

MANGALORE UNIVERSITY

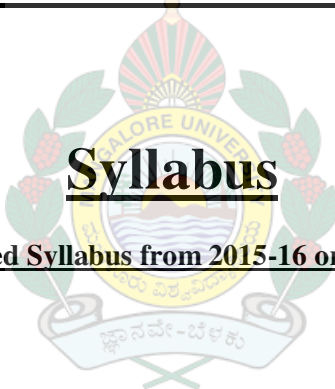
Department of Studies and Research in Microbiology

PG Centre Jnana Kaveri, Chikka Aluvara

Kodagu-571 232

Programme:

PH.D. COURSE WORK IN MICROBIOLOGY



Revised Syllabus from 2015-16 onwards

Programme Outcome:

The Ph.D programme course work and syllabus build confidence, augment candidate's capacity to address societal problems, and frame objectives. Also, by gaining theoretical knowledge of literature survey students are made able to write research specific review of literature and format reports. Candidates equip with problem solving capacity by understanding techniques and technology in Microbiology.

Programme Specific Outcome

PSO 1: Generation of human resource trained with microbial techniques and principles

PSO 2: Trained manpower in various specific field of Microbiology

PSO 3: Importance of publications with respect to quality, rules of publications processes, citations, journal lists

PSO 4: Understanding on IPR and patent procedures

PSO 5: Knowledge on construction and working principles of microbiological equipments such as Microscopy, Spectroscopy, Chromatography, Centrifugation, Electrophoresis

PSO 6: Laboratory designing, good laboratory practices and Bio-safety levels

SCHEME OF EXAMINATION

Paper	Particulars	Hours of Instruction per Week	Duration of Exam (hrs)	Marks			
				IA	Theory	Total	Credits
Paper - I	Research Methodology	4	3	30	70	100	4
Paper - II	Review of Literature	16	-	-	-	-	-
	Review Report	-	-	-	-	150	8
	Viva	-	-	-	-	50	2
							14

Evaluation of the course consists of

1. Theory exam for 3 hours duration for 70 marks
2. Internal Assessment for 30 marks (written test/ submission of assignments/ seminar presentation)

Question paper pattern:

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PH.D COURSE WORK EXAMINATION MONTH-YEAR
SUBJECT: MICROBIOLOGY
PAPER-1: RESEARCH METHODOLOGY

Time: 3 HOURS

Max. Marks: 70

PART-A

I. Answer any FIVE of the following

2x5=10

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

PART-B

II Answer any SIX of the following

5x6=30

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.



PART-C

III. Answer any THREE of the following

10x3=30

- 1.
- 2.
- 3.
- 4.

Paper II: Review of literature and Viva

Submission of Review of literature report

Presentation/viva by doctoral committee

Max. Marks: 150

Max. Marks 50

PAPER-1: RESEARCH METHODOLOGY

Course Outcome

CO 1: Identification of problem, hypothesis, framing objectives

CO 2: Literature survey, report writing, formats of writing

CO 3: Practical approach to advanced tools and techniques in microbiology

CO 4: Knowledge and implications of Data collections, data analysis, tests of significances

CO 5: Applications of computers and software's in microbiological analysis, statistical analysis

CO 6: Internet, Literature search techniques, citations, H index

CO 7: Bioinformatics, Sequence analysis, NGS

UNIT 1: Research Methodology

12hr

Introduction, Scope, Identification of problem, Formulation of Research Objectives, Hypothesis Testing, Components of research design, Good Laboratory practices, Bio-Safety level, Laboratory designing

Intellectual Property Rights, Patent Laws, Patenting of Microorganisms

Bioethics, Institutional Ethics Committee, Model/Experimental Organisms: *E. coli*, *Drosophila melanogaster*, *Coenorhabditis elegans*, *Arabidopsis thaliana*, Mouse, Rat, Guinea pig, Rabbit, CPCSEA Guidelines- Maintenance, Handling, Treating and Collection of Biological Samples and Waste disposal.

Literature Survey and Review: Report writing, Pre-writing considerations, Thesis writing, Formats of Report writing, Formats of Publications in Research Journals.

Plagiarism: Tools and Software for detection

UNIT 2: Advanced Tools and Techniques

18hr

Microscopic techniques: Electron microscopy, Confocal Microscopy, Fluorescent Microscopy, Live Cell imaging,

Chromatography: Principle, protocols and application of GLC, HPLC

Electrophoresis: 2D Gel Electrophoresis, PFGE, DGGE, Western, Southern and Northern Blotting

Spectroscopy: Principles and Applications of UV-Visible, Mass Spectroscopy, LC-MS, NMR Spectroscopy, MALDI-ToF

Isotopes in Research: Radio Labeling, Autoradiography, radioimmunoassay, Use of Radioisotopes in Microbiological Research

Immunological Techniques: Precipitation, ELISA, Immunohistochemistry, Immunofluorescence

Molecular Analysis: PCR, Real Time PCR, DNA Microarray, DNA Sequencing, Cloning and Expression Vector, Construction of vector, Construction of Vectors, Whole DNA-methylome Protein Microarray and Protein Sequencing

Nano-Technology: Microbial Nanoparticles; Principles and Applications

UNIT 3: Quantitative Data Analysis

06hr

Data Collection: Types, Methods and Tools

Normal, Binomial, distributions: Properties and Significances.

Test of Significances: Student *t*-test, F-test, Chi-square test,

Correlation and regression, ANOVA, Multiple-range test.

UNIT 4: COMPUTER APPLICATIONS

12hr

Introduction to Spread Sheet Application, Features and Functions, using Formula and Functions, Data sorting, Generation Charts/Graphs and other features, Molecular modelling Presentation Tools: Features and Functions, Creating and Customizing Presentation.

ICT: Meaning, Advantages and Uses.

Basics of Internet, Search Engines and Advanced Search Techniques, JIF, JCI and Citation Search, H-index, Literature search techniques.

Statistical Data Analysis using Computers and Software; TOOLPAK, COSTAT, SPSS.

Microbial Sequence Analysis: Using Bioinformatics tools; BLAST, EMBL, GENE BANK, PDB Next Generation Sequencing Methods.

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