

M.Phil. MICROBIOLOGY

(2014-2015)

Revised SYLLABUS

PAPER I RESEARCH METHODOLOGY

Unit - I Scientific research and scientific writing

Importance and need for research ethics and scientific research. Formulation of hypothesis - types and characteristics. Designing research work. Scientific writing - characteristics. Logical format for writing thesis and papers. Essential features of abstract, introduction, review of literature, materials and methods and discussion. Effective illustration - tables and figures. Reference styles - Harvard and Vancouver systems.

Unit - II Biostatistics

Collection and classification of data - diagrammatic and graphic representation of data. Measurement of central tendency - standard deviation - normal distribution - test of significance based on large samples. Student *t* test. Correlation and regression - Chi square test for independence of attributes - ANOVA.

Unit - III Basic concepts of computers

History of computers, concept of computer hardware, concept of computer - languages, concept of computer software.

Computer application in Biology

Spreadsheet tools: Introduction to spreadsheet applications, features, using formulae and functions, data storing, features for statistical data analysis. Generating charts/graph and other features, tools Microsoft excel or similar presentation tools: Introduction features and functions. Power point. Presentation, customizing and showing presentation. Introduction to internet, use of internet and WWW, use of search engines.

Unit - IV Bioethics

Bioethics - Definition – Principles of Bio ethics –General issues related to environmental release of genetically modified microorganisms. Ethical issues related to the use of animal as models for microbial diseases- Animal ethics norms in India - Licensing of animal house - Ethical clearance norms for conducting studies on human subjects. Ethical issues related to research in embryonic stem cell cloning.

Unit -V Biosafety

Biosafety – Introduction. Different levels of biosafety. Guidelines for recombinant DNA research activities in microorganisms. Good Laboratory Practices (GLP). Containments – Types. Basic Laboratory and Maximum Containment microbiology Laboratory research.

Reference Books

1. Christian Lenk, Nils Hoppe, Roberto Andorno (2007). Ethics and Law of Intellectual Property: Current Problems in Politics, Science and Technology, Ashgate Publisher (p) Ltd.
2. Felix Thiele, Richard E. Ashcroft (2005). Bioethics in a Small World. Springer.
3. John Bryant (2005) Bioethics for Scientists. John Wiley and Sons
4. Recombinant DNA safety guidelines (January1990), Department of Biotechnology, Ministry of Science & Technology, Government of India, New Delhi.
5. Paul Sanna and Alan Wright Windows 8.1 Absolute Beginner's Guide (2013), How Que Publishing
6. Web Wise Seniors, The Internet for Beginners, 2005, Web Wise Seniors, Inc.
7. Kothari, C.R., 2013. Research methodology Methods and Techniques, New Age International Pvt Ltd Publishers., New Delhi.
8. Anderson, J., Durosn, B.H. and Poole, M. 2011. Thesis and assignment writing, Wiley Eastern Ltd., New Delhi.MIBC201Core Paper IV Medical Microbiology

PAPER - II ADVANCES IN MICROBIOLOGY - I

Unit - I Soil Microbiology

Broad significance of soil Microorganisms - Characteristic of soil Microorganisms – Enzymes of soil microorganisms – Microbial Biochemistry – Plant – Soil Microorganisms interactions – Factors affecting the activities of soil microorganisms – Microbial degradation of pesticide compounds in soil.

Unit - II Environmental Microbiology

Concept & Scope of Environmental Microbiology – soil pollution – water pollution – Air pollution – Oil pollution- Biomining of metals – solid wastes Management. Microbial control of environmental pollution and Bio remediation– Microbial degradation of Xenobiotis. Environmental laws, Biological warfare

Unit - III Food Microbiology

Food micro flora - spoilage organisms - Food poisoning - Intoxication and infection - Quality management in food industries - Fermented foods - SCP. Microbial enzymes - Genetically modified foods.

Unit - IV Industrial Microbiology:

Concept and scope of industrial Microbiology – strain improvement; Bioreactors – types, design and functional characteristics. Scale up of fermentations. Production of organic solvents , organic acids and amino acids. Third generation antibiotics , Bioassay techniques of antibiotics. Production of microbial inoculants, Principles of immobilization – different kinds of immobilization techniques and their uses in industries. Intellectual property rights (IPR) Patents, Trademark, copyright, Design registration and know- how – patent system India – patenting microorganisms and microbial products.

Unit - V Medical Microbiology:

Diagnostic Microbiology - General methods for isolation and identification of bacteria - typing of bacterial isolates - Sero diagnosis Antimicrobials - General characters and drug resistance – antiviral and anti- parasitic drugs.

References Books

1. Mishra R.R., (2004). Soil Microbiology. CBS Publishers & Distributors., New Delhi.
2. Dirk, J. Elsas, V., Trevors, J.T., Wellington, E.M.H. (2006). Modern Soil Microbiology, Marcel Dekker INC, New York, HongKong.
3. Stanbury, P.F., Whittaker, A. and Hall, S.J., 2009. Principles of fermentation technology, 2nd edition, Pergamon press.
4. Cassida, J.E., 2007. Industrial Microbiology, New Age International
5. Frazier, W.C and Westhoff D.C 2013. Food Microbiology. TATA McGraw Hill Publishing Company Ltd. New Delhi.
6. Jay, J.M.2013. Modern Food Microbiology. 7th Edn. CBS Publishers and Distributors, New Delhi.
7. Asthana D.K. and Meera Asthana, 2005. Environment: Problems and Solutions, S.Chand and Company Ltd., New Delhi.
8. Gerald collee. J and Anthony Simmons 2000. Practical Medical Microbiology. Longman Singapore (P) Ltd, Singapore.
9. Greenwood, D. Slack R.B and Peutherer J.F (2012). Medical Microbiology, 18th Edn Churchill Livingstone, London