Dr.Babasaheb Ambedkar Marathwada University, Aurangabad.

Syllabus Template for PET Examination 2016

SECTION – A : Research Methodology **(50 % weightage)**

UNIT I Introduction to Research Methodology : Meaning of Research, Objectives and motivation of Research, Types of Research, Research Approaches, Significance of Research, Research Methods v/s Methodology, Research and Scientific Methods, Research Process, Criteria of Good Research ,Defining the Research Problem , Selecting the Problem, Necessity of defining the problem, Research Design: Meaning, Need, Features of Good Design, Concepts, Types. Basic Principles of Experimental Design, Developing a Research Plan, Hypothesis as a framework for scientific projects. Alternatives of hypothesis driven research: hypothesis generating research, Writing research hypothesis (grant). Presenting research: oral and poster

UNIT II Sampling, Data Collection and Presentation,

Representative Sample, Sample Size, Sampling Bias and Sampling techniques.

sources of data, Type of Data, primary data, secondary data, Method of Collection of Primary and Secondary Data: questionnaire, sampling methods, merits and demerits, experiment-observation method, sampling errors-type I / type II errors Methods of Data Presentation including Graphical Representation by Histogram, Polygon, Ogive Curve, Pie Diagram

UNIT III Sample Design : Implication, Steps. Criteria for selecting a sample procedure, Characteristics of Good sampling Procedure, Types of Sample Design, Selecting Random Samples, Complex random sampling Design

Literature Search: Literature review, Defining the research question, Approaches and Methodology, Documentation and presentation of data, Analysis and interpretation of data, Common statistical tests manuscript preparation

UNIT IV Tools and techniques in biotechnology: Brief introduction to :Biochemical and Biophysical techniques,Cell biology techniques- Basic molecular biology, Genetic engineering techniques, Techniques used for purification and/or characterization of biomolecules: Radiolabeling techniques

UNIT V

Central Tendency and Measure of Central Tendency: Mean, mode, median, **Measure of Variability** : Standard Deviation, Standard Error Range ,Mean Deviation, Coefficient of Variation, Correlation Coefficient and Regression (Positive & Negative),Calculation of Correlation Coefficient & Regration Coefficient , Linear Regression and Regression Equation, ANOVA: One and Two Way Classification.**Test of Significance** & **Computer based statistical techniques:** F-test , Z-test .T-test and Chi-Square ,Probability Distribution : Binomial, Poison and Normal Distributions.**Use of in-built statistical functions for computations** of Mean, S.D., Correlation, regression coefficients etc. Use of bar diagram, histogram, scatter plots, etc. graphical tools in EXCEL for presentation of data. Introduction to Internet and use of the same for communication, searching of database, literature, references etc. Introduction to Bioinformatics, Databank search- Data mining,

SECTION – B : Biotechnology (50 % weightage)

UNIT I : Microbiology, Immunology and Virology

UNIT II : Inheritance, Central Processes, Gene Expression, Genetic Engineering. Generation of recombinants for environment, agriculture, veterinary and human use. Recombinant product preparation, ethics and awareness on their implementation.

UNIT III : Cell Biology and Developmental Biology

UNIT IV : Various instruments used in biotechnology, principle, function, applications of simple to sophisticated instruments. Analytical methods for design and purification of primary and secondary metabolites, and their fusion derivatives. Bioprocess Engineering and recovery of valuable products after fermentation.

UNIT V: macromolecules, bioenergetics, metabolism. Structural components of prokaryotic cell and eukaryotic cell with reference to synthesis and localization, biochemical reactions. Cell Cell interactions, signaling processes both in prokaryotic and eukaryotic organisms. Concept of Enzyme, classification, regulation and designing of enzymes for metabolic engineering and recombinant biology.