

**ARYAVART INTERNATIONAL UNIVERSITY**

Tilthai, Dharmanagar, North Tripura-799250

**Syllabus for B Sc (Zoology)**

**Semester 1**

<b>Theory</b>										
Course Code	Subjects	L	T	P	Credit	Theory Marks (T)	Internal Marks (T/P)	Practical Marks (P)	Total Marks	
24ZO104	Diversity and Evolution of Non-Chordates I	4	0	0	4	70	30	0	100	
24ZO105	Perspectives In Ecology	4	0	0	4	70	30	0	100	
24EN102	Business Communication	4	0	0	4	70	30	0	100	
24CS101	Fundamentals of IT	4	0	0	4	70	30	0	100	
<b>General Elective (GE-1) Choose any one</b>										
24ZO111	Animal Diversity	4	0	2	6	70	30/30	70	200	
24ZO112	Environment and Public Health	4	0	2	6	70	30/30	70	200	
24ZO113	Insect Vectors and Diseases	4	0	2	6	70	30/30	70	200	
24ZO114	Food, Nutrition and Health	4	0	2	6	70	30/30	70	200	
24ZO115	Human Physiology	4	0	2	6	70	30/30	70	200	
<b>Practical</b>										
24ZO193	Diversity and Evolution of Non-Chordates I Practical	0	0	2	2	0	30	70	100	
24ZO194	Perspectives In Ecology Practical	0	0	2	2	0	30	70	100	
<b>Total</b>					<b>26</b>	<b>350</b>	<b>240</b>	<b>210</b>	<b>800</b>	

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**Detailed Syllabus**

**Semester 1**

**DIVERSITY AND EVOLUTION OF NON-CHORDATES I**

**Code: 24ZO104**

**Max. Marks: 70**

**UNIT: I Invertebrates**

Concept, diversity, and outline classification- major and minor phyla; Protozoa: Classification up to order; Locomotion, nutrition, reproduction; Structural organisation of *Paramecium/Euglena*; Protozoa and Human Disease.

**UNIT: II Porifera**

Classification up to order and General Organisation; Skeleton and canal system; Economic Importance of Sponges; Coelenterata: General characters and Classification up to order; Polymorphism; Coral reefs and their formation.

**UNIT: III Ctenophora**

General Characters & Classification up to order, Affinities; Platyhelminthes: Classification up to order; Features of significance in life-cycle of *Fasciola hepatica*; Parasitic adaptations of *Taenia*.

**UNIT: IV Aschelminthes**

General Characters and Classification up to order; Some common Nematode Parasites of Man- *Ascaris* (common roundworm), *Ancylostoma* (common hookworm) and *Wuchereria* (Filarial worm); Rotifera: Morphological and anatomical features Affinities

**Textbook:**

1. Barnes, R.D. (1982). Invertebrate Zoology, V Edition. Holt Saunders International Edition.

**Suggested Readings:**

1. 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
2. Barrington, E.J.W. (1979). Invertebrate Structure and Functions. II Edition, E.L.B.S. and Nelson
3. Boradale, L.A. and Potts, E.A. (1961). Invertebrates: A Manual for the use of Students. Asia Publishing Home

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**PERSPECTIVES IN ECOLOGY**

**Code: 24ZO105**

**Max Marks: 70**

**UNIT: I**

1. Concept and Scope of Ecology, Important terminologies and Approaches to Ecology
2. Ecological factors- Abiotic and Biotic
3. Components of ecosystems, Food chain – detritus and grazing, ecosystem energetics.
4. Ecosystem and its types

**UNIT: II**

1. Population ecology: Basic concept, Population Character, Population dynamics.
2. Community ecology: Definition and characteristics; Composition, structure, origin. Methods of study of communities; classification of communities.
3. Ecological succession and concept of climax
4. Liebig law of minimum, Shelford's law of tolerance, Significance of limiting factors, Ecotone and Edge effect.

**UNIT: III**

1. Biogeochemical cycles –carbon, nitrogen, sulphur cycles, impact of human activity on nutrient cycles.
2. Environmental Pollution- Air, Water, Soil.
3. Natural resource and their conservation.
4. Major environmental regimes of Earth, Environmental monitoring, Environmental impact assessment and environmental management plan.

**UNIT: IV**

1. Study and concept of different protected areas.
2. Wildlife Management with special reference to Northeast India.
3. National and International efforts for conservation: Indian Wildlife Protection Act, Indian Forest Act, Wildlife Trade and CITES, IUCN and criteria for Extinct (EX), Extinct in the wild (EW), critically endangered (CE), Low risk (LR), Data deficient (DD) and not evaluated.

**Textbook:**

1. Krebs, C. J. (2001). Ecology. VI Edition. Benjamin Cummings.
2. Odum, E.P., (2008). Fundamentals of Ecology. Indian Edition. Brooks/Cole.

**Suggested Readings:**

1. Colinvaux, P. A. (1993). Ecology. II Edition. Wiley, John and Sons, Inc.
2. Robert Leo Smith Ecology and field biology Harper and Row publisher.
3. Ricklefs, R.E., (2000). Ecology. V Edition. Chiron Pres.

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**BUSINESS COMMUNICATION**

**Code: 24EN102**

Max Marks: 70

**UNIT I**

**Concepts and Fundamentals:** Introduction to Technical Communication, Need and importance of communication, channel, Distinction between general and technical communication, nature and features of technical communication, Seven Cs of communication, Types of Technical communication, style in technical communication, technical communication skills, Language as a tool of Communication, History of development of Technical Communication, Computer Aided Technical Communication

**UNIT II**

**Oral Communication:** Principles of effective oral communication, Introduction of Self and others, Greetings, Handling Telephone Calls Interviews: Meaning & Purpose, Art of interviewing, Types of interviews, Interview styles, Essential, Techniques of interviewing, Guidelines for Interviewer, Guidelines for interviewee. Meetings: Definition, Kind of meetings, Agenda, Minutes of the Meeting, Advantages and disadvantages of meetings/committees, Planning and organization of meetings. Project Presentations: Advantages & Disadvantages, Executive Summary, Charts, Distribution of time (presentation, questions & answers, summing up), Visual presentation, Guidelines for using visual aids, electronic media (power-point presentation). The technique of conducting Group Discussion and JAM session.

**UNIT III**

**Written Communication:** Overview of Technical Writing: Definition and Nature of Technical Writing, Basic Principles of Technical Writing, Styles in Technical Writing,

Note – Making, Notice, E-mail Writing

Writing Letters: Business letters, Persuasive letters- Sales letters and complaint letters Office memorandum, good news and bad news letters

Report Writing: Definition & importance; categories of reports, Elements of a formal report, style and formatting in report

Special Technical Documents Writing: Project synopsis and report writing, Scientific Article and Research Paper writing, Dissertation writing: Features, Preparation and Elements

Proposal Writing: Purpose, Types, characteristics and structure

Job Application: Types of application, Form & Content of an application, drafting the application, Preparation of resume.

**UNIT IV**

**Soft Skills:** Business Etiquettes – Professional Personality, Workplace Protocols, Cubicle. Non-Verbal Communication: Kinesics and Proxemics, Paralanguage

Interpersonal Skills

**Language Skills:** Improving command in English, improving vocabulary, choice of words, Common problems with verbs, adjectives, adverbs, pronouns, tenses, conjunctions, punctuations, prefix, suffix, idiomatic use of prepositions. Sentences and paragraph construction, improve spellings, common errors and misappropriation, Building advanced Vocabulary (Synonyms, Antonyms), introduction to Business English.

**Text Book:**

1. Kavita Tyagi and Padma Misra, “Advanced Technical Communication”, PHI, 2011
2. P.D.Chaturvedi and Mukesh Chaturvedi, “Business Communication – Concepts, Cases and Applications”, Pearson, second edition.
3. Rayudu, “C.S- Communication”, Himalaya Publishing House, 1994.
4. Asha Kaul, “Business Communication”, PHI, second edition.

**Reference Books:**

1. Raymond Murphy, “Essential English Grammar- A self-study reference and practice book for elementary students of English”, Cambridge University Press, second edition.

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2. Manalo, E. & Fermin, V. (2007). Technical and Report Writing. ECC Graphics. Quezon City.
3. Kavita Tyagi and Padma Misra, "Basic Technical Communication", PHI, 2011.
4. Herta A Murphy, Herbert W Hildebrandt and Jane P Thomas, "Effective Business Communication", McGraw Hill, seventh edition.

**FUNDAMENTALS OF IT**

**Code: 24CS101**

Max Marks: 70

**UNIT I**

**Fundamentals of Computers:** Definition and Characteristics of Computer System. Computer Generation from First Generation to Fifth Generation. Classifications of Computers: Micro, Mini, Mainframe and super computers.

**Computer Hardware:** Major Components of a digital computer, Block Diagram of a computer, Input-output devices, Description of Computer Input Units, Output Units, CPU.

**Computer Memory:** Memory Hierarchy, Primary Memory – RAM and its types, ROM and its types, Secondary Memory, Cache memory. Secondary Storage Devices - Hard Disk, Compact Disk, DVD, Flash memory.

**UNIT II**

**Interaction with Computers:** Computer Software: System software: Assemblers, Compilers, Interpreters, linkers, loaders.

**Application Software:** Introduction to MS Office (MS-Word, MS Power point, MS-Excel).

**Operating Systems:** Elementary Operating System concepts, Different types of Operating Systems.

**DOS:** Booting sequence; Concepts of File and Directory, Types of DOS commands.

**Computer Languages:** Introduction to Low-Level Languages and High-Level Languages.

**UNIT III**

**Computer Number System:** Positional and non-positional number systems, Binary, Decimal, Octal and Hexadecimal Number Systems and their inter-conversion.

**Binary Arithmetic:** Addition, subtraction, multiplication and division. Use of complement method to represent negative binary numbers, 1's complement, 2's complement, subtraction using 1's complement and 2's complement. Introduction to Binary Coded Decimal (BCD), ASCII Codes, EBCDIC codes.

**UNIT IV**

**Computer Network & Internet:** Basic elements of a communication system, Data transmission modes, Data Transmission speed, Data transmission media, Digital and Analog Transmission, Network topologies, Network Types (LAN, WAN and MAN), Basics of Internet and Intranet.

**Internet:** Terminologies related to Internet: Protocol, Domain name, Internet Connections, IP address, URL, World Wide Web. Introduction to Client-Server Model, Search Engine, Voice over Internet Protocol (VOIP), Repeater, Bridge, Hub, Switch, Router, Gateway, Firewall, Bluetooth technology.

**Advanced Trends in IT Applications:** Brief Introduction to Cloud Computing, Internet of Things, Data Analytics, AI and Machine Learning.

**Text Book:**

1. P. K. Sinha & Priti Sinha, "Computer Fundamentals", BPB Publications, 1992.
2. Anita Goel "Computer Fundamentals", Pearson.

**Reference Books:**

1. B. Ram Computer Fundamentals Architecture and Organization, New Age Intl.
2. Alex Leon & Mathews Leon, "Introduction to Computers", Vikas Publishing.
3. Norton Peter, "Introduction to computers", 4th Ed., TMH, 2001.
4. Vikas Gupta, "Comdex Computer Kit", Wiley Dreamtech, Delhi, 2004.

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**ANIMAL DIVERSITY**

**Code: 24ZO111**

**Max. Marks: 70**

**Unit I**

**Protista:** General characters of Protozoa; Life cycle of *Plasmodium*.

**Porifera:** General characters and canal system in Porifera.

**Radiata:** General characters of Cnidarians and polymorphism.

**Unit II**

**Aceolomates:** General characters of Helminthes; Life cycle of *Taenia solium*

**Pseudo-coelomates:** General characters of *Nemethelminthes*; Parasitic adaptations.

**Coelomate- Protostomes:** General characters of Annelida; Metamerism.

**Arthropoda:** General characters. Social life in insects.

**Unit III**

**Mollusca:** General characters of Mollusca; Pearl Formation

**Coelomate Deuterostomes:** General characters of Echinodermata, Water Vascular System in Starfish.

**Protochordata:** Salient features.

**Pisces:** Osmoregulation, Migration of Fishes.

**Unit IV**

**Amphibia:** General characters, Adaptations for terrestrial life, parental care in Amphibians.

**Reptilia:** Amniotes; Origin of reptiles, Terrestrial adaptations in reptiles.

**Aves:** The origin of birds; Flight adaptations.

**Mammalia:** Early evolution of mammals, Primates, Dentition in mammals.

**Text books:**

1. Modern Text Book of Zoology, Invertebrates, Vol. I & Vertebrates Vol. II, R L Kotpal, Rastogi Publications.
2. Barnes, R.D. (1992). Invertebrate Zoology. Saunders College Pub. USA.

**Recommended Books-**

1. E. L. Jordan and Dr. P. S. Verma, Invertebrate Zoology & Vertebrate Zoology, S Chand and Co. Ltd.
2. Ruppert, Fox and Barnes (2006) Invertebrate Zoology. A functional Evolutionary Approach 7th Edition, Thomson Books/Cole
3. Campbell & Reece (2005). Biology, Pearson Education, (Singapore) Pvt. Ltd.
4. Kardong, K. V. (2002). Vertebrates Comparative Anatomy. Function and Evolution. Tata McGraw Hill Publishing Company. New Delhi.
5. Raven, P. H. and Johnson, G. B. (2004). Biology, 6th edition, Tata McGraw Hill Publications. New Delhi.

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**ANIMAL DIVERSITY PRACTICAL**

**Code: 24ZO111**

**Max. Marks: 70**

**Contents:**

1. Study of following specimens: Non-Chordates: *Euglena*, *Noctiluca*, *Paramecium*, *Sycon*, *Physalia*, *Metridium*, *Taenia*, *Ascaris*, *Nereis*, Aphrodite, Leech, *Peripatus*, *Limulus*, Hermitcrab, Millipede, Centipede, Beetle, Chiton, Dentalium, Octopus, Asterias, and Antedon. Chordates: *Balanoglossus*, *Amphioxus*, *Petromyzon*, *Pristis*, *Hippocampus*, *Labeo*, *Ichthyophis*, Salamander, Draco, *Uromastix*, *Naja*, Viper, model of *Archaeopteryx*, Owl, Squirrel and Bat.
2. Study of following Permanent Slides: Cross section of *Sycon*, Sea anemone and *Ascaris* (male and female). T. S. of Earthworm passing through pharynx, gizzard, and typhlosolar intestine. Bipinnaria and Pluteus larva.
3. Temporary mounts of mounts of Placoid, cycloid and ctenoid scales.
4. Demonstration of Digestive and nervous system of Cockroach.
5. Lab notebook with labelled diagrams, methods and results.

**ENVIRONMENT AND PUBLIC HEALTH**

**Code: 24ZO112**

**Max. Marks: 70**

**UNIT I: Introduction**

Sources of Environmental hazards, hazard identification and accounting, fate of toxic and persistent substances in the environment, dose Response Evaluation, exposure Assessment.

**UNIT II: Climate Change and Pollution**

Greenhouse gases and global warming, Acid rain, Ozone layer destruction, Effect of climate change on public health; Air, water, noise pollution; sources and effects, Pollution control.

**Unit III: Waste Management Technologies**

Sources of waste, types and characteristics, Sewage disposal and its management, Solid waste disposal, Biomedical waste handling and disposal, nuclear waste handling and disposal, Waste from thermal power plants, Case histories on Bhopal gas tragedy, Chernobyl disaster, Seveso disaster and Three Mile Island accident and their aftermath.

**Unit IV: Diseases**

Causes, symptoms and control of tuberculosis, Asthma, Cholera, Minamata disease, typhoid.

**Textbook:**

1. Cutter, S.L., Environmental Risk and Hazards, Prentice-Hall of India Pvt. Ltd., New Delhi, 1999.
2. Kasperson, J.X. and Kasperson, R.E. and Kasperson, R.E., Global Environmental Risks, V.N. University Press, New York, 2003.

**Recommended Books-**

1. Kolluru Rao, Bartell Steven, Pitblado R and Stricoff —Risk Assessment and Management Handbook, McGraw Hill Inc., New York, 1996.
2. Kofi Asante Duah —Risk Assessment in Environmental management, John Wiley and sons, Singapore, 1998.
3. Joseph F Louvar and B Diane Louver Health and Environmental Risk Analysis fundamentals with applications, Prentice Hall, New Jersey 1997.

**ENVIRONMENT AND PUBLIC HEALTH PRACTICAL**

**Code: 24ZO112**

**Max. Marks: 70**

**Contents:**

1. Determination of pH, Cl, SO<sub>4</sub>, NO<sub>3</sub> in soil and water samples from different locations.
2. Lab notebook with labelled diagrams, methods (wherever applicable) and results must be incorporated.

**INSECT VECTORS AND DISEASES THEORY**

**Code: 24ZO113**

**Max. Marks: 70**

**Unit I: Introduction to Insects**

General Features of Insects, Morphological features, Head – Eyes, Types of antennae, Mouth parts w.r.t. feeding habits.

**Unit II: Concept of Vectors**

Brief introduction of Carrier and Vectors (mechanical and biological vector), Reservoirs, Host-vector relationship, Vectorial capacity, Adaptations as vectors, Host Specificity.

**Unit III: Insects as Vectors**

Classification of insects up to orders, detailed features of orders with insects as vectors – Diptera, Siphonaptera, Siphunculata, Hemiptera.

**Unit IV: Dipteran as Disease Vectors**

Dipterans as important insect vectors – Mosquitoes, Sand fly, Houseflies; Study of mosquito-borne diseases – Malaria, Dengue, Chikungunya, Viral encephalitis, Filariasis; Control of mosquitoes Study of sand fly-borne diseases – Visceral Leishmaniasis, Cutaneous Leishmaniasis, Phlebotomus fever; Control of Sand fly Study of house fly as important mechanical vector, Myiasis, Control of house fly.

**Unit IV: Siphonaptera as Disease Vectors**

Fleas as important insect vectors; Host-specificity, Study of Flea-borne diseases - Plague, Typhus fever; Control of fleas.

**Unit V: Siphunculata as Disease Vectors**

Human louse (Head, Body and Pubic louse) as important insect vectors; Study of louse-borne diseases –Typhus fever, Relapsing fever, Trench fever, Vagabond's disease, Phthiriasis; Control of human louse.

**Unit VI: Hemiptera as Disease Vectors**

Bugs as insect vectors; Blood-sucking bugs; Chagas disease, Bed bugs as mechanical vectors, Control and prevention measures.

**Textbooks:**

1. Imms, A.D. (1977). A General Text Book of Entomology. Chapman & Hall, UK.
2. Pedigo L.P. (2002). Entomology and Pest Management. Prentice Hall Publication.

**Suggested Readings:**

1. Chapman, R.F. (1998). The Insects: Structure and Function. IV Edition, Cambridge University Press, UK.
2. Mathews, G. (2011). Integrated Vector Management: Controlling Vectors of Malaria and Other Insect Vector Borne Diseases. Wiley-Blackwell.



## INSECT VECTORS AND DISEASES PRACTICAL

**Code: 24ZO113**

**Max. Marks: 70**

### Contents:

1. Study of different kinds of mouth parts of insects.
2. Study of following insect vectorsthrough permanent slides/ photographs: *Aedes*, *Culex*, *Anopheles*, *Pediculus humanus capitis*, *Pediculus humanus corporis*, *Phithirus pubis*, *Xenopsyllacheopis*, *Cimex lectularius*, *Phlebotomus argentipes*, *Musca domestica*, through permanent slides/ photographs.
3. Study of different diseases transmitted by above insect vectors.
4. Submission of a project report on any one of the insect vectors and disease transmitted.

## FOOD, NUTRITION AND HEALTH

**Code: 24ZO114**

**Max. Marks:**

### Unit 1: Basic concept of food and nutrition

Food Components and food-nutrients; Concept of a balanced diet, nutrient needs and dietary pattern for various groups- adults, pregnant and nursing mothers, infants, school children, adolescents and elderly.

### Unit II: Nutritional Biochemistry

Carbohydrates, Lipids, Proteins- Definition, Classification, their dietary source and role; Vitamins-Vitamins-Fat-soluble and Water-soluble vitamins- their dietary source and importance Minerals-- Iron, calcium, phosphorus, iodine, selenium and zinc: their biological functions.

### Unit III: Health Introduction to health

Definition and concept of health, Major nutritional Deficiency diseases- Protein Energy Malnutrition (kwashiorkor and marasmus), Vitamin A deficiency disorders, Iron deficiency disorders, Iodine deficiency disorders- their causes, symptoms, treatment, prevention and government programmes, if any; Life style related diseases- hypertension, diabetes mellitus, and obesity- their causes and prevention through dietary and lifestyle changing; Problems of smoking, alcoholism, drug dependence and Acquired Immuno Deficiency Syndrome (AIDS): their causes, treatment and prevention.

### Unit IV: Food hygiene

Food and Water borne infections: Bacterial infection, Cholera, typhoid fever, dysentery; Viral infection: Hepatitis, Poliomyelitis; Protozoan infection: amoebiasis, giardiasis; Parasitic infection: taeniasis and ascariasis their transmission, causative agent, sources of infection, symptoms and prevention; Brief account of food spoilage: Causes of food spoilage and their preventive measures.

### Textbooks:

1. Mudambi, SR and Rajagopal, MV. Fundamentals of Foods, Nutrition and Diet Therapy; Fifth Ed; 2007; New Age International Publishers.
2. Lakra P, Singh MD. Textbook of Nutrition and Health; First Ed; 2008; Academic Excellence.

### Suggested Readings:

1. Srilakshmi B. Nutrition Science; 2002; New Age International (P) Ltd.
2. Srilakshmi B. Food Science; Fourth Ed; 2007; New Age International (P) Ltd.
3. Swaminathan M. Handbook of Foods and Nutrition; Fifth Ed; 1986; BAPPCO.
4. Bamji MS, Rao NP, and Reddy V. Text Book of Human Nutrition; 2009; Oxford & IBH Publishing Co. Pvt Ltd.
5. Wardlaw GM, Hampl JS. Perspectives in Nutrition; Seventh Ed; 2007; McGraw Hill.
6. Manay MS, Shadaksharaswamy. Food-Facts and Principles; 1998; New Age International (P) Ltd.
7. Gibney et al. Public Health Nutrition; 2004; Blackwell Publishing.

**FOOD, NUTRITION AND HEALTH PRACTICAL**

**Code: 24ZO114**

**Max. Marks: 70**

**Contents:**

1. To detect adulteration in Ghee, Sugars, Tea leaves and Turmeric
2. Estimation of Lactose in milk
3. Ascorbic acid estimation in food by titrimetry.
4. Lab notebook with labelled diagrams, methods (wherever applicable) and results must be incorporated.

**HUMAN PHYSIOLOGY**

**Code: 24ZO115**

**Max. Marks: 70**

**Unit I: Digestion and Absorption of Food**

Structure and function of digestive glands; digestion and absorption of carbohydrates, fats and proteins; nervous and hormonal control of digestion (in brief).

**Unit II: Functioning of Excitable Tissue (Nerve and Muscle)**

Structure of neuron, Propagation of nerve impulse (myelinated and non-myelinated nerve fibre); Structure of skeletal muscle, mechanism of muscle contraction (Sliding filament theory), neuromuscular junction.

**Unit III: Respiratory and Renal Physiology**

Ventilation, external and internal respiration, transport of oxygen and carbon dioxide in blood, Factors affecting transport of gases; Functional anatomy of kidney, mechanism and regulation of urine formation, Nitrogenous wastes.

**Unit IV: Cardiovascular, Endocrine and Reproductive Physiology**

Structure of heart, Coordination of heartbeat, Cardiac cycle, ECG; Structure and function of endocrine glands (pituitary, thyroid, parathyroid, pancreas, adrenal, ovaries, and testes), brief account of spermatogenesis and oogenesis, menstrual cycle.

**Textbook:**

1. Tortora, G.J. and Derrickson, B.H. (2009). Principles of Anatomy and Physiology, XII Edition, John Wiley and Sons, Inc.
2. Guyton, A.C. and Hall, J.E. (2011). Textbook of Medical Physiology, XII Edition, Harcourt Asia Pvt. Ltd/ W.B. Saunders Company.
3. Marieb, E. (1998). Human Anatomy and Physiology, IV Edition, Addison-Wesley.

**Suggested Readings:**

1. Dee Silverthorn. (2018). Human Physiology: An Integrated Approach. 8<sup>th</sup> Edition. Pearson Publications. 984 pages.
2. Prakash, G. (2012). Lab Manual on Blood Analysis and Medical Diagnostics, S. Chand and Company Ltd.
3. Kesar, S. and Vashisht, N. (2007). Experimental Physiology, Heritage Publishers.
4. Widmaier, E.P., Raff, H. and Strang, K.T. (2008). Vander's Human Physiology, XI Edition, McGraw Hill.

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**HUMAN PHYSIOLOGY PRACTICAL**

**Code: 24ZO115**

**Max. Marks: 70**

**Contents:**

1. Preparation of temporary mounts: Neurons and Blood film.
2. Preparation of haemin crystals.
3. Estimation of haemoglobin using Sahli's haemoglobinometer.
4. Study of permanent histological slides of mammalian oesophagus, stomach, duodenum, lung, kidney, thyroid, pancreas, adrenal, testis, ovary.
5. Preparation of temporary mounts of squamous epithelium, striated and non-striated muscles.
6. DLC of blood.
7. Lab notebook with labelled diagrams, methods (wherever applicable) and results must be incorporated.

**DIVERSITY AND EVOLUTION OF NON-CHORDATES I PRACTICAL**

**Code: 24ZO193**

**Max Marks: 70**

1. Microscope and its practical use
2. Symmetry:
  - a) Asymmetric organization: Amoeba,
  - b) Radial symmetry: Sea anemone/Aurelia,
  - c) Bilateral symmetry: Planaria/Liver fluke
3. Animal Diversity (identification from specimen/model)
  - a) Protozoa: *Euglena*, *Plasmodium*, *Paramecium*;
  - b) Porifera: *Grantia*, *Spongilla*;
  - c) Cnidaria: *Physalia*, *Vallela*, *Aurelia*, sea anemone and any one coral;
  - d) Platyhelminthes: *Planaria*, liver fluke and tapeworm;
  - e) Aschelminthes: *Ascaris*- male and female.
4. Preparation of Permanent Slide
5. Identification of prepared slides:

*Euglena*, Hydra, Obelia colony, Polystomella, Sponge spicules, TS of *Ascaris*.
6. Study of *Paramecium* culture to observe food vacuole, contractile vacuole and ciliary movement.
7. Viva
8. Practical Record Book

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**PERSPECTIVES IN ECOLOGY PRACTICAL**

**Code: 24ZO194**

**Max. Marks: 70**

1. Determination of PH of pond water (lovibond disc comparator/ PH meter) and Turbidity of water.
2. Estimation of DO and CO<sub>2</sub> in pond water
3. Determination of air temperature and humidity.
4. Estimation of primary productivity in aquatic ecosystem.
5. Estimation of chloride of water sample.
6. Estimation of total alkalinity and hardness.
7. Study of zooplanktons and its role in a pond ecosystem.
8. Analysis of physical parameters of soil determination of soil moisture.
9. Submission of laboratory notebook.
10. Viva voice.
11. Study of life tables and plotting of survivorship curves of different types from the hypothetical/real data provided
12. Determination of population density in a natural/hypothetical community by quadrat method and calculation of Shannon-Weiner diversity index for the same community.
13. Study of an aquatic ecosystem: fauna and flora Measurement of area, temperature, turbidity.
14. Report on a visit to National Park/Biodiversity Park/Wild life sanctuary

Total: 100 Marks  
External: 70 Marks  
Internal: 30 Marks

**External: 70 Marks**

10 Question (MCQ): 1 marks each (1x10 = 10)  
Answer any 6 out of 8 (Very Short 20-30 Words): 2 marks each (2x6 = 12)  
Answer any 6 out of 8 (Short 50-70 Words): 3 marks each (3x6 = 18)  
Answer any 6 out of 8 (Long 100-120 Words): 5 marks each (5x6 = 30)

**Internal: 30 Marks**

Two Internal Assessment Examinations will be conducted, each carrying 50 marks. The higher of the two scores will be considered for the final assessment.

Practical: 100 Marks  
External: 70 Marks  
Internal: 30 Marks

**External (Two programs): 70 Marks**

**Program Writing:** 10 + 10 Marks  
**Algorithm & Flowchart:** 5 + 5 Marks  
**Program Execution:** 15 + 15 Marks  
**Viva:** 10 Marks

**Internal Assessment (30 Marks)**

Internal Assessment Examinations will be conducted, carrying 50 marks  
**Record:** 5 Marks  
**Attendance:** 5 Marks  
**Program Writing:** 15 Marks  
**Program Execution:** 15 Marks  
**Viva:** 10 Marks