

Department of Microbiology
Faculty of Science
V.B.S. Purvanchal University, Jaunpur
Course work for Ph.D. Students
w.e.f. Session 2021-22

Ph. D. Course work will be conducted as per University guide line Vide Letter No. 1097/Academic/Section/ 2018 dated 08.09.2018. The Ph. D. course work will be comprised of three courses of 50 marks each are as follows-

Course 1: Research Methodology

Course 2: Computer Applications

Course 3: Research Ethics

Course 1 will be evaluated based on written examination while Course 2 and Course 3 will be evaluated based on practical examination and presentation by the candidate respectively in front of Departmental Research Committee (DRC).

Course 1: Research Methodology

50 Marks

UNIT I

Objectives of Research, Research problem and techniques involved in defining a problem, steps of scientific study, formulation of hypothesis, defining sources, workable hypothesis, basic concept of research design

UNIT II

Survey, Case study (if required), experimental method, interdisciplinary approaches

UNIT III

Collection, Classification and tabulation of data, Measures of central tendency, Chi square test

UNIT IV

Analysis and interpretation of data, techniques of interpretation, steps of report/ review/ research paper writing, layout and preparation of report

UNIT V Studying various National R&D agencies (CSIR, ICMR, DST, DBT, UGC, ICAR, etc) to find out their priority areas and thrust areas.

Recommended readings:

1. Research methodology: Methods and techniques by Kothari, CR(2007); New age international Pvt. Ltd.
2. Research Methodology by pannerselvam, R(2007); prentice Hall India (P) Ltd.
3. Quantitative Methods; ICFAI University press(2004).
4. Instrumental Methods of Analysis: by HH Willard, merrit, jr LL, Dean JA &Settle, jr, FA; CBS Publisher and distribution (1986).

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5. Business Statistics by Bhardwaj, RS Excel Books. Statistical Methods by Shenoy, GV and Pant. LM(1994); MacMillan India Ltd.

Course 2: Computer Applications

50 Marks

UNIT I Introduction to computer, types of computer and components of computer, role of computer in research

UNIT II Concept of languages, languages suitable in scientific research

UNIT III MS Office tools (access, excel, power point, word)

UNIT IV Introduction to internet, different parts of internet, application of internet

UNIT V Introduction to software. Software commonly used in scientific research (sigma-plot, enzfinder, BLAST etc.)

Recommended readings:

1. Biostatistics, Computer Application and Bioinformatics (2015) V. Kumaresan, N. Arumugam, R. Sundaralingam A. Gopi , A. Meena
2. Computer Applications for Life Sciences **Author:** Joan Harnett **ISBN:** 978-1-60797-418-5

Course 3: Research Ethics

50 Marks

UNIT I: Objectives in research ethics; management of risk, the application of fundamental ethical principles in scientific research.

UNIT II: Various aspects of academic scandal, including scientific misconducts (such as fraud, fabrication of data and plagiarism), Whistle blowing, etc.

UNIT III: The design and implementation of research involving human and animal experimentation; Animal Ethics Committees (AECs),

UNIT IV: Ethical Issues in Agricultural Research: the efficiency, equity, excellence and environmental consequences of resource and institutional management.

UNIT V: Regulations and guidelines relating to radiation or biological safety.

Recommended readings:

1. **Research in Medical and Biological Sciences-** From Planning and Preparation to Grant Application and Publication, 1st Edition **Editors:** Petter Laake Haakon Benestad Bjorn R. Olsen **Paperback ISBN:** 9780127999432 **eBook ISBN:** 9780128001547 **Imprint:** Academic Press

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2. Textbook of Research Ethics Theory and Practice By: Sana Loue
ISBN: 9781475773170

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