

SEMESTER SYSTEM OF Ph.D ZOOLOGY

Paper – 711

(Recent Trends in Zoology)

Theory – Compulsory

Marks – 80 + 20 (4 CH)

UNIT-I: BIOPHYSICS AND BIOCHEMISTRY

Membrane systems and Membrane transport
Principles of Thermodynamics
Concept of energy, standard free energy, Free energy hydrolysis of ATP
Electron Transport System, Oxidative phosphorylation
Amino group Metabolism
Oxidation of Fatty acids

UNIT-II : IMMUNOLOGY, BIOTECHNOLOGY AND BIOINFORMATICS

Major Histocompatibility Complex, Auto immune diseases
Complement Systems, Cytokines
Monoclonal antibodies and their applications
Techniques of Recombinant DNA technology (Blotting Techniques)
Transfection, Transgenic Animals
DNA Fingerprinting
Sequence Analysis (BLAST, FASTA, CLUSTAL)

UNIT –III:PHYSIOLOGY, ENDOCRINOLOGY AND ETHOLOGY

Homeothermy (Temperature regulation) in mammals
Hormonal regulation of Reproduction (Ovulation, Implantation, Pregnancy, Parturition, Lactation)
Mechanism of Hormonal Action and Signal Transduction
Biological rhythms and factors regulating biological rhythms
Ageing: causes and theories

UNIT-IV: MOLECULAR BIOLOGY AND CYTOGENETICS

Ultrastructure of eukaryotic chromosome
Banding patterns of chromosome
Chromosomal Diseases in Man
Transcription in Eukaryotes and Post- transcriptional regulation
Translation in eukaryotes and Post –translational modifications of polypeptides
Transposons

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Paper – 712 (Research Methodology - I) Theory – Compulsory Marks – 80 + 20 (4 CH)

UNIT – I : SCOPE OF RESEARCH AND ETHICS:

Introduction and Scope

Research problem: Identification, Selection, Formulation of research objectives

Research design: Components, Types and Importance

Research ethics, Institutional ethics committee

Plagiarism – Pitfall

UNIT – II: TECHNICAL WRITING:

Types of technical documents; Full length research paper, Short / Brief communications, Letters to editor, Book chapter, Review, Conference report, Project proposal

Components of a full length research paper; Title / Topic statement, Abstract/key words, Aims and objectives, Hypothesis building, Rationale of the paper, Work plan, Materials and methodology, Results and discussion, Key issue and arguments, Acknowledgement, Conflict of interest statement, bibliography, Technical Resumes & Cover Letters

Components of a research proposal; Project summary Key words, Origin of the proposal, Major Objectives Methodology, Instrument facility available in the PI's department, Overview of status of Research and Development in the subject, Importance of the proposed project in the context of current status, Bibliography

UNIT – III: SCIENTOMETRICS:

How to cite and how to do referencing

Literature search technique, using SCOPUS, Google Scholar, PUBMED, Web of Science, Indian Citation Index, and RG

Styles of referencing; APA, MLA, Oxford, Harvard, Chicago

Annotated bibliography

Tools for citing and referencing, Grammarly, Endnote etc

UNIT – IV: PRESENTATION AND COMMUNICATION SKILLS:

Tables, Figures and Pictures using Excel

PowerPoint slide preparation

Preparation of Posters

Electronic submission of manuscripts

Communication skills, oral and poster

SEMESTER SYSTEM OF Ph.D ZOOLOGY

Paper – 713 **(Research Methodology - II)** **Theory – Compulsory** **Marks – 80 + 20 (4 CH)**

UNIT – I : IPR AND CYBER LAW:

Patents
Patent laws, process of patenting a research finding
Intellectual property (IP), Intellectual property right (IPR)
Copyright, Trademarks, GI
Cyber laws
COPE

UNIT – II: QUANTITATIVE DATA ANALYSES:

Types of data, Data collection - Methods and Tools
Hypothesis testing
Normal and Binomial distributions and their property
Tests of significance: Student t-test, F-test, Chi-square test
Correlation and Regression
ANOVA - One-way and Two-way, Multiple-range test

UNIT – III: COMPUTER FUNDAMENTALS:

Introduction to MS-Office software: MS-Word (Track change)
MS-Excel
MS-Power Point
MS-Access
Features for Statistical data analysis using computers and software
Microsoft Excel Data Analysis Tool Pak, SPSS

UNIT – IV: ADVANCED TOOLS & TECHNIQUES

Microscopic techniques – Compound Microscopy, Fluorescence
Microscopic and Electron microscopy
Colorimeter, Spectrophotometer
Principle, protocol and application of Chromatography – GLC & HPLC
Electrophoresis and its application.
PCR, Real time PCR
DNA microarray, DNA sequencing

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Paper – 714

Marks – 150+25+25=200 (8 CH)

REVIEW WORK

(Report Writing + Seminar Presentation of the Report + Viva – Voce)

Books Recommended:

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| Alberts, B., Johnson A., Lewis J, et al. | Molecular Biology of the Cell |
| Andreoli, T.E, Hoffman, J.F. et al | Membrane transport process in organized system |
| Barret, K.E et al. | Gangong's Review of Medical Physiology |
| Baxevanis, A.D. and Ouellete, F.F | Bioinformatics: A practical guide to the analysis of gene and proteins |
| Buranen L and Roy AM | Perspective on Plagiarism and intellectual Property in a Post-Modern World |
| Campbell RC | Statistics for biologists |
| Cassel P et al. | Inside Microsoft Office Professional |
| Chatwal and Chatwal | Instrumentation |
| Coleman P and Dyson P | Mastering Internets |
| Cooper, Geoffrey M | The Cell: A molecular Approach |
| Cox, M.M and Nelson, D.L | Principles of Biochemistry |
| Epplen,J. And Lubjuhnn,T. | DNA profiling and DNA Fingerprinting |
| Gilmore B | Plagiarism: why it happens, how to prevent it? |
| Gralla P | How the Internet Works |
| Gupta, P.K. | Molecular Biology |
| Gupta, P.K. | Biotechnology and Bioinformatics |
| Guyton and Hall | A textbook of Medical Physiology |
| Habraken J | Microsoft® Office 2003 All in one, Microsoft ® Office 2010 in Depth |
| Hall, J.E | Guyton and Hall : Textbook of Medical Physiology |
| Kaufman, Myron | Principles of thermodynamics |
| Kothari, CR | Research Methodology |
| Kirby,L.T | DNA Fingerprinting: An Introduction |
| Kreitzman, Leon &Foster, R. | The Rhythms of Life: The biological clocks that control daily lives of every living thing. |
| Kuby, Janis | Immunology |
| Kumar Anupa P | Cyber Law |
| Kumar, Pranav | Biophysics and Molecular Biology |
| Lewin, B | Genes IX |
| Lodish, H., Berk,A. et al. | Molecular Cell Biology |
| Olander, D.R. | General Thermodynamics |
| Powar, C.B. | Cell Biology(Vol-II) |
| R Panneerselvam | Research Methodology |
| Rao,Y.V.C | An Introduction to thermodynamic |
| Russel | i-Genetics: A molecular approach |
| Sharma, B.K | Instrumental method of analysis |
| Shelly GB, Vermaat ME, Cashman TJ | Microsoft® 2007, Introductory Concepts and Techniques. |
| Shourie, Abhilasha & Chapadgaonkar, Shilpa S. | Bioanalytical techniques |
| Shukla, A.N. | Textbook of Chronobiology |
| Singh, B.D. and Singh, R.P. | Biotechnology |
| Stryer, Lubert | Biochemistry |

Tortora, G.J and Derrickson,B.
Voet, D and Voet, J.G
Vogel, AL
Watson,J.D
Wilson,K. And Walker,J.

Principles of Anatomy and Physiology
Biochemistry
Analytical chemistry
Molecular Biology of the Gene
Biochemistry and Molecular Biology