

(w.e.f. A.Y. 2022-23)

Paper – I: Research Methodology
(4 Units)

UNIT-I: Research Problem and Design

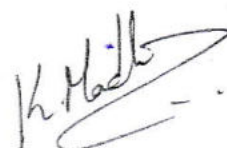
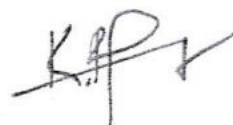
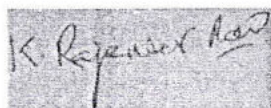
1. Introduction to Research Methodology: Meaning of Research, Objectives of Research, Motivations in Research, types of Research, Research Approaches, Significance of Research, Research Methods v/s Methodology, Research and Scientific Methods, Research Process, Criteria of Good Research.
2. Defining the Research Problem: Concept and need, Identification of Research problem, defining and delimiting Research problem.
3. Research Questions and Hypothesis: Variables, Research question, characteristics of good Hypothesis and formulation of hypotheses-directional and non-directional hypotheses, Basis for hypotheses.
4. Research design: Meaning, Need, Features of Good Design, Concept, Types. Basic principles of Experimental Design, various methods of Research: Survey, Philosophical, Historical, Experimental, Causal, Comparative, Genetic and Case Studies.

UNIT-II: Literature Searching and Report Writing

1. Tools for Data Collection: Collection of Primary Data, Collection of Data through questionnaires and Surveys, Observation, Interview Methods.
2. Collection of Secondary Data. Selection of appropriate method for data collection, Reliability and validity of Research tools.
3. Writing Research Report: Format and style, Review of related literature and its implications at various stages of research. (Formulation of research problem, hypothesis, interpretation and discussion of results).
4. Major findings, Conclusions. Citation of References and Bibliography.

UNIT-III: Statistical analysis & Bioinformatics

1. Statistical analysis: descriptive statistics and inferential statistics.
2. Chi-Square Test, T-Test. Standard deviation, Coefficient of variation. Correlation.
3. Bioinformatics: Types of databases; Search tools: BLAST and FASTA. Sequence analysis of biological data. Major Bioinformatics resources (NCBI, EBI, ExPASy).
4. Phylogenetic analysis: Concept of phylogenetic trees and multiple sequence alignment methods; Protein structure prediction, Proteomics and Genomics; EMBOSS.



Prof. Manjula Bhanoori

Dr. Karuna Rupula

Dr. S. Suma

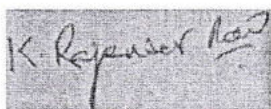
Chairperson, Board of Studies
Dept. of Bioinformatics
Mahatma Gandhi University,
GONDA-505204 (T.S.)

UNIT-IV: Analytical Techniques

1. Spectroscopy: Principle of spectroscopy: Laws governing light absorption (Beer-Lambert's Law). Principles and biological applications of UV and visible spectroscopy, Flame photometry, Atomic Absorption Spectrophotometry. Basic principles and applications of X-ray diffraction, Fluorescence, IR, NMR and Mass spectroscopy.
2. Separation techniques: Principles and biological applications various Chromatography techniques, Electrophoresis methods, Centrifugation techniques.
3. Microscopy: Principles and applications of Light and Phase Contrast, Fluorescent, Scanning and Transmission Electron Microscopy.
4. Flow cytometry principle and its applications.

Reference Books:

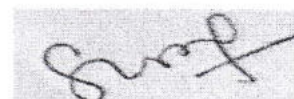
- a) Best and Kahn, Research Methodology, PHI Limited.
- b) Kothari, C.R. Research Methodology (Methods and Techniques), New Age Publisher.
- c) Kerlinger, Foundation of Research.
- d) Fundamentals of modern statistical methods by R.wilcox.
- e) Power Analysis for Experimental research A Practical Guide for the Biological, Medical and social Sciences by R. Barker Bausell, Yi-Fang Li Cambridge University Press.
- f) Design of Experience: Statistical Principles of Research Design and Analysis, by Robert O. Kuehl Brooks/cole.



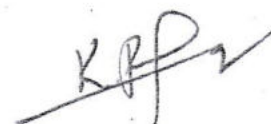

Prof. Manjula Bhanoori




Dr. Karuna Rupula



Dr. S. Suma




Chairperson, Board of Studies
Dept. of Biochemistry
University of Mysore
Mehanna College of Science
NALCOETA, DSS (U.S.)

(w.e.f. A.Y. 2022-23)

PAPER –II: CELL, IMMUNOLOGY AND MOLECULAR BIOLOGY
(Broad field of specialization)

UNIT-I

1. Cell cycle and its Regulation; Biomembranes: Structure and functions, Membrane transport.
2. General concept of signal transduction mechanisms: Protein Kinases and Second messengers.
3. Receptors and mechanism of action of Hormones. Molecular physiology and Muscle contraction and Neurotransmission.

UNIT-II

1. Immunology: Classification of Immunoglobulins, Immunity, Humoral and Cell mediated Immunity.
2. Immunological memory, Adjuvants, Lymphokines, T cell receptors.
3. Hypersensitivity, HLA, Autoimmunity, Complement system, Antibody diversity.

UNIT-III

1. DNA Replication, DNA damage and Repair.
2. Mechanism of Transcription and Translation in Prokaryotes and Eukaryotes.
3. Viruses: RNA & DNA viruses, life cycle of T-even phages, TMV, ØX174, SV40 and Retroviruses.

UNIT-IV

1. Regulation of Gene Expression: Operon concept, Lytic cascade and lysogenic repression. DNA Methylation, Heterochromatin, Antisense RNA, post transcriptional and post translational modification, Molecular Chaperones. Protein targeting, Signal hypothesis.
2. Oncogenes and molecular basis of Cancer. Tumor suppressor genes, Apoptosis and its regulation.

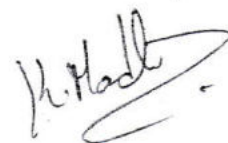
K. Rajender Reddy



Dr. Karuna Rupula



Prof. Manjula Bhanoori






Dr. S. Suma










Chairperson, Board of Studies
Dept. of Biochemistry
University College of Science
Mahatma Jyoti Bapu University,
NALGONDA - 431 234 (T.S.)

MGU (Nalgonda), UCS, Biochemistry Department.

Board of Studies members' suggestions taken through e-mail from 30th November, 2022 to 3rd December, 2022 to modify Biochemistry Pre-Ph.D. syllabus.

Members in the Board of Studies committee:

- | | | |
|---|----|---------|
| 1. Dr.M. Thirumala, chairperson, BOS | -- | present |
| 2. Dr.M. Ramchander goud, HOD, Exofficio member | -- | present |
| 3. Dr.T. Sivaram, Member, BOS | -- | present |
| 4. Dr.K. Madhuri, Member, BOS | -- | present |
| 5. Dr.K. Premsagar, Member, BOS | -- | present |
| 6. Dr.S. Kalyani, Member, BOS | -- | present |
| 7. Prof. Manjula Bhanoori, Member, BOS | -- | present |
| 8. Dr. Karuna Rupula, Member, BOS | -- | present |
| 9. Dr. S. Suma, Member, BOS | -- | present |
| 10. Dr. S. Ravikiran, Member, BOS | -- | Absent |
| 11. Dr. K. Rajender Rao, Member, BOS | -- | present |
| 12. Dr. N. Uttamkumar, Member, BOS | -- | Absent |
| 13. Dr. Mahesh Yanamandra, Member, BOS | -- | Absent |







Agenda:




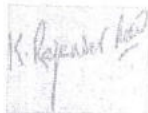
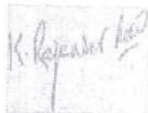
MGU (Nalgonda), Board of Studies members' suggestions taken through e-mail (due to time constraint) from 30th November, 2022 to 3rd December, 2022 to modify and approve the Biochemistry Pre-Ph.D. syllabus with effect from the 2022-23 A.Y.


The following resolutions were made:

1. Changes suggested and inputs given by the members of the BOS committee have been incorporated in the syllabus of the earlier approved Biochemistry Pre-Ph.D. syllabus (w.e.f. A.Y. 2017-18) and this ratified syllabus has been approved w.e.f. Academic Year 2022-23. The title and contents of Paper-I have been changed; title has been changed to Research Methodology as per MGU, Ph.D. rules and regulations and accordingly contents were also changed by taking suggestions of the committee members.
2. In Paper-II, Bioinformatics topics of syllabus w.e.f. A.Y. 2017-18 were shifted to paper-I, in present ratified syllabus with little modifications.

The chairman, BOS thanked all the members for making it convenient to suggest the changes.

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