

ಮಂಗಳೂರು
MANGALORE



ವಿಶ್ವವಿದ್ಯಾನಿಲಯ
UNIVERSITY

(Accredited by NAAC)

ಕ್ರಮಾಂಕ/ No. : MU/ACC/CR 67/2020-21/A2

ಕುಲಸಚಿವರ ಕಛೇರಿ

ಮಂಗಳಗಂಗೋತ್ರಿ - 574 199

Office of the Registrar
Mangalagangothri - 574 199

ದಿನಾಂಕ/Date:25.11.2021

NOTIFICATION

Sub: Revised syllabus for Ph.D. Coursework in Microbiology
Ref: Academic Council approval vide agenda
No.: ಎಸಿಸಿ:ಶೈ.ಸಾ.ಸ.2: 18(2021-22) dated 27.10.2021

The revised syllabus for Ph.D. Coursework in Microbiology which has been approved by the Academic Council at its meeting held on 27.10.2021 is hereby notified for implementation with effect from the academic year 2021-22.


REGISTRAR
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To,

1. The Co-ordinator, Dept. of Microbiology, Jnana Kaveri, P.G. Centre, Chikka Aluvara, Kodagu.
2. The Chairman, BOS in Microbiology, Jnana Kaveri, P.G. Centre, Chikka Aluvara, Kodagu.
3. The Registrar (Evaluation), Mangalore University.
4. The Superintendent (ACC), O/o the Registrar, Mangalore University.
5. The Asst. Registrar (ACC), O/o the Registrar, Mangalore University.
6. The Director, DUIMS, Mangalore University – with a request to publish in the website.
7. Guard File

MANGALORE UNIVERSITY

Department of Studies and Research in Microbiology

Jnana Kaveri, Chikka Aluvara

Kodagu-571 232

Programme:

PH.D. COURSE WORK IN MICROBIOLOGY

Syllabus

Revised Syllabus from 2020-2021 onwards

SCHEME OF EXAMINATION

Course	Particulars	Hours of Instruction per Week	Duration of Exam (hrs)	Marks			
				IA	Theory	Total	Credits
Course 1	Research Methodology	4	3	30	70	100	4
Course 2	Research and Publication ethics (RPE)	2	3	30	70	100	2
Course 3	Review of Literature	14	-	-	-	150	6
	Review Report Viva						
				Total		400	14

Evaluation of the course consists of

1. Continuous Internal Assessment for 30 marks (Internal test/ Assignments/ Seminars/Group discussions, weightage will be given for active participation)
2. Final Written examination will be conducted at the end of the course work for 3 hours duration for 70 marks

Question paper pattern: Internal Test (30 marks)

PART-A

- I. Answer any THREE of the following 2X3=06
- 1.
 - 2.
 - 3.
 - 4.
 - 5.

PART-B

- II. Answer any TWO of the following 4X2=08
- 6.
 - 7.
 - 8.
 - 9.

PART-C

- III. Answer any TWO of the following 8X2=16
- 10.
 - 11.
 - 12.
 - 13.

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PH.D COURSE WORK EXAMINATION MONTH-YEAR
SUBJECT: MICROBIOLOGY

Time: 3 HOURS**Max. Marks: 70****PART-A****I. Answer any FIVE of the following****2x5=10**

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

PART-B**II. Answer any SIX of the following****5x6=30**

- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

PART-C**III. Answer any THREE of the following****10x3=30**

- 17.
- 18.
- 19.
- 20.
- 21.

Course 3: Review of literature and Viva
Submission of Review of literature report
Presentation/Viva by Doctoral Committee

Max. Marks: 150
Max. Marks 50

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 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

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

Course-1: RESEARCH METHODOLOGY

UNIT 01: Research Methodology (12 hrs.)

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 02: Advanced Tools and Techniques (18hrs.)

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 03: Quantitative Data Analysis (06hrs.)

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 04: COMPUTER APPLICATIONS (12hrs.)

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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- Bioinformatics Methods and Applications Genomics, Proteomics and Drug Discovery* (S.C. Rastogi , N. Mendiratta and P. Rastogi)
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- The search for Bioactive compounds from Microorganisms* by S Omura.
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- Kuby: immunology*; RA goldsby,Thomas J. Kindt, Barbara A. Osborne
- Developing bioinformatics computer skills* (Cynthia Gibas and Per Jambeck).

COURSE-2: RESEARCH AND PUBLICATION ETHICS (RPE)

Unit 01(Theory): Philosophy and Ethics (4hrs.)

Introduction to philosophy: definition, nature and scope, concept, branches
Ethics: definition, moral philosophy, nature of moral judgements and reactions

Unit 02(Theory): Scientific conduct (4hrs.)

Ethics with respect to science and research
Intellectual honesty and research integrity
Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP)
Redundant publications: duplicate and overlapping publications, salami slicing
Selective reporting and misrepresentation of data

Unit 03(Theory): Publication ethics (7hrs.)

Publication ethics: definition, introduction and importance
Best practices / standards setting initiatives and guidelines: COPE, WAME, etc.
Conflicts of interest
Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa, types
Violation of publication ethics, authorship and contributorship
Identification of publication misconduct, complaints and appeals
Predatory publishers and journals

Unit 04(Practice): Open access publishing (4hrs.)

Open access publications and initiatives
SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies
Software tool to identify predatory publications developed by SPPU
Journal finder / journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.

Unit 05(Practice): Publication misconduct (4hrs.)

A. Group Discussions (2 hrs.)

1. Subject specific ethical issues, FFP, authorship
2. Conflicts of interest
3. Complaints and appeals: examples and fraud from India and abroad

B. Software tools (2 hrs.)

Use of plagiarism software like Turnitin, Urkund and other open source software tools

Unit 06(Practice): Databases and Research Metrics (7hrs.)

A. Databases (4 hrs.)

1. Indexing databases
2. Citation databases: Web of Science, Scopus, etc.

B. Research Metrics (3 hrs.)

1. Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score
2. Metrics: h-index, g index, i10 index, altmetrics

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