Syllabus	
B.Sc. II Year	
Paper – I	**Ecology, Environmental Biology, Evolution and Behaviour**
Unit – I	Ecology: Definition, Scope and Importance. Ecological factors: Abiotic and biotic factor. Ecosystem: Types of Ecosystem, Components of ecosystem. Energy flow in the Ecosystem: Energy flow models. Food Chains and Food Web. Ecological pyramids. Ecological succession.
Unit – II	Air pollution: Evolution and composition of atmosphere, Chemical and photochemical reactions in the atmosphere, Air pollutants, Control of air pollution. Water pollution: Sources of water pollution, Hydrologic cycle, water quality standards, Eutrophication and algal blooms.
Unit – III	Industrial pollution: Sources and major pollutants. Bioremediation: Types and techniques. Solid waste management. Environmental impact assessment. Pollution control laws and acts.
Unit – IV	Evolution: Basic concepts. Theories of organic evolution Patterns of evolution: Divergent and convergent evolution, parallel evolution, co-evolution. Evolution in action: Variations, mutations, recombination, ploidy, isolation, Natural selection, Concept of species and speciation. Micro and Macroevolution
Unit – V	Concepts and patterns of behaviour. Instinct and learning: Innate behavior, Learned behaviour and types of learning, Genetic basis of behaviour. Control of behavior: Neural, hormonal and pheromonal. Social organization: Communication, Living in groups, Eusocial organization. Migration, orientation and navigation

Paper – II	**Biodiversity and Systematics of Invertebrates and Vertebrates**
Unit – I	General characters and classification of Invertebrates up to orders with examples emphasizing their biodiversity, economic importance and conservation measures. Protozoa: Plasmodium. Protozoa and diseases. Porifera: Sycon. Coelentrata: Obellia. Helminths: Liver fluke
Unit – II	Annelida: Nereis, Metamorphism and Trocophore larvae. Arthropoda: Prawn. Mollusca: Pila. Echinodermata: Star fish, Echinoderm larvae. Hemichordata: Balanoglossus
Unit – III	Chordata: Origin and Classification. Protochordata; Classification up to orders, interrelationships, Urochordates; Amphioxus Agnatha: Petromyzon, Fishes: skin and scales, Migration and Parental care
Unit – IV	Amphibia : Parental care, Neoteny. Reptiles : Extinct reptiles, poisonous and non-poisonous snakes, poisonous apparatus and snake venom

Unit – V	Birds: Migration, Ratitae, Flight adaptation. Mammals; Aquatic mammal, Dentition in mammal, Prototheria and Affinities

Practical	1. Determination of density, abundance and frequency of biota from grasslands 2. Determination of temperature and pH of the industrial effluents. 3. Determination of phenopthalein, methyl orange and total alkalinities and free and total CO2 of industrial effluents 4. Determination of phosphate, sulphate, nitrate, nitrite and ammonia nitrogen of industrial effluents. 5. Determination of DO of industrial effluents 6. Collection and identification of plants and animal species from different industrial effluent channels. 7. Study of specimens of representative examples of different phylum (Classification up to order). 8. Study of permanent slides of different sections of representative examples as per theory syllabus. 9. Microscopic techniques including unstained and stained permanent mount of animal material. 10. Examination of local fauna of different ponds. 11. Phototactic behaviour in *Mimosa pudica* and fish 12. Learning behaviour of cockroach, mice 13. Reasoning behaviour of mouse and rat 14. Study of representative examples of the different chordates (classification and characters) 15. Simple microscopic techniques through unstained and stained permanent mounts 16. Study of histological slides in accordance with the theory papers. 17. Study of osteology of different chordates

Books Recommended	1. Odum EP: Ecology 2. PD Sharma: Fundamentals of Ecology 3. Moody: Introduction to Evolution 4. Paul L. Bishop - Pollution Prevention: Fundamentals and Practice 5. Marquita K. Hill - Understanding Environmental Pollution: A Primer 6. Daniel Vallero - Fundamentals of Air Pollution, Fourth Edition 7. Kenneth M. Vigil - Clean Water: An Introduction to Water Quality and Pollution Control 8. W.Wesley Eckenfelder - Industrial Water Pollution Control 9. A.G. Clarke - Industrial Air Pollution Monitoring - Gaseous and particulate emissions 10. Harry M. Freeman - Industrial Pollution Prevention Handbook 11. Alcock (2009): Animal Behaviour: An Evolutionary Approach 12. Grier (1984): Biology of Animal Behaviour 13. Lorenz (1981): The Foundation of Ethology 14. Manning & Dawkins (1998): An Introduction to Animal Behaviour 15. Mcfarland (1985): Animal Behaviour: Psychology, Ethology and Evolution 16. Scott (2005): Essential Animal Behaviour 17. Anil Kulshreshtha: Unified Practical Zoology

	18. Michael Stachowitsch, Sylvie Proidl (Illustrator): The invertebrates: An illustrated glossary 19. L.H. Hyman: The Invertebrata vol I & II 20. Rouer and Parsons – The Vertebrate Body, Saunders 21. Kotpal: Modern text book of Zoology: Invertebrates (11th ed. 2016 Rastogi) 22. Kotpal: Modern text book of Zoology: Vertebrates (4th ed. 2016 Rastogi) 23. Jordan & Verma: Invertebrate Zoology (Reprint 2014, S. Chand) 24. Jordan & Verma: Chordate Zoology (Reprint 2014, S. Chand)