

Ph.D. Course Work Syllabus  
**Department of Microbiology**



Revised in 2014

Vidyasagar University  
Midnapore 721102, West Bengal

## Course Work for Ph.D. Programme in Microbiology

Total Marks: 200

### Division of marks

Course Code	MARKS
Course I	Theoretical: 40 Practical: 10 Total: 50
Course II	Theoretical: 40 Practical: 10 Total: 50
Course III	Theoretical: 50 Total: 50
Course IV	Seminar & Review : 50 Total: 50
TOTAL	200

### Structure of the Curriculum for Ph.D. Course work

Course Code	Course Name	Marks			Exam Time
		Theor.	Assign.	Total	
Course I	Research Methodology	40	10	50	2 hours
Course II	Computer Application and Statistical Methods	40	10	50	2 hours
Course III	Microbiology	50		50	2 hours
Course IV	Special Topics in Microbiology	50		50	2 hours

# Course Contents

**Course Code: Course I**

**Course Name: Research Methodology**

**Marks: Theoretical – 40 + Assignment (Practical) – 10 = 50**

## **Group A: Theoretical – 40 marks**

- 1.1 Research: definition, importance, meaning and characteristics. Steps in research.
- 1.2 Research problem: identification, selection and formulation.
- 1.3 Sampling: definition, theory, types, techniques and steps. Sample size, advantages and limitations of sampling.
- 1.4 Data: definition, sources and types. Data collection methods. Limitations and cautions. Analysis of data.
- 1.5 Review of literature and Bibliography.
- 1.6 Research report: types, contents, styles and steps in drafting. Editing the final draft and Thesis writing.

## **Group B: Assignment writing on any one (Practical) – 10 marks**

- (a) Review of articles
- (b) Research proposal
- (c) Sample design
- (d) Data analysis

**Course Code: Course II**

**Course Name: Computer Application and Statistical Methods**

**Marks: Theoretical – 40 + Assignment – 10 = 50**

## **Group A: Theoretical – 20 marks**

- 2.1 Operating system: latest version of WINDOWS, UNIX.
- 2.2 Internet: data uploading and downloading, e-mail and e-journal.
- 2.3 Database management System.
- 2.4 Office management: MS-Word, MS-Excel, MS-Power Point, and Latex.
- 2.5 Software Packages: SPSS, R-Statistics, MATHLAB, EMBOS, etc.

**Group B: Theoretical – 20 marks**

- 2.6 Normal probability distribution.
- 2.7 Test for goodness of fit for a proposed distribution.
- 2.8 Correlation coefficient: simple linear, multiple linear, and partial.
- 2.9 Regression; simple, multiple and stepwise.
- 2.10 Experimental design. Analysis of variance: its model, one or two way ANOVA. Multiple comparison tests.

**Group C: Assignment writing on any one (Practical) – 10 marks**

- (a) Power point presentation on a research topic.
- (b) Analysis of data using MS-Excel.
- (c) Analysis of data on given statistical methods.

**Course Code: Course III**

**Course Name: Microbiology**

**Marks: 50**

- 1. HPLC & GC-MS
- 2. Monoclonal antibody and its pharmaceutical application
- 3. MALDI – TOF & Protein crystallography
- 4. Nano technology & drug designing
- 5. Bioinformatics tools
- 6. Fermentation Technology and industrial microbiology
- 7. FACS
- 8. Recombinant DNA technology -cloning and transgenesis
- 9. Molecular technique used in microbiology
- 10. Tissue culture techniques
- 11. Quality control in microbial technology

**Course Code: Course IV**

**Course Name: Special Topics in Microbiology**

**Marks: 50**

Review and seminar on the relevant topics of research work