



Hemchandracharya North Gujarat University, Patan

PH.D. COURSE WORK SYLLABUS

SUBJECT : MICROBIOLOGY

Scheme & Course

Sr.	Paper	Nomenclature	Credits	Marks
1.	Paper-I-MICRO-CW-101	Research Methodology	04	70+30
2.	Paper-II-MICRO-CW-102	Advance course in Microbiology	04	70+30
3.	Paper-III-MICRO-CW-103	Computer Applications to the subject	04	70+30
4.	Paper-IV-MICRO-CW-104	Review of published research in the relevant field	04	70+30
5.	Paper-V-MICRO-CW-105	Comprehensive Viva	04	100

Notes:

- The candidate has to obtain a minimum of 55% of marks or its equivalent grade points in aggregate in the course work in order to be eligible to continue in the Ph.D. programme.
- If candidate obtains 'F' or 'Ab.' grade in the course/ subject. He/ she will be treated to have failed in that course. He/ She has to reappear in the examination in the next semester.

Paper-I	MICRO-CW-101	Research methodology	Credit-4		(70+30)
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- UNIT-1** Introduction to Research Methodology and Research design : Meaning of Research, Objective of research, Research Problem, Need for Research Design, Different Research Designs, Developing a Research Plan.
- UNIT-2** Sample and Sampling Sample: sampling unit, Purpose of sampling, process of sampling and different methods of sampling
- UNIT-3** Data Collection : Collection of Primary Data, Observation Method, Interview method, Collection of Data through questionnaire and Schedules, Other methods Collection of Secondary Data, Selection of appropriate method of data collection.
- UNIT-4** Processing and Analysis of Data: Measures of Central Tendency, Dispersion, t-Test, Chi -square test, Analysis of Variance and Co-variance, Probability Definition, types of probability.
- UNIT-5** Interpretation and Report Writing: Meaning of Interpretation, Technique of Interpretation, Significance of Report Writing Different Steps in Writing Report, Layout of the Research Report, Types of Reports, Mechanics of Writing a Research Report, Ethics in research.

Reference Books:

- Garg B.L.Karadia R.,Agarwal, F. and Agarwal U.K.,2002 An introduction to Research Methodology, RBSA Publisher
- Kothari C.R., 1990, Research Methodology : Methods and Techniques, New Age International ,418p.
- Sinha S. C.and Dhiman A. K., 2002. Research Methodology, Ess Publications, 2 volumes
- Trochim W. M.K,2005. Research Mehods : the concise knowledge base Atomic Dog Publishing 270p
- Suedecor G.W and Cochran W.G., 1968). 'Statistical methods', Oxford & IBH, Delhi.
- Prasad S.,2014 . Elements of Biostatistics, Rastogi Publications.



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Paper-II	MICRO-CW-102	Advance course in Microbiology	Credit-4	(70+30)
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- UNIT-1** History of microbiology : Discovery of microbial world ; Landmark discoveries relevant to the field of microbiology; Berge's manual, Classification of microbes Five kingdom classification, Three domains system, Molecular approaches to microbial taxonomy.
- UNIT-2** Microbiological techniques and Instrumentation: Sterilization, aseptic culture techniques, Isolation and purification of microbes, Microscopy, Light-phase contrast and electron microscopy.
- UNIT-3** Microbial growth- Definition of growth : Growth curve; Mathematical expression of exponential growth phase; Measurement of growth; Synchronous growth; Continuous culture; Factors affecting microbial growth, physical and chemical factors for controlling growth of microorganisms.
- UNIT-4** Microbial interactions : Carbon, sulphur and nitrogen cycles; Different types of microbial interactions, Plant microbial interactions.
- UNIT-5** Application of Microbes : Fermentation and its applications, application of microbes in industries, agriculture, medicine and in recombinant DNA technology.

Reference Books :

1. Harley and Klein, Microbiology by Prescott, The Mc Graw Hill companies Inc., New York
2. Medigan M.T., Martinko J.,M and Parker J., Brock Biology of Microorganism, Prerson Education Inc. ,New York
3. Nelson D.I. Cox, M.M.,2000 Lehninger- Principles of Biochemistry, III ED. McMillan
4. Klug W. S. and Cummings M. K .2000. Concept of enetics , VII Ed., Person Education, New Delhi.
5. Chaapra H.L., Text Book of Medical Microbiology.

Paper-III	MICRO-CW-103	Computer Applications to the subject	Credit-4	(70+30)
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- UNIT-1** Computer Fundamentals - Computer Basics, Computer Generations, Classification of computers, Computer organization and architecture.
- UNIT-2** Memory, Storage system and Input and Output devices - RAM, ROM, Storage system, Input devices and Output devices.
- UNIT-3** Computer codes and operating systems- Decimal system, Binary system, Function and Types of Operating systems, popular operating systems.
- UNIT-4** Computer software p Types of computer software software, MS- DOC, MS word, MS excel, MS Power point
- UNIT-5** Internet and its applications - History of Internet, Applications of Internet, Web Browsers, Email service.

Reference Books :

1. Rajaraman, Fundamentals of Computers, Prentice Hall India Pvt. Ltd.
2. Gary B. Shelly, Thomas J.Cashman, Misty F. Vermaat, 2007. Microsoft Office word: Complete CONcepts and Techniques. Cengage learning Inc.
3. Guy Hart- Davis, How to Do Everything with Microsoft office Excel, Mc Grav Hill.
4. Catheine Skintik, 2007, Learning Microsoft Power Point, Pearson Education.
5. Rashidi H.H.and Buehler L.K., 2002. Bioinformatic Basics: Applications in Biological Science and Medicine CRC Press, London.
6. Balagurusamy E., Fundamentals of Computers 2014 McGraw Hill Education (India).



(Signature)
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Paper-IV MICRO-CW-104 Review of published research in the relevant field Credit-4 (70+30)

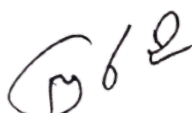
For this paper candidates will have to review literature in an area of research, prepare a research proposal and submit a report to the University at the end of the course work. The selection of the problem and preparation of the proposal will be in consultation with research guide.

Paper-V MICRO-CW-105 Comprchensive viva voce Credit-4 (100)

Candidate will face a Comprehensive Viva-Voce of 4 credits on the subject of Research Methodology, Advance Course in Microbiology and literature review report submitted to the university. The Presentation will have to be made by the candidate and it will need to be prepared in consultation with research guide.

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