SYLLABUS FOR pre- Ph.D. COURSE WORK
ZOOLOGY
(Under Revised Ordinance 16 notified vide letter no/Acad./2016/947 dated 26/04/2016)
(Academic Session 2016 – 2017 & Onwards)

SCHEME OF EXAMINATION

Number & Title of the Paper	Credit Marks	Max Marks	Min. Marks for Passing
PAPER I RESEARCH METHODOLOGY	5	100	50
PAPER II COMPUTER APPLICATION	3	50	25
PAPER III REVIEW OF LITERATURE (IN THE FORM OF THESIS)	3	50	25
PAPER IV COMPREHENSIVE VIVA VOCE	4	50	25
TOTAL	15	250	125

PAPER – I
RESEARCH METHODOLOGY

Unit – I

Sampling technique, sterilization technique, various methods for isolation of pure culture methods for measurement of microbial growth, manipulation of environment, nutritional and genetic parameters, maintenance and preservation of microbes (pure culture). Introduction to Cell & Tissue Culture. Design & lab setup of Tissue Culture laboratory, Tissue culture Media (Composition preparation), Types of culture.

Unit - II

Chromatographic techniques – Gel filtration, ion exchange chromatography, hydrophobic interaction and reverse phase chromatography, affinity chromatography, gas chromatography, high performance liquid chromatography, fast protein liquid chromatography; Application in separation of proteins including enzymes.

Unit - III

Molecular Biology and spectroscopic techniques – Comet Assay; Real time PCR; RAPD, RFLP, ARDRA and Fluorescence *in situ* hybridization techniques. Atomic absorption spectroscopy, infrared spectroscopy, nuclear magnetic resonance spectroscopy, mass spectrometry including ESI MS and MALDI-TOF MS and Applications.

Unit - IV

Electrophoretic and centrifugation techniques - SDS and Native PAGE, Agarose gel electrophoresis, isoelectric focusing and two-dimensional electrophoresis, proteome analysis;

Differential and density gradient centrifugation, analytical ultracentrifugation, separation of DNA/RNA using ultracentrifugation technique, determination of molecular weight and Sedimentation coefficient.

Unit - V

Quantitative methods; Principles and Designs of Experiments; Tools Parametric and Non~parametric statistics. Confidence interval, Errors. Levels of significance, Regression and Correlation coefficient. Analysis of variance for one way and two way classifications; Multiple Comparisons – Least Significant Difference Test, Duncan's New Multiple Range Test; Factorial Analysis; Analysis of Covariance.

PAPER - II

COMPUTER APPLICATION

Unit - I

Features and applications related to presentation of text in suitable format and saving the MS WORD data for future applications. Practical knowledge of MS Word to type the script, insert tables, figures and graphs to prepare thesis and research papers in presentable format.

Unit – II

Construction of spreadsheets from the experimental data. MS EXCEL design and application of formula for calculations and their applications to the experimental data. Use of statistical tools, preparation of graphs, histograms and charts.

Unit – III

Preparation of powerpoint presentations based on the topic of research. Insertion of MS power point figures, graphs, charts in presentation. Preparation of scientific posters for presentations. Use of various presentation techniques.

Unit – IV

Method of preparing data sheets and entering the data according to its characteristics. Use of SPSS & of various statistical tools on SPSS. Internet Overview of networking, Internet and its applications. Applications exploring various websites and search engines for collecting quality literature and secondary data related to research work.

Unit – V

Data processing, Data mining; Bioinformatics – Concept and applications; Biological databases – Primary and Secondary; Sequence Databases (EMBL, GenBank, DDBJ, SWISS-

PROT, PIR, TrEMBL); Protein Family/Domain Databases (PROSITE, Pfam, PRINTS & SMART); Structure Database (PDB); Tools like BLAST, FASTA and EMBOS.

PAPER III

REVIEW OF LITERATURE IN THE RELEVANT FIELD

PAPER IV

COMPREHENSIVE VIVA VOCE