith, P.W.G. & Tatchell, A.R. Practical Organic Chemistry, 5th Ed. Pearson (2012)

3. Ahluwalia, V.K. & Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000). 22

4. Ahluwalia, V.K. & Dhingra, S. Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press (2000).

5. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011). Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. Experiments in Physical Chemistry 8th Ed.; McGraw-Hill: New York (2003).

6. Halpern, A. M. & McBane, G. C. Experimental Physical Chemistry 3rd Ed.; W.H. Freeman & Co.: New York Hrs.5

PRACTICAL EXAMINATION M.M.50 Three Experiments are to be performed.

1. Inorganic – Qualitative semimicro analysis of mixtures. 12 marks OR One experiment from synthesis and analysis by preparing the standard solution.

2. (a) Identification of the given organic compound & determine its M.Pt./B.Pt. 6 marks (b) Determination of Rf value and identification of organic compounds by paper chromatography. 6 marks

3. Any one physical experiment that can be completed in two hours including calculations. 12 marks

4. Viva 10 marks

5. Sessional 04 marks In case of Ex-Students one marks will be added to each of the experiment. Page -4

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Laboratory work
(B.Sc. – III & IV Semester)
(CORE COURSE – CCB- 03 & 04)

TIME: 3 Hrs.

Marks – 25+25 = 50

Core Course – CCB 03 ----25 marks		CCB 04 = Choice courses(CBCB 04 E1)---25 marks	
1. Ecological experiment	04	1. Description of ethno medical plant	04
2. Physico-chemical analysis	04	2. Description of herbal medicinal plant	04
3. Plant Description	04	3. Phytochemical screening test	04
4. Field Report (Local flora : Rainy / winter/summer season)	04	4. Field report of ethno medicinal / herbal medicinal plant	04
5. Spotting	04	5. Spotting	04
6. Viva- voce	05	6. Sessional	05

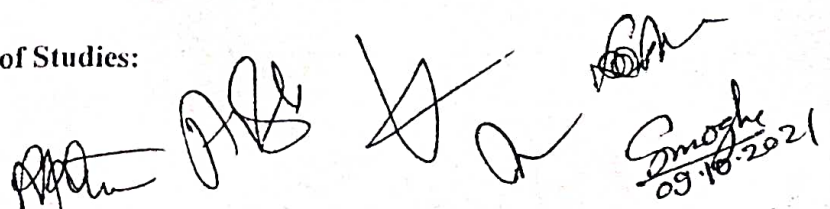
Suggested Laboratory Exercises (CCB- 03)

- Determination of pH, carbonates, chlorides, nitrates and sulphates of the grassland and woodland soils.
- To determine moisture content and water holding capacity of grassland and woodland soils.
- To study the vegetation structure through profile diagram.
- To estimate transparency, pH and temperature of different water bodies.
- To measure dissolved oxygen contained in polluted and unpolluted water sample.
- To estimate slightly or different water samples.
- To determine minimum number of Quadrat size for the study of herbaceous vegetation in the college campus by species area curve method.
- To study the Frequency of herbaceous species in grassland and to compare the frequency distribution with Raunkair's Standards Frequency diagram.
- To study the Frequency of herbaceous species in grassland and to compare the frequency distribution with Raunkair's Abundance Standards Frequency diagram.
- To study the Frequency of herbaceous species in grassland and to compare the frequency distribution with Raunkair's density Standards Frequency diagram.
- To measure the above ground biomass in a grassland.
- To study the vegetative and floral characters of families mention in syllabus.
- Mounting of a properly dried and pressed specimen of local flora of cultivated and wild plants species included in syllabus.

Suggested Laboratory Exercises (CBCB- 04 E1)

- To study the vegetative and floral characters of ethnomedicinal plant species especially modern medicine mentioned in syllabus.
- To study the vegetative and floral characters of folk medicinal plant species especially modern medicine mentioned in syllabus.
- To study the vegetative and floral characters of herbal medicinal plant species especially modern medicine mentioned in syllabus.
- Biological testing of herbal drugs.
- Phytochemical screening test for secondary metabolite/alkaloids, phenolic compound, flavonoids, steroids, triterpenoids.
- Vegetative propagation of Ethno medicinal plants.

Signature of Convener & Members, Board of Studies:



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

B. Sc. ZOOLOGY – SEMESTER: IV

Paper: Choice Based Course - A

Session 2021-22

ECONOMIC ZOOLOGY (CREDITS: THEORY-3) LECTURES: 45

Max. Marks: 60

Min. Pass Marks: 21

Unit 1: Bee-keeping and Bee Economy (Apiculture)

Varieties of honey bees and Bee pasturage; Setting up an apiary: Langstroth's/Newton's hive, bee veil, brood and storage chambers, iron frames and comb sheets, drone excluder, rearing equipments, handling of bees, artificial diet; Diseases of honey bee, American and European Foulbrood, and their management; Honey extraction techniques; Physico-chemical analysis of honey; Other beneficial products from bee; Visit to an Apiculture Institute and honey processing Units

Unit 2: Silk and Silk Production (Sericulture)

Different types of silk and silkworms in India; Rearing of *Bombyxmori* – Rearing racks and trays, disinfectants, rearing appliances, black boxing, Chawki rearing, bed cleaning, mountages, harvesting of cocoons; Silkworm diseases: Pebrine, Flacherie, Grasserie, Muscardine and Aspergillosis, and their management; Silkworm pests and parasites: Uzi fly, Dermestid beetles, and their management; Silk reeling techniques; Quality assessment of silk fibre.

Unit 3: Aquaculture

Brood stock management; Induced breeding of fish and prawn; Management of hatchery of fish; Management of nursery, rearing and stocking ponds; Preparation and maintenance of fish aquarium; Preparation of compound diets for fish; Role of water quality in aquaculture; Fish diseases: Bacterial, viral and parasitic; Preservation and processing of harvested fish; Fishery by-products.

Unit 4: Poultry Farming

Introduction: Indigenous and exotic breeds; Rearing, housing, feed and rationing; Commercial importance of poultry farming; Varietal improvement techniques; Diseases and their management; poultry farm management and business plan; Visit to any Poultry Poultry farm.

Unit 5: Dairy Farming

Introduction; Indigenous and exotic breeds; Rearing, housing, feed and rationing; Commercial importance of dairy farming; Varietal improvement techniques; Diseases and their management; Dairy farm management and business plan; Visit to any Dairy farm.

SUGGESTED READINGS

1. Prost, P. J. (1962). *Apiculture*. Oxford and IBH, New Delhi.
2. Sericulture, *FAO Manual of Sericulture*.
3. Hafez, E. S. E. (1962). *Reproduction in Farm Animals*, Lea and Fabiger Publishers.
4. Srivastava, C. B. L. (1999). *Fishery Science and Indian Fisheries*. Kitab Mahal publications, India.
5. Sardar Singh, *Beekeeping in India*, Indian council of Agricultural Research, New Delhi.
6. Dhyan Singh Bisht, *Apiculture*, ICAR Publication.
7. Knobil, E. and Neill, J. D. (2006). *The Physiology of Reproduction*, Vol. 2, Elsevier Publishers.

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

B. Sc. ZOOLOGY – SEMESTER: IV

Paper: Choice Based Course - B

Session 2021-22

WILD LIFE CONSERVATION AND MANAGEMENT

LECTURES: 45

Max. Marks: 60

Min. Pass Marks: 21

Unit 1:

Wild life - Values of wild life - positive and negative; Our conservation ethics; Importance of conservation; Causes of depletion; World conservation strategies. Habitat analysis, Evaluation and management of wild life - Physical parameters: Topography, Geology, Soil and water; Biological Parameters: food, cover, forage, browse and cover estimation; Standard evaluation procedures: remote sensing and GIS.

Unit 2:

Management of habitats - Setting back succession; Grazing logging; Mechanical treatment; Advancing the successional process; Cover construction; Preservation of general genetic diversity.

Unit 3:

Population estimation: Population density, Natality, Birth rate, Mortality, fertility schedules and sex ratio computation; Faecal analysis of ungulates and carnivores: Faecal samples, slide preparation, Hair identification, Pug marks and census method.

Unit 4:

National Organizations involved in wild life conservation; Elementary idea of Wild life Legislation - Wild Protection act - 1972, its amendments and implementation.

Management of excess population & translocation; Bio-telemetry; Care of injured and diseased animal; Quarantine; Common diseases of wild animal

Unit 5

Protected areas National parks & sanctuaries, Community reserve; Important features of protected areas in India; Tiger conservation - Tiger reserves in India; Management challenges in Tiger reserve. Management planning of wild life in protected areas; Estimation of carrying capacity; Eco tourism / wild life tourism in forests; Concept of climax persistence;

PRACTICALS

1. Identification of flora, mammalian fauna, avian fauna, herpeto-fauna
2. Demonstration of basic equipment needed in wildlife studies use, care and maintenance (Compass, Binoculars, Spotting scope, Range Finders, Global Positioning System, Various types of Cameras and lenses)
3. Familiarization and study of animal evidences in the field; Identification of animals through pug marks, hoof marks, scats, pellet groups, nest, antlers etc.
4. Demonstration of different field techniques for flora and fauna
5. PCQ, Ten tree method, Circular, Square & rectangular plots, Parker's 2 Step and other methods for ground cover assessment, Tree canopy cover assessment, Shrub cover assessment.
6. Trail / transect monitoring for abundance and diversity estimation of mammals and bird (direct and indirect evidences).

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B. Sc. ZOOLOGY – SEMESTER: IV

Paper: Choice Based Course - C

Session 2021-22

IMMUNOLOGY

(CREDITS: THEORY-3)

THEORY

LECTURES: 45

Unit 1: Overview of Immune System

Historical perspective of Immunology, Early theories of Immunology, Haematopoiesis, Cells and organs of the Immune system

Unit 2: Innate and Adaptive Immunity

Anatomical barriers, Inflammation, Cell and molecules involved in innate immunity. Adaptive immunity (Cell mediated and humoral). Passive: Artificial and natural Immunity. Active: Artificial and natural Immunity, Immune dysfunctions.

Unit 3: Antigens

Antigenicity and immunogenicity, Immunogens, Adjuvants and haptens, Factors influencing immunogenicity, B and T-Cell epitopes

Immunoglobulins

Structure and functions of different classes of immunoglobulins, Antigen-antibody interactions. Immunoassays, Polyclonal sera, Monoclonal antibodies, Hybridoma technology

Unit 4 Major Histocompatibility Complex

Structure and functions of endogenous and exogenous pathway of antigen presentation Cytokines-Properties and functions, Cytokine-based therapies

Unit 5: Hypersensitivity

Gell and Coombs' classification and Brief description of various types of hypersensitivities Vaccines -Types of vaccines: Recombinant vaccines and DNA vaccines

PRACTICAL

1. Demonstration of lymphoid organs
2. Ouchterlony's double immuno-diffusion method
3. ABO blood group determination
4. Preparation of single cell suspension of splenocytes from chick spleen, cell counting and viability test
5. ELISA/ dot Elisa (using kit)
6. Principles, experimental set up and applications of immuno-electrophoresis, RIA, F

SUGGESTED READINGS

1. Kindt, T. J., Goldsby, R.A., Osborne, B. A. and Kuby, J (2006). *Immunology*, VI Edition. W.H. Freeman and Company.
2. David, M., Jonathan, B., David, R. B. and Ivan R. (2006). *Immunology*, VII Edition, Mosby, Elsevier Publication.
3. Abbas, K. Abul and Lechtman H. Andrew (2003.) *Cellular and Molecular Immunology*: V Edition. Saunders Publication.

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

Practical

B.Sc. Semester III +IV

Session: 2021-22 (M.M. 50)

PRACTICAL WORK

SCHEME OF PRACTICAL EXAMINATION

1. Spots-8(Slides-4, Bones-4)	16
2. Exercise based on Physiology	04
3. Exercise based on Evolution	05
4. Two Exercises based on Applied Zoology/ Wild life/Immunology	10
5. Viva	05
6. Sessional marks	10
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Total	50

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Paper-II
WAVES, ACOUSTICS AND OPTICS

Unit-1 Waves in media: Speed of transverse waves on uniform string, speed of longitudinal waves in a fluid, energy density and energy transmission in waves. Waves over liquid surface: gravity waves and ripples. Group velocity and phase velocity and relationship between them. Production and detection of ultrasonic and infrasonic waves and applications.

Reflection, refraction and diffraction of sound : Acoustic impedance of a medium, percentage reflection & refraction at a boundary, impedance matching for transducers, diffraction of sound, principle of a sonar system, sound ranging.

Unit-2 Fermat's Principle of extremum path, the aplanatic points of a sphere and other applications. Cardinal points of an optical system, thick lens and lens combinations. Lagrange equation of magnification, telescopic combinations, telephoto lenses. Monochromatic aberrations and their reductions; aspherical mirrors and Schmidt corrector plates, aplanatic points, oil immersion objectives, meniscus lens.

Optical instruments: Entrance and exit pupils, need for a multiple lens eyepiece, common types of eyepieces. (Ramsdon and Hygen's eyepieces).

Unit-3 Interference of light: The principle of superpositions, two slit interference, coherence requirement for the sources, optical path retardations, Conditions for sustained interference, Theory of interference, Thin films. Newton's rings and Michelson interferometer and their applications its application for precision determinations of wavelength, wavelength difference and the width of spectral lines. Multiple beam interference in parallel film and Fabry-Perot interferometer. Rayleigh refractometer, Twyman-Green interferometer and its uses.

Unit-4 Diffraction, Types of Diffraction, Fresnel's diffraction, half-period zones, phasor diagram and integral calculus methods, the intensity distribution, Zone plates, diffraction due to straight edge, Fraunhofer diffraction due to a single slit and double slit, Diffraction at N-Parallel slit, Plane Diffraction grating, Rayleigh criterion, resolving power of grating , Prism, telescope.

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Polarized light and its mathematical representation, Production of polarized light by reflection, refraction and scattering. Polarization by double refraction and Huygen's theory, Nicol prism, Retardation plates, Production and analysis of circularly and elliptically polarized light. Optical activity and Fresnel's theory, Biquartz polarimeter.

Unit-5 Laser system: Basic properties of Lasers, coherence length and coherence time, spatial coherence of a source, Einstein's A and B coefficients, Spontaneous and induced emissions, conditions for laser action, population inversion, Types of Laser : Ruby and He-Ne laser and. Applications of laser : Application in communication, Holography and Basics of non linear optics and Generation of Harmonic.

TEXT AND REFERENCE BOOKS:

1. A.K. Ghatak, 'Physical Optics'
2. D.P. Khandelwal, 'Optical and Atomic Physics' (Himalaya Publishing House, Bombay, 1988)
3. K.D. Moltev; 'Optics' (Oxford University Press)
4. Sears: 'Optics'
5. Jenkins and White: 'Fundamental of Optics' (McGraw-Hill)
6. B.B. Laud: Lasers and Non-linear Optics (Wiley Eastern 1985)
7. Smith and Thomson: 'Optics' (John Wiley and Sons)
8. Berkely Physics Courses: Vol.-III, 'Waves and Oscillations'
9. I.G. Main, 'Vibrations and Waves' (Cambridge University Press)
10. H.J. Pain: 'The Physics of Vibrations and Waves' (MacMillan 1975)
11. Text Book of Optics: B.K. Mathur
12. B.Sc. (Part III) Physics: Editor: B.P. Chandra, M.P. Hindi Granth Academy.
13. F. Smith and J.H. Thomson, Manchester Physics series: optics (John wiley, 1971)
14. Born and Wolf : 'Optics'.
15. Physical Optics: B. K. Mathur and T. P. Pandya.
16. A textbook of Optics: N. Subrahmanyam, Brijlal and M. N. Avadhanulu.
17. Geometrical and Physical Optics: Longhurst.
18. Introduction to Modern Optics: G. R. Fowels.
19. Optics: P. K. Srivastav.

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PRACTICALS

Minimum 16 (Eight from each group)

Experiments out of the following or similar experiments of equal standard

1. Study of Brownian motion.
2. Study of adiabatic expansion of a gas.
3. Study of conversion of mechanical energy into heat.
4. Heating efficiency of electrical kettle with varying voltage.
5. Study of temperature dependence of total radiation.
6. Study of temperature dependence of spectral density of radiation.
7. Resistance thermometry.
8. Thermo emf thermometry.
9. Conduction of heat through poor conductors of different geometries.
10. Experimental study of probability distribution for a two-option system using a coloured dice.
11. Study of statistical distribution on nuclear disintegration data (GM counter used as a black box).
12. Speed of waves on a stretched strings.
13. Studies on torsional waves in a lumped system.
14. Study of interference with two coherent source of sound.
15. Chlandi's figures with varying excitation and loading points.
16. Measurements of sound intensities with different situations.
17. Characteristics of a microphone-loudspeakers system
18. Designing an optical viewing system.
19. Study of monochromatic defects of images.
20. Determining the principle point of a combination of lenses.
21. Study of interference of light (biprism or wedge film).
22. Study of diffraction at a straight edge or a single slit.
23. Study of F-P etalon fringes.
24. Study of diffraction grating and its resolving power.
25. Resolving power of telescope system.
26. Polarization of light by reflection; also cos-squared law.
27. Study of optical rotation for any system.
28. Study of laser as a monochromatic coherent source.
29. Study of a divergence of laser beam.
30. Calculation of days between two dates of a year.
31. To check if triangle exists and the type of a triangles.
32. To find the sum of the sine and cosines series and print out the curve.

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33. To solve simultaneous equation by elimination method.
34. To prepare a mark-list of polynomials.
35. Fitting a straight line or a simple curve
36. Convert a given integer into binary and octal systems and vice versa .
37. Inverse of a matrix.
38. Spiral array.

TEXT AND REFERENCE BOOKS

1. D.P. Khandelwal, Optics and Atomic physics (Himalaya Publishing house, Bombay 1988).
2. D.P. Khandelwal, A Laboratory Manual for Undergraduate Classes (Vani Publishing House, New Delhi).
3. S. Lipschutz and a Poe, Schaum's outline of theory and Problems of Programming with Fortran (McGraw-hill Book Company 1986).
4. C Dixon, Numerical Analysis .

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GOVT. BILASA GIRLS' P.G. COLLEGE BILASPUR (C.G.)**B.Sc. Semester IV
COMPUTER SCIENCE****INTRODUCTION TO DATA STRUCTURE AND OOPS****UNIT-I**

Introduction, Procedure-Oriented Programming paradigm, Object-Oriented Programming paradigm, Basic characteristics of OOP's: object, class, encapsulation, inheritance, reusability, polymorphism and overloading, static and dynamic binding, message passing, benefits of OOP's and application of OOP's.

UNIT-II

C++ Basics: Overview, Syntax, Comments, Basic Data types, Tokens, identifiers, Keywords, Constants/Literals, Variables, Variable Scope, Modifier Types, Storage Classes, Operator, array, Strings, pointer, References, Date & Time, I/O statements, namespace, Program structure, typecasting, control statements: if statement, if-else statement, nested if-else statement, ladder if-else, switch statement, for loop statement, while loop statement, do-while loop statement.

UNIT-III

Objects and classes : Basics of object and class and abstract class in C++, private and public members, static data and function members, function prototype, inline functions.

Introduction to : function overloading, friend functions, default arguments, constructors and destructors, inheritance and polymorphism.

UNIT-IV

Linear and Non linear data structures, Data structure operations, Algorithmic notations, Complexity of algorithms, Control structures. Memory representation and operations on:

Arrays- One dimensional, Multidimensional arrays.

Linked List- Singly and Doubly Linear link lists, circular linked list

Stack: PUSH, POP, TRAVERSE, implementations using array and linked list,

Applications of stack: Infix, Prefix, Postfix representation and conversion using stack, Postfix expression evaluation using stack, use of stack in recursion, Polish notation.

Queues: Priority Queue, Deques

UNIT V

Definition of trees and their types, Binary trees, Properties of Binary trees and Implementation operation (Insertion, deletion, searching and traversal algorithm: preorder, post order, in-order traversal), Definition of Binary Search Trees, AVL Trees, B trees, multi way search trees.

Sorting: Sequential Sort, Insertion Sort, Selection Sort, Bubble Sort, Quick Sort, Merge Sort, Heap Sort, Radix sort.

Linear or sequential search, Binary search.

TEXT/REFERENCE BOOKS:

1. "Data structures using C", Tenenbum, PHI, 1996
2. "Fundamentals of Data Structures", Horowitz and Sahani, Computer Science Press, 1978
3. "Data structures and Algorithms", Aefred V. Aho, Jhon E. Joperoft and J.E. Ullman.
4. "An Introduction to Data Structures with Applications", Jean Paul Trembley and Paul Sorenson, TMH, International Student Edition, 1985
5. "Data Structures and Program Design in C", R. Kurse, Leung & Tondo, 2nd Edition, PHI publication
6. Data Structures, Seymour Lipschutz, Schaum's Outlines, TMH.

TEXT/REFERENCE BOOKS:

1. "Object-Oriented Programming with C++", E. Balaguruswamy, TMH
2. "C++ The Complete Reference", Herbert Schildt, Osborne, TMH, latest
3. "Object-oriented programming with C++", Robert Lafore, Macmillan computer
4. "Tech yourself C++", Herbert Schildt, Osborne, TMH
5. "C & C++ Complete reference", Herbert Shieldt, Osborne, TMH
6. "Object-Oriented programming in C++", NabajyotiBarkakati, PHI
7. "C++ Primer Plus", Stephen Prata, Galgotia Publications, 1996
8. "Object-Oriented analysis and Design with applications", Grady Booch

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~~Programming Lab in C++ and Data Structure~~
Programming Lab in c++ and Data Structure

C++ Lab

1. Write a C++ program for finding greatest of three numbers.
2. Write a C++ program for solving the quadratic equation.
3. Write a C++ program to print all the prime numbers in the given range.
4. Write a C++ program for displaying the Fibonacci series.
5. Write a C++ function for swapping two numbers without using third variable.
6. Write a C++ function for string reverse, string palindrome, string comparison.
7. Write a C++ program for sorting the number in ascending and descending order.
8. Write a C++ program for matrix addition and multiplication.
9. Write a C++ program for copy constructor and dynamic initialization of constructor.
10. Write a C++ program for array of pointers to objects.
11. Write a C++ program for operator overloading using friend function.
12. Write a C++ program for different types of inheritance using virtual base class.
13. Write a C++ program for run time polymorphism.
14. Write a C++ program to perform sorting using generic function(template).

Data Structure Lab

Linked List

1. Implement a menu driven program for Linked List.
2. Representation of sparse matrix using multi Linked Structure Implementation of Sparse matrix multiplication.
3. Implementation of polynomial operations (addition, subtraction) using Linked List.
4. Implementation of Double Ended Queue using Linked List.
5. Implementation of priority queue program using Linked List.

Stack

1. Implementation of menu driven program for stack.
2. Implementation of stack in one array.
3. Implementation of postfix to infix transformation and its evaluator program.
4. Implementation of infix to postfix transformation and its evaluator program.
5. Simulation of postfix to infix transformation and its evaluator program.

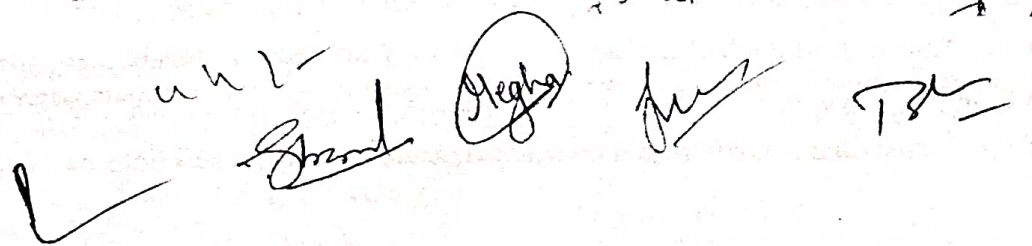
Queue

1. Implementation of circular queue menu driven program.
2. Implementation of queue menu driven program.
3. Implementation of priority queue program using array.

Tree

1. Implementation of binary tree menu driven program.
2. Implementation of binary tree traversal program.
3. Implementation of construction of expression tree using postfix expression.
4. Implementation of B tree menu driven program.
5. Implementation of B+ tree program.
6. Implementation of preorder traversal of a threaded binary tree.

Sorting and Searching program

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GOVT. BILASA GIRLS' P.G. COLLEGE BILASPUR(C.G.)

Session 2021-22

B.Sc. MATHEMATICS

SEMESTER :IV PAPER : ADVANCED CALCULUS AND
DIFFERENTIAL EQUATIONS-II

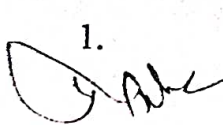
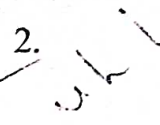
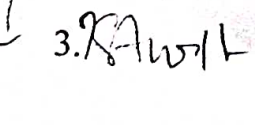

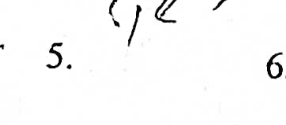

Max. Marks: 80;Min.Marks:28

Hours 45;Credit-3

- UNIT I** Envelopes. Evolutes. Maxima , Minima and saddle points of functions of two variables. Lagrange's multiplier method..
- UNIT II** Beta and Gamma functions. Double and triple integrals. Dirichlet's integral. Change of Order of integration in double integrals.
- UNIT III** Partial differential equations of the first order. Lagrange's solution. Some special types of equations which can be solved easily by methods other than the general method. Charpit's general method of solution.
- UNIT IV** Partial differential equation of second and higher orders. Classification of linear partial differential equations of second order.Homogeneous and non - homogeneous equations with constant coefficients. Partial differential equation reducible to equations with constant coefficient.
- UNIT V** Calculus of Variations - Variational problems with fixed boundaries, Euler's equations for functionals containing first order derivatives and one independent variable. Extremals. Functional dependent on higher order derivatives. Functionals dependent on more than one dependent variable. Variational problems in parametric form. Invariance of Euler's equation under coordinates transformation.

REFERENCES:

1. C. H. Edwards and D. E. Penny, D E and BVP Pearson education, India 2005.
2. Dennis G. Zill, A first course in differential equations,
3. S. L. Ross: Differential equations, John Wiley and Sons, 2004.
4. Zafar Ahsan: Text Book of Differential Equations and their Applications, PHI
5. Khalil Ahmad: Text Book of Differential Equations, World Education Publishers, 6. D.A.
6. A.S. Gupta: Calculus of variations with applications, Prentice Hall of India, 1997.
8. I.N. Sneddon: Elements of Partial Differential Equations, McGraw Hill Company, 1988.

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Session: 2021-22**Govt. Bilasa Girls P.G. College, Bilaspur(C.G.)****BIOTECHNOLOGY****B. Sc. Fourth Semester****(Plant/Animal Biotechnology, DNA Technology and Ethical Issues)****THEORY: Lectures – 45 Hours / 68-70 Periods**

Max. Marks – 60
 Passing marks - 21
 Time of Exam. – 2.5 Hrs.

Maximum Marks: 75
 Internal assessment marks: 15
 Term end examination marks: 60

Unit – 1: Plant Tissue Culture:**(9 Hours/14 Periods)**

Basic techniques of plant tissue culture, in-vitro pollination & fertilization, embryo culture & its applications. embryogenesis & organogenesis. Micro propagation, haploids & its application. Somaclonal variations & its applications. Endosperm culture & Production of triploids.

Unit – 2: Animal tissue culture:**(9 Hours/14 Periods)**

Tissue culture media: Physiochemical properties. Balance Salt Solution, complete media, Serum, Serum Free Medium - Advantages and Disadvantages. Equipment's, Culture Vessel and Sterilization. Primary Cell Culture. Cell lines: Finite and continuous cell line.

Unit-3: Molecular Tools For Gene Cloning Nucleases:**(9 Hours/14 Periods)**

Exonucleases and Endonucleases, Restriction Enzymes (Type I, Type II, Type III, Type IV & Type V). RNases Methylases: CpG Methylase, Dam Methylase, Dcm Methylase Polymerases: DNA Pol I, Klenow Fragments, Reverse Transcriptase, Taq & Pfu Polymerases Ligases: T4 DNA Ligase, *E.coli* DNA Ligase, T4 RNA Ligase Topoisomerases: Type I(A, B) & Type II(A,B) End Modifying Enzymes: Terminal Transferase, T4 Polynucleotide Kinase, Alkaline Phosphatases

Unit-4: Vectors and Gene Cloning**(9 Hours/14 Periods)**

Introduction to cloning vectors - Desirable properties of vectors – Prokaryotic & Eukaryotic Expression Systems (Constitutive & Inducible) Plasmid Vectors - Phage Vectors - Cosmids -Phagemids - BACs - Yeast Vectors – YACs. Physical and chemical method of introduction of recombinant vector into host. Genomic libraries, cDNA Cloning. Screening of recombinants (blue-white screening and hybridization)

Unit – 5: Transgenic animal and Bioethical issues:**(9 Hours/14 Periods)**

Cloning in mammalian cells, integration of DNA into mammalian genome. Transgenic animals (Fish, Mice and Sheep). Bioethical and Regulatory issues; Medical ethics, facts and technology involves in bioethical issues. Intellectual property rights introduction, trade secret, patents, and copyright and plant variety protection

Suggested Books:

1. Gene Cloning - An introduction, T.A. Brown. Van Reinhold,
2. Recombinant DNA - Watson JD, Gilman M, Witkowski J and Zoller M, 1992. Second Ed. Scientific American Books.
3. Principles and Practice of Animal Tissue Culture; Sudha Gangal Universities Press

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Session 2021-22

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

BIOTECHNOLOGY

Fourth Semester

Laboratory Work

1. Isolation of plasmid by alkaline lysis method.
2. Preparation of bacterial competent cells.
3. Transformation & screening of transformants in bacteria.
4. Isolation of genomic DNA from onion.
5. Southern / western blotting Technique
6. Replica plating technique.
7. Restriction digestion of isolated plasmid DNA.
8. Identification of Lac⁺ bacteria by blue white screening using IPTG
9. To design a primer for Polymerase chain Reaction using BLAST and FastA.
10. Demonstration of PCR and DNA sequencing.
11. Estimation of DNA from plant cells
12. Sterilization of Plant material.
13. Plant tissue culture by plant parts.
14. To prepare medium for Plant tissue culture
15. Callus induction and Organogenesis

Scheme of Practical Examination:

- ❖ Schedule of Examination – In Second semester only [CCBT-03+CCBT-04]
- ❖ Total Marks - 50
- ❖ Marks distribution –
 - Lab. Task - 30 marks[15 from each course-CCBT-03 & CCBT-04]
 - Question of 20 marks - [two questions (10+5)] from course
 - Question of 20 marks - [two questions (10+5)] from course
 - Spotting-5 spots -10 marks [at least two spots from each course [CCBT-03 & CCBT-04]
 - Viva-voce - 05 marks
 - Sessional - 05 marks

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Signature of Members, Board of Studies: