1.1.1 THE INSTITUTION ENSURES EFFECTIVE CURRICULUM PLANNING AND DELIVERY THROUGH A WELL-PLANNED AND DOCUMENTED PROCESS INCLUDING ACADEMIC CALENDAR AND CONDUCT OF CONTINUOUS INTERNAL ASSESSMENT

St. Bede's College Shimla

2018-19

2019-20

2020-21

2021-22

2022-23

St. Bede's College Shimla

2018-19

Political Science

DEPARTMENT OF POLITICAL SCIENCE

(Course plan for 2018-19)

CLASS – B.A I

PAPER– Introduction to Political Theory

S. No.	DATE	TOPICS TO BE COVERED	No. of Lectures	ACADEMIC ACTIVITY
1.	August-September	1.Discussion of the syllabus 2. Suggested Readings 3. Pattern of the Exam 4. Pattern of Internal Assessment UNIT –I 1.What is Politics? 2.Evolution of Political Science as a subject. 3. Approaches to study Political science. 4.What is Political Theory and its relevance?	03 04	• Bridge Classes • Orientation of for the students • Explaining about college library Departmental Library • Group Discussion on Politics • Assignments • Power Point Presentations
2.	October	UNIT –II 1.What is State? 2. Elements & meaning of state. 3.Various Theories on origin of state 4.Civil Society ,its meaning and relevance 5. Relationship between civil society and state	2 2 2 2 1	• Tutorials • Quiz • Class Test • Explaining Glorious revolution • PPT-Civil war
4.	November	6.Theoretical Concepts – Liberty Equality Justice UNIT-III 1. What is Democracy ? 2.Debates on Democracy & economic growth.	3 3 3 3	• Lecture • Assignments • Paper Presenatation • Discussion on previous year papers • Lecture Method

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		3 Tenets of democracy. 4. Types of Democracy.	4	
5.	December	1.Liberalistic & socialist Perspective. 2.Differnce between liberalism and socialism. 3. Why socialism? Relevance of Socialism.	3 3 3	• Class tests • MCQ's • Tutorials • Class discussion
6.	February	UNIT-IV 1.Protective Discrimination 2.What is Principle of Fairness? Principles. 3.Rawlsian theory of Justice	3 3 3	• Presentations • Class Discussion • Tutorial • Quiz • Minor Tests
7.	March	4.Institution of Family and State Intervention . Revision 1.Revision of the syllabus	4 4	• Paper Presentation • PPT • Lecture mode • Class Test
Total			**60**	

CLASS – B.A I

Indian Government and Politics

S. No.	DATE	TOPICS TO BE COVERED	No. of Lectures	ACADEMIC ACTIVITY
1	August	1.Discussion of the syllabus 2. Suggested Readings 3. Pattern of the Exam 4. Pattern of Internal Assessment 5 Relevance of the subject UNIT –I 1. Nature Of Indian State. 2. Historical background of making of Indian State 3. Approaches on study Indian politics-Marxist Theory, Liberal State	02 3 2 2	• Bridge Classes • Orientation of departmental students Explaining about E-content, Inflibnet (college library), Departmental Library

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		. 4. Difference between Liberal & Marxist Theory	3	• Discussion on Indian as a Nation State • Lecture Method • Power Point Presentations
2	September	1.Gandhian Approach, it's relevance 2. Local Self Government, Urban and rural. UNIT- II 1.Indian Preamble, its, features and relevance 2. Indian Constitution and it's making. 3.Fundamental Rights- Features, Scope, Limitations	3 4 3 3	• Class discussion • Objective Questions • Lecture method • MCQ's • Tutorials
3	October	4.Fundamental Duties-Need and relevance 5.Difference between Fundamental Rights and Fundamental Duties 6.Directive Principles 7.Parliament, Indian , Office of Prime Minister. 8.Judicial set up Of India. 9.Hierarchy of the Courts in India and their Features. 10.Nature of appointment of the judges, Power Structure of India.	3 3 3 3 3 3	• Lecture Method • Assignments • Paper Presentations • Discussion on previous year papers • Lecture Method • Power Point Presentation • Class Test

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7	November, December	UNIT-III 1.Concept of Secular State, Role of religion in Politics. 2.Party and party system in India. 3.Differencce between National and State Parties.	3 3 3	• Lecture Method • Power Point Presentation • Paper Presentation • Class discussion • Question paper discussion
	February-March	UNIT-IV 1.What are Social Movements? Workers Movements, peasants' Movements, Women's Movements. 2 .Economic system Of Indian. 3.Economic Reforms after 1990's-Liberalization, Privatization and Globalization	3 2 2	
Total			**60**	

B.A. II

DSC-1C –POLS 301-Comparative Government and Politics

S. No.	DATE	TOPICS TO BE COVERED	No. of Lectures	ACADEMIC ACTIVITY
1	July-August	1.Brief Discussion of the syllabus 2. Suggested Readings 3. Pattern of the Exam 4. Pattern of Internal Assessment 5. Origin of Comparative Politics as a separate discipline	2	• Bridge Classes • Orientation of departmental students • Discussion on Scope of the subject
		UNIT-I 1. Nature of Comparative Politics and Government.	2 2	• Lecture Method • Power Point Presentation

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		2. Difference between Comparative Govt. and Comparative Politics 3. Methods and approaches to study the subject. 4.Relevance of the Comparative government and Politics	2 2	• Paper Presentation • Class Discussion
3	August-September	UNIT-II 1.Different types of regimes in the World. 2.Authoritarian Regime and their presence in the world. 3.Democratic regimes- what is Democracy? Forms-Direct, Indirect 4.Classification of Political systems- Parliamentary form of Govt- Features,U.k and Constitutional Monarchy. 5. Presidential form of Govt.- U.S.A and it's Congress	1 2 2 1 1 2	• Lecture Method • Class Discussion • Class Quiz • Power Point Presentation by students
4	September-October	1.What is Federalism? Features of Federal form of Government. 2.Unitary form of Government –Features and scope 3.Difference between Federal and Unitary form of Government UNIT-III 1.What is electoral system? 2.First Past the Post System.- Features, significance. 3.Limitations of First past the Post System 4.What is Proportional Representation?	3 2 2 2 2 2	• Paper Presentation by students • Lecture method • Group Discussion • Assignments • Class test
5	October-November	5.Significance of Proportional Representation and Limitations.	1 1	• Lecture Method • Class Discussion

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		UNIT –IV 1.Party system in world. 2.Forms of Party system-One Party,Two Party and Multi- Party system 3.What is welfare State. 4. Need of welfare State	 2 2 1 1	• Power Point Presentation • Class Test • Paper Discussion
	TOTAL		**40**	

B.A II (Semester IV)

Sec-2-POLS 402 -Public opinion and Survey Research

S. No.	DATE	TOPICS TO BE COVERED	No. of Lectures	ACADEMIC ACTIVITY
1	December	1.Brief Discussion of the syllabus 2. Suggested Readings 3. Pattern of the Exam 4. Pattern of Internal Assessment 5.Relevance of the subject UNIT-I 1.What is Public Opinion? 2. Meaning of Public Opinion, Notions associated with Public Opinion, why it matters? 3. Features of Public Opinion and scope 4. Role of Public Opinion.	1 2 2 2 2	• Bridge Classes • Orientation of departmental students • Discussion on Types of Research and it`s value. • Discussion on Scope of the subject • Power Point Presentation
2	February-March	5.Meaning of Democracy, Types of Democracy. 6.Relationship between Public Opinion and Democracy	2 2	• Lecture method • Peer Teaching • Classroom Discussion

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		UNIT-II 1.What is Research? 2.Steps to conduct a research. 3.Meaning of Sampling- Types of Sampling Technique. 4.Meaning of a Sample, Utility of a Sample.	 2 2 2 2	• Class Test • Assignments
3	March - April	1.Types of Sampling- Probability Sampling and Non- Probability UNIT-III 1.Survey Research-What and why? Importance of Survey in Research 2.Interview technique – Types, 3.Advantages, disadvantages of Interview Techniques. 4. Meaning and relevance of a Questionnaire. 5.Questionnaire Methods	2 2 2 2 3	• Paper Presentation by Students • Class Test • Power point Presentation • Extempore speech by Students
6	April	6.Advantages and disadvantages of the questionnaire methods UNIT-IV 1. Types of Data –Quantitative Method, Qualitative Method. 2. Analysis and interpretation of Data. 3.Meaning of Opinion Polls and it's Relevance 4.Exit Polls-Relevance and Formation 5.Revision classes	1 2 2 1 1 3	• Lecture method • Group Discussion • Power Point Presentation • Oral Test Of Students • Tutorials • Group Discussion on Research in Social Sciences
	TOTAL		**42**	

B.A. II (Semester IV)

DSC-1C –POLS 401-Introduction to international Relations

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S. No.	DATE	TOPICS TO BE COVERED	No. of Lectures	ACADEMIC ACTIVITY
1	November 2018	1.Brief Discussion of the syllabus 2. Suggested Readings 3. Pattern of the Exam. 4. Pattern of Internal Assessment 5. Origin of International Relations as a discipline.	3	• Bridge Classes • Orientation of departmental students • Discussion on Scope of the subject
2	November 2018	UNIT-I 1.Importance of studying International Relations. 2. Meaning Nature and scope of International Relations 3.Approaches to study International Relations Liberalism & Realism, 4.Hans J Morgenthau's six principles of Realism 5. Immanual Wallerstein's theory of World System Approach . 6.. Dependency theory (AG Frank)	1 2 2 2 2 2	• Lecture Method • Power Point Presentation • Paper Presentation • Class Discussion
3	November last week, 2018	UNIT-II 1.Cold war Meaning and Nature. 2.Reasons of cold war. And causes of its end. 3. Major events of cold war. .New cold war and difference between new and old cold war.	2 2 2	• Lecture Method • Class Discussion • Class Quiz • Power Point Presentation by students
4	December 2018	4.New cold war 5. Difference between new and old cold war. 6.Dissintegration of USSR	1 1 1	• Lecture Method • Power Point Presentation • Paper Presentation • Class Test

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5	February 2019	UNIT-III 1.Features of Post-Cold war Era. 2.Emerging centres of Power; European union. 3. Rise of China and Russia as centers of power. 4. Japan as emerging centre of power in post cold war era	2 1 2 1	• Paper Presentation by students • Lecture method • Group Discussion • Assignments
6	March, 2019	UNIT-IV 1.What is Foreign Policy. 2. Role of Jawahar Lal Nehru in Indian foreign Policy. 3.India's Foreign Policy and its basic features. 4.Determinants of Indian Foreign Policy.	1 1 2 2	• Lecture Method • Class Discussion • Power Point Presentation • Class test
7	April, 2019	5.History and evolution of Non-Alignment movement. 6.features of Non-Aligned Foreign Policy. 7 NAM Summits	2 2	• Discussion on existence of NAM. • Lecture Method • Paper Presentation
	TOTAL		39	

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2019-20

Chemistry

CHEM 202TH
CHEMISTRY OF MAIN GROUP ELEMENTS, CHEMICAL ENERGETICS AND EQUILIBRIA

Section	Name of Topic	No of Hours	
A	**S-Block Elements**	16	
	Unique position of Hydrogen in the periodic table, isotopes, ortho and para hydrogen, Industrial production, Hydrides and their chemistry, Heavy water, Hydrogen bonding, Hydrates.	4	Mr. Nishant
	S-Block Elements Periodicity of elements with respect to electronic configuration, atomic and ionic size, ionization enthalpy, electron gain enthalpy, electronegativity (Pauling Scale).	5	
	General characteristics of s-block elements like density, melting points, flame colouration and reducing character, solvation and complexation tendencies and solutions of metals in liquid ammonia.	7	
B	**P- Block Elements**	16	
	Comparative studies including diagonal relationship of group 13 and 14 elements.	2	Mr. Nishant
	Borohydrides, Hydrides, oxide and oxy-acids and halides of boron, borax, Borazine	2	
	allotropic forms of carbon, fullerenes, carbides of calcium and silicon	2	
	Hydrides, oxides, oxoacids and halides of nitrogen. Allotropic forms of phosphorous. Hydrides, halides, oxides and oxyacids of phosphorous.	2	
	Basic properties of halogens and inter halogen compounds, pseudohalogens and poly halides.	3	
	Noble Gases Occurrence of noble gases, History of discovery of noble gases and isolation of noble gases form air. Preparation properties and structure of important compounds of noble gases-flourides, oxides, oxyflorides of xenon (valence bond structure only). Krypton difloride and clatherate compounds of noble gases.	5	
C	**Chemical Energetics:**	12	
	Review of thermodynamics and the Laws of Thermodynamics. Important principles and	3	

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	definitions of thermochemistry.		
	Concept of standard state and standard enthalpies of formations, integral and differential enthalpies of solution and dilution.	3	**Mr. Nishant**
	Calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data. Variation of enthalpy of a reaction with temperature – Kirchhoff's equation.	4	
	Statement of Third Law of thermodynamics and calculation of absolute entropies of substances	2	
D	**Chemical Equilibrium**	16	
	Free energy change in a chemical reaction. Thermodynamic derivation of the law of chemical equilibrium. Distinction between ΔG and ΔG^{o},	3	**Mr. Nishant**
	Le Chatelier's principle. Relationships between Kp, Kc and Kx for reactions involving ideal gases.	3	
	Ionic Equilibria: Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect.	5	
	Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions. Solubility and solubility product of sparingly soluble salts – applications of solubility product principle	5	

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CHEM 203
BASIC ANALYTICAL CHEMISTRY

Section	Name of Topic	No of Hours	
A	**Introduction**	15	
	Introduction to Analytical Chemistry and its interdisciplinary nature. Concept of sampling. Importance of accuracy, precision and sources of error in analytical measurements. Presentation of experimental data and results, from the point of view of significant figures.	8	**Mr. Nishant**
	Analysis of soil: Composition of soil, Concept of pH and pH measurement, Complexometric titrations, Chelation, Chelating agents, use of indicators. a. Determination of pH of soil samples. b. Estimation of Calcium and Magnesium ions as Calcium carbonate by complexometric titration	7	
B	**Analysis of water**	15	
	Definition of pure water, sources responsible for contaminating water, water sampling methods, water purification methods.	4	**Mr. Nishant**
	a. Determination of pH, acidity and alkalinity of a water sample. b. Determination of dissolved oxygen (DO) of a water sample.	4	
	Analysis of food products: Nutritional value of foods, idea about food processing and food preservations and adulteration.	3	
	a. Identification of adulterants in some common food items like coffee powder, asafoetida, chilli powder, turmeric powder, coriander powder and pulses, etc. b. Analysis of preservatives and colouring matter	4	
C	**Chromatography**	12	
	Definition, general introduction on principles of chromatography, paper chromatography, TLC etc.	2	**Mr. Nishant**
	a.Paper chromatographic separation of mixture of metal ion (Fe3+ and Al3+). b. To compare paint samples by TLC method.	3	
	Ion-exchange: Column, ion-exchange chromatography etc. Determination of ion exchange capacity of anion / cation exchange resin (using batch procedure if use of column is not feasible).	7	

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2020-21

Botany

Course Plan

B. Sc III Botany

Economic Botany and Biotechnology (BOTA 301)

1.	MOTIVATION P.K Testing	1. What are cultivated plants. 2. What are the uses of Wheat and Rice. 3. Name a few species used in daily life. 4. How tea leaves are processed. 5. Give some examples of plants used to yield sugar. 6. Which part of cotton plant is used to obtain fibre. 7. Name some edible oil yielding plants. 8. What are the important Indian medicinal plants. 9. Define tissue culture. 10. What are transgenic plants. 11. What do you understand by genetic engineering.
2.	LEARNING OBJECTIVES	1. To familiarize students with the concept of cultivated plants and their centres of origin. 2. To aware students about cultivation, morphology and uses of the economically important plants & plant products useful in everyday life. 3. To develop appreciation among students for the diversity of plants and their products in human use. 4. To develop knowledge of different types of plant tissue culture and its applications in different branches of Botany. 5. To enable students to understand the core concepts of plant biotechnology and recombinant DNA technology. 6. To familiarize students with various modern techniques used in plant biotechnology and their applications.
3.	CONTENTS	**Unit I** (3 Lectures) **Cultivated Plants** Introduction, Research centres, Concept of centres of origin, their importance with reference to

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		Vavilov's work **Unit II** (5 Lectures) **Cereals** Wheat and Rice -Origin, morphology, uses **Unit III** **Pulses & Vegetables** (4 Lectures) General account with special reference to Gram , soybean and Potato **Unit IV** **Spices** (3 Lectures) General account with special reference to clove, black pepper, cinnamon, Ginger and Turmeric (Botanical name, family, part used, morphology and uses) **Unit V** **Beverages** (4 Lectures) Tea and Coffee (morphology, processing, uses) **Unit VI** **Oils and Sugar** (4 Lectures) General description with special reference to groundnut and sugarcane **Unit VII** **Fibre Yielding Plants** (4 Lectures) General description with special reference to Cotton (Botanical name, family, part used, morphology and uses) **Unit VIII** **Medicinal Plants** (3 Lecture) Brief account of Ocimum, Tinospora, Aloe, Rauvolfia, Emblica and Cathranthus **Unit IX** **Introduction to Biotechnology** (15 Lectures) Tissue culture techniques, Micropropagation; haploid production through androgenesis and gynogenesis; brief account of embryo & endosperm culture; Applications of plant tissue culture in agriculture, horticulture and forestry **Unit X** **Biotechnological Techniques** (15 Lectures) Introduction to r-DNA, Cloning vehicles, Gene transfer techniques in plants, Transgenic plants, Agarose electrophoresis, Blotting techniques: Northern, Southern and Western Blotting, DNA Fingerprinting; Molecular DNA markers i.e. RAPD, RFLP, SNPs; DNA sequencing, PCR and Reverse Transcriptase-PCR. ELISA, Hybridoma and monoclonal an tibodies, ELISA and Immunodetection. Molecular diagnosis of human disease, Human gene Therapy.
4.	METHODOLOGY	1. Class lectures

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		2. Discussion 3. Power point presentation on various economically important plants
5.	TEACHING AIDS	1. Power point presentation 2. Charts 3. Field explorations
8.	REFERENCES	1. Kochhar, S.L. (2017). Economic Botany. Cambridge University Press. 2. Bhojwani, S.S. and Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice. Elsevier Science Amsterdam. The Netherlands. 3. Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology- Principles and Applications of recombinant DNA. ASM Press, Washington.
9.	ASSIGNMENTS	1. Projects on economically important plants. 2. Power point presentation by students on biotechnological techniques.

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Unit 3 Cell Signalling

Signalling molecules and their receptors Function of cell surface receptors

Pathways of intra-cellular receptors – Cyclic AMP pathway, cyclic GMP and MAP kinase pathway

Contents	No of lecture required	Lesson Outcome
Types of signaling molecules and receptors	2	Students are educated about the various types of cell signaling molecules and the receptors involved.
Cell surface receptors and signaling pathways	4	The mechanism of action of cell surface receptors and their functions in cell signaling are described to the students. Various signaling pathways such as MAP kinase, cyclic AMP, cyclic GMP and GPCRs are taught to the students.
Intra-cellular receptors and signaling pathways	4	Students will get an understanding of the various intra-cellular signaling receptors and signaling pathways.

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2021-22

Zoology

Lesson Plan (First Year)

DSC IA : Animal Diversity

ZOOL 101 TH

1.	MOTIVATION P.K Testing	1. What is the basic line of difference between chordates and echinoderms 2. Can you give some examples of chordates 3. From which organisms did chordates evolve 4. How do you differentiate between Balanoglossus, Herdmania, Lamprey on the basis of notochord. 5. What do you know about the subphylum Vertebrata 6. What can you say about Super class Pisces? Gives some examples. 7. Differentiate between class Chondrichthyes and Osteichthyes on the position of its mouth 8. Are there some fishes which can stay out of water? 9. Do fishes migrate? 10. Is consuming fish good or bad 11. Which nutrient does fish contain the most.
2.	LEARNING OBJECTIVES	1. The objective of teaching Zoology is to create general awareness among them about the biodiversity and its impact on society. At the same time, it is expected that the students, on reading this course, shall develop attitude toward science (e.g., interest in animals, attitude toward new discoveries) and scientific attitude (i.e., open-minded, honesty, or skepticism). 2. To develop an appreciation for the *Plasmodium* species and to impart knowledge about various species of *Plasmodium* and its life history 3. To develop an appreciation for the *Sycon* species and to impart knowledge about various functions of their life viz., nutrition, respiration, excretion, reproduction canal system and skeleton. 4. To bring to knowledge about various polymorphic forms in Phylum Coelenterata and their correlation in forming coral and

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		coral reefs and understanding their role in ecosystem. 5. To develop an appreciation for the *Fasciola* and study lifecycle and pathogenicity etc 6. To acquaint the students with the latest classification, general organization and morphology lifecycles and pathogenicity of Nematodes. 7. To acquaint the students with the variety of Mollusca and Echinodermata their classification and general characters. 8. To enable the student to develop scientific attitude where student shall have a desire to know and understand, questioning to all various statements, search for data and their meaning, search for verification, and consideration of consequences. 9. To develop in the students positive attitude towards Zoology showing increased attention to classroom instruction and participation more in science activities 10. The objective of studying Chordates in Zoology allows students to see science as a way of dealing with problems faced regarding conservation of animals and students become more curious about the material world and use different scientific methods to conserve animals. 11. It is with this aim in mind that all students attains scientific literacy. 12. To enable the student to create student-centered environment where students improve on their own ideas, raise questions, and undertake investigations. Studying Chordates starts with real world issues and various measures implemented to conserve the biodiversity.
3.	CONCEPTS/COURSE	**1.** To educate the students about the Origin of

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	OBJECTIVES	chordates, characteristics and classification so as to make them aware of the diversity and evolutionary affinities. **2.** To acquaint the students about the structure and function of Hemichordates, Urochordates, Cephalochordates and to make the student understand the basic characters, advancements and affinities of Balanoglossus, Herdmania and Lamprey. **3.** To enable the student to develop an appreciation for the biodiversity of vertebrate species and to impart knowledge about co-existence of different forms of living organisms. Studies on this group Cyclostoma bring to light variety of modes like phylogenetic position and larva of Petromyzon. **4.** To acquaint the students about the general characters including morphology and physiology (nervous system) of Scoliodon. To impart in depth knowledge about their structural modification (scales and fins) acquired to suit varied living conditions. **5.** To enable the students to understand the difference in the morphology and general anatomy and to classify and study the general characters of Class Osteichthyes including their behaviour and physiological adaptations and osmoregulation, accessory respiratory organs. To develop an appreciation for various fishes and to impart knowledge about the importance and conservation of fishes.
4.	CONTENTS	Section A Unit 1: Kingdom Protista General characters and classification up to classes; Locomotory Organelles and locomotion in Protozoa Unit 2: Phylum Porifera General characters and classification up to classes; Canal System in Sycon Unit 3: Phylum Cnidaria General characters and classification up to classes; Polymorphism in Hydrozoa Unit 4: Phylum Platyhelminthes General characters and classification up to classes; Life history of Taenia

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		solium Unit 5: Phylum Nemathelminthes General characters and classification up to classes; Life history of Ascaris lumbricoides and its parasitic adaptations Section B Unit 6: Phylum Annelida General characters and classification up to classes; Metamerism in Annelida Unit 7: Phylum Arthropoda General characters and classification up to classes; Vision in Arthropoda, Metamorphosis in Insects Unit 8: Phylum Mollusca General characters and classification up to classes; Torsion in gastropods Unit 9: Phylum Echinodermata General characters and classification up to classes; Water-vascular system in Asteroidea Section C Unit 10: Protochordates General features and Phylogeny of Protochordata Unit 11: Agnatha General features of Agnatha and classification of cyclostomes up to classes Unit 12: Pisces General features and Classification up to orders; Osmoregulation in Fishes Unit 13: Amphibia General features and Classification up to orders; Parental care Section D Unit 14: Reptiles General features and Classification up to orders; Poisonous and non-poisonous snakes, Biting mechanism in snakes Unit 15: Aves General features and Classification up to orders; Flight adaptations in birds Unit 16: Mammals Classification up to orders; Origin of mammals
5.	METHODOLOGY	1. Discussion 2. Power point presentation 3. Brainstorming questions 4. Quiz 5. Field Visits
6.	TEACHING AIDS	1. White board and marker 2. Power point presentation 3. Charts 4. Flex Posters 5. Learning by doing: A visit to fish culture farm

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7.	INTERNAL EVALUATION	1. Student-directed questions shall serve to define problems, potential solutions, and actions need to resolve them. This enables students to see/ do science in the same way that scientists do. This makes science more meaningful, exciting, and appropriate for most students. 2. The purpose of internal evaluation is to investigate whether students can handle the knowledge obtained in classroom with various situations given by the teacher in the class
8	SUMMARY	1. Students shall be able to classify non chordates and chordates and they shall become aware of the diversity and evolutionary affinities through group discussions 2. Students shall be able to understand the structure and function of protochordates and chordates by showing images on projectors of various organisms and showing the basic line of difference among them 3. Students shall be able to educate the society about the importance of conservation of animals through Hand-outs.
9	REFERENCES	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 3. Edition. The McGraw-HillCompanies. 4. Young, J.Z. (2004). The life of vertebrates. III Edition. Oxford university press. 5. Hall B.K. and Hallgrimsson B. (2008). Strickberger's Evolution. IV Edition. Jones and Bartlett Publishers,Inc. 6. P.S. Dhami (2015) 7. Modern' s Zoology (2015) 8. Ruppert and Barnes, R.D. (2006). 9. Invertebrate Zoology, VIII Edition. Holt Saunders International Edition. 10. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). The Invertebrates: A New Synthesis, III Edition, Blackwell Science

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		11. Pough H. Vertebrate life, VIII Edition, Pearson International. 12. R.D Publications (2020)
10	ASSIGNMENTS	1. Tabular representation of Porifera, Coelenterata, Platyhelminthes and Nemathelminthes on the basis of the general characters 2. To draw well labeled diagrams of Poison apparatus of Snake, Water vascular system in Echinodermata and Mechanism of Torsion in Gastropoda. 3. Tabular representation of Hemichordates, Urochordates, Cephalochordates on the basis of the general characters 4. Make posters Plasmodium life cycle 5. Make a project on classification of non-chordates and chordates

Dr. Shweta Thakur
Assistant Professor
Department of Zoology

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2022-23

Biotechnology

Course: BIOTECH3C11TH
ANIMAL BIOTECHNOLOGY

Theory examination: 50 marksPractical examination: 20 marksInternal Assessment: 30 marks

Note: The Examiner will set a total of nine (9) questions covering all topics/ units of the prescribed course by setting at least two questions from each unit. Out of the nine questions, one question containing ten (10) short- answer type questions that will cover entire course will be compulsory. The candidate will attempt a total of five questions (one from each unit) including the compulsory question. All questions will carry equal marks.

UNITI(10 Periods)

Gene transfer methods in Animals – Microinjection, Embryonic Stem cell, gene transfer, Retrovirus & Gene transfer.

UNITII(10 Periods)

Introduction to transgenesis. Transgenic Animals – Mice, Cow, Pig, Sheep, Goat, Bird, Insect. Animal diseases need help of Biotechnology – Foot-and mouth disease, Coccidiosis, Trypanosomiasis, Theileriosis.

UNITIII(20 Periods)

Animal propagation – Artificial insemination, Animal Clones. Conservation Biology – Embryo transfer techniques. Introduction to Stem Cell Technology and its applications.

UNITIV(20 Periods)

Genetic modification in Medicine - gene therapy, types of gene therapy, vectors in gene therapy, molecular engineering, human genetic engineering, problems & ethics.

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Course Plan

UNITI **(10 Periods)**

Gene transfer methods in Animals – Microinjection, Embryonic Stem cell, gene transfer, Retrovirus & Gene transfer.

Content	No of Lectures Required	Lesson Outcome
Gene transfer methods in Animals – Microinjection, Embryonic Stem cell	5	Students are educated about the various methods of gene transfer in animals such as microinjection, stem cell transfer etc.
Retrovirus & Gene transfer.	5	The various viral methods of gene transfer in animal cells are also illustrated to the students

UNITII **(10 Periods)**

Introduction to transgenesis. Transgenic Animals – Mice, Cow, Pig, Sheep, Goat, Bird, Insect. Animal diseases need help of Biotechnology – Foot-and mouth disease, Coccidiosis, Trypanosomiasis, Theileriosis.

Content	No of Lectures Required	Lesson Outcome
Introduction to transgenesis. Transgenic Animals – Mice, Cow, Pig, Sheep, Goat, Bird,	5	Students are given an insight into the details of the production and applications of transgenic animals
Animal diseases need help of Biotechnology – Foot-and mouth disease, Coccidiosis, Trypanosomiasis, Theileriosis	5	The role of biotechnology in treatment, diagnosis and prevention of animal diseases is discussed with the students

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UNITIII **(20 Periods)**

Animal propagation – Artificial insemination, Animal Clones. Conservation Biology – Embryo transfer techniques. Introduction to Stem Cell Technology and its applications.

Content	No of Lectures Required	Lesson Outcome
Animal propagation – Artificial insemination, Animal Clones. Conservation Biology	10	Students are given a detailed insight into the reproductive technology including animal cloning, artificial insemination and conservation biology
Embryo transfer techniques. Introduction to Stem Cell Technology and its applications.	10	The concept of embryo transfer techniques in animals and humans and their applications along with the stem cell technology are explained in depth to the students.

UNITIV **(20 Periods)**

Genetic modification in Medicine - gene therapy, types of gene therapy, vectors in gene therapy, molecular engineering, human genetic engineering, problems & ethics.

Content	No of Lectures Required	Lesson Outcome
Genetic modification in Medicine - gene therapy, types of gene therapy, vectors in gene therapy,	10	Students are educated about the concept of gene therapy, their types and applications.
Molecular engineering, human genetic engineering, problems & ethics.	10	The techniques involved in the molecular engineering and human genetic engineering along with the problems and ethics involved are briefed to the students

Teaching Learning Activities
Teaching and learning will be made more effective through activities like • Power Point Presentations • Group Discussions • Smart Boards • Debates • Quiz Competitions • Poster Making • Paper Presentations • Class Tests

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