

चौधरी चरण सिंह विश्वविद्यालय, मेरठ
Chaudhary Charan Singh University, Meerut

Jitender Singh
M.Sc., Ph.D., F.P.S.I
Professor & Head



Department of Microbiology
C.C.S. University, Meerut-250004 (India)

Letter No.: *PB Meer-183*
Date: 12.06.2023

To
The Assistant Registrar (Academic)
Committee Cell
Chaudhary Charan Singh University, Meerut-250004

Subject: Regarding Agenda for Academic Council for approval of BoS Proceeding, Department of Microbiology.

Sir,

As per letter No. committee Cell (Bos)-Microbiology was held on **June 09, 2023** at 11.00 a.m. in the Department of Microbiology to finalize the syllabus for **Pre Ph.D.-Course Microbiology** and list of paper setters/examiners. Both the agenda was approved. In this regard, Sir you are requested to put the agenda of BoS Proceeding, Department of Microbiology for the approval of Academic council on 12.06.2023.

Submitted for kind necessary action, please

Jitender Singh
12/06/23

(Jitender Singh)
Head

Department of Microbiology

चौ0 चरण सिंह विश्वविद्यालय, मेरठ
Chaudhary Charan Singh University, Meerut



CCSU/Micro/2023/

Dated: 09.06.2023

Proceedings of the BoS, Department Microbiology

As per letter No. committee Cell (Bos)-Microbiology was held June 09, 2023 at 11.00 a.m. in the Department of Microbiology to finalize the syllabus and ordinance for Pre Ph.D.-Course Microbiology w.e.f. session 2023-2024 and list of paper setters/examiners.

Following Members of the Board of Studies were Present:

1.	Dean, Faculty of Science, Chaudhary CharanSingh University, Meerut-250004
2.	Prof. Jitender Singh, HoD, Microbiology, Chaudhary CharanSingh University, Meerut-250004
3.	Prof. Rakesh Pandey, Professor Emeritus, Microbiology, ACSIR, CSIR-CIMAP, Lucknow, Uttar Pradesh
4.	Dr. Hemant Kumar Gautam, Chief Scientist, CSIR-ICGIB, Sukhdev Vihar, New Delhi-25
5.	Dr. Rajesh Kumar Sharma, (Retd. Principal), SSV PG College, Hapur
6.	Dr. Rajeev Singh, Dean, College of Veterinary and Animal Sciences, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut-250110
7.	Prof. Y. Vimala, Coordinator Microbiology Courses (SFS). Invited Member

Following Agenda were discussed and Approved:

1. The committee discussed and went through the course contents of Pre PhD-Course of Microbiology and approved the course structure w.e.f. the session 2023-2024 (Annexure "1").
2. The Committee also discussed about the Potential Examiners/Experts for the Programme M.Sc. Microbiology at Chaudhary Charan Singh University, Meerut campus as well for affiliated Colleges. The name suggested by the BoS Members were incorporated in the list and same was approved (Annexure "2").

(Rakesh Pandey)
Subject Expert

(Hemant Kumar Gautam)
Subject Expert

(Rajesh Kumar
Sharma)
Subject Expert

(Rajeev Singh)
Subject Expert

(Y. Vimala)
Coordinator
(Jitender Singh)
Head, Microbiology
Prof. Jaimala
Dean
Faculty of Science

SCHEME AND CURRICULUM
Ph.D. Microbiology
Department of Microbiology

Chaudhary Charan Singh University, Meerut-250004

Program Objectives

- Imparting skills and knowledge in advance research methodologies
- Solving the existing scientific problems in area of basic and applied microbiology
- Creating a highly skilled professionals with expertise in current trends of research in area of microbiology
- Imparting hand on experience to students of different techniques and instrumentations of advance biological sciences
- Generating independent researchers who are capable of translating the research developed at laboratory scale to the industrial level.
- Imparting skills needed to become a successful academician, scientists or entrepreneur
- Inculcating the scientific ethics, temperament to contribute to field of science and help in nation building

Program outcomes

- The students successfully completing the course will have following skills
- Solid basic knowledge of research methodologies in area of modern biological sciences
- Contributing new methodologies and results in area of the basic and advanced microbiology for taking the research to next level
- Innovative scientists, skilled workforce to work in specialized area of microbiology
- Independent researchers who can contribute through fulfilling responsibility of academicians, scientist and entrepreneur
- Can start independent research and can contribute in solving new problems faced in current science or in future.

Employability

- As academicians in different university or colleges at national and international levels
- As a researcher at different research institute at national and international level where they can initiate their independent research
- They can be absorbed by R& D sector of different biotechnological based company

Mission Statements of the Department

M1	To impart knowledge and training across the different fields of microbiology in order to equip students for academics/industry.
M2	To enhance awareness of current research across various fields of microbiology and to bring student's knowledge to the latest state-of-the-art in their area of interest.
M3	To integrate theoretical and experimental learning in order to encourage critical scientific thinking.

 

***Research Methodology**

***Common Course as decided by the University:**

Subject: Common for all faculties (Tentative)		
Course Code: -----	Course Title: Research Methodology	Theory
<p>Course Objectives: The main objective of this paper is to</p> <ol style="list-style-type: none"> 1. Identify and discuss the role and importance of research. 2. Identify and discuss the issues and concepts salient to the research process. 3. Identify and discuss the complex issues inherent in selecting a research problem, selecting an appropriate research design, and implementing a research project. 4. Identify and discuss the concepts and procedures of sampling, data collection, analysis and reporting. <p>Course Outcomes: At the end of this course, the students should be able to:</p> <p>CO1. Understand some basic concepts of research and its methodologies.</p> <p>CO2. Explain key research concepts and issues read, comprehend, and explain research articles in their academic discipline.</p> <p>CO3. Select and define appropriate research problem and parameters.</p> <p>CO4. Organize and conduct research (advanced project) in a more appropriate manner.</p> <p>CO5. Write a research report and thesis.</p> <p>CO6. Write a research proposal (grants).</p>		
Credits: 4	Core Compulsory	
Max. Marks: 100	Min. Pass Marks:55	
Total No. of Lectures-Tutorial (in hours per week): L-T: 4-0-0		
Unit	Topics	No. of Lectures 60
I	Perception & Definition of Research, Objectives & Motivations of Research, Importance of Research, Types of Research, Research Methods versus Methodology, Process of Research; Review of Literature, Formulation of the Research Problem, Sources and Identification of a Research Problem, Status of the Research Problem, Formulation of Hypothesis, Research Design,	12
II	Outlines of Synopsis; Project Proposal, Project Report Writing; Research Paper Writing; Components of Research Reports; ThesisWriting: Outlines of Thesis, Reference citing, Formats of Writing References, Bibliography; Plagiarism.	12
III	Intellectual Property (IP), Intellectual Property Rights (IPR), Intellectual Property Law, Different fields of Intellectual Property Rights, Patents, Publication Ethics: Definitions importance Conflicts of Interest, Publication Misconduct Definition, Concept, Problems that lead to Unethical Behavior and vice	12

JK *de*

Course: Advanced Analytical Techniques

Course Code:

Course objective: To provide an advanced understanding of the core principles of various techniques used in biological experiments.		
Learning outcomes: • Demonstrate principles of various basic and advanced techniques used in biological experiments • Critically analyze and interpret the results obtained from biological experiments		
Credits: 4		Core Compulsory
Max. Marks: 100		Min. Pass Marks:55
Total No. of Lectures-Tutorial (in hours per week): L-T: 4-0-0		
UNIT	TOPICS	No. of lectures 60
I	Recombinant DNA techniques Use of Restriction and modification enzymes in cloning; Plasmid vector; Transformation and Plasmid isolation; PCR; Southern Blotting, Northern Blotting, RFLP, RAPD, Western Blotting, DNA finger printing, DNA sequencing methods (Sanger's chain termination method, and automated DNA sequencing); Real time PCR and Microarrays and their applications, RNAi and Genome editing.	12
II	Biostatics Types and sources of data, data collection methods, primary data, secondary data, analysis for specific type of data, tabulation and graphical representation, central tendency, dispersion, skewness, correlation, regression, chi-square test, t- and F- tests, ANOVA- One way and two-way, important non-parametric tests like Sign, Run, Kendall's coefficient.	12
III	Genomics and Proteomics Next generation sequencing (NGS); Genome annotation, Phylogenetic Analysis-Methods and Tools, gene prediction, ORF finding. Homology: Ortholog & paralog Global expression profiling; RNA-seq. and protein expression, Microbial genomic resources. UV and fluorescence spectroscopy; Circular Dichroism; Mass spectrometry - Principles and their applications; Protein separation techniques and instrumentation (Gel filtration, Ion exchange and Affinity chromatography, 1D and 2D Polyacrylamide gel electrophoresis); Immunochemical detection of proteins.; Introduction and overview of Metabolomics; Nanotechnology and its Applications in Microbiology.	12
IV	Microbial and Cellular Techniques Microbial techniques; Microbial growth and kinetics (synchronous culture, continuous and batch and fed-batch cultures, chemostat and turbidostat); Methods for identifying microbes (polyphasic approach); Cell disruption and fractionation of organelles; Isolation and purification of membrane proteins;	12

[Handwritten signatures]

Recent Trends in Microbiology

Course Code:

Course code	Course Title: Recent Trends in Microbiology	Theory
Course objective: To provide an advanced understanding of the core principles of various techniques used in biological experiments.		
Learning outcomes:		
<ul style="list-style-type: none"> • Demonstrate principles of various basic and advanced techniques used in biological experiments • Critically analyze and interpret the results obtained from biological experiments 		
Credits: 4		Core Compulsory
Max. Marks: 100		Min. Pass Marks:55
Total No. of Lectures-Tutorial (in hours per week): L-T: 4-0-0		
Unit	Topics	No. of lectures: 60
I	Agriculture and Environment Microbiology Advances in biofertilizer technology and biological nitrogen fixation. Microbial successions and transformation of organic matter during composting and biogas production; Microorganisms and microbial enzymes as soil health indicators, biological control of fungal pathogens and insects. Microbial fuel cell-principles and technological Implications, Bioremediation, Bio-stimulation, Bioaugmentation and Biosorption, Applications of bioremediation to decontaminate various niches. Recent techniques in industrial wastewater treatment and disposal processes.	12
II	Clinical Microbiology Microbial Interactions with humans –normal microflora of human body, Collection, transport and culturing of clinical samples (sputum; urine, blood, stools) for microbiological analysis; Detection and identification of Bacteria, Viruses (Plants and Animal) and Fungi (Plants and Animal) using automated microbial identification systems and molecular techniques. Quorum sensing and Quorum quenching in bacteria, Determination of MIC of Antimicrobial agents; Mechanism of resistance to antimicrobial agents; Molecular methods for detecting antibacterial and antiviral resistance gene.	12
III	Microbiome An introduction of human microbiome project, Human gut/oral/skin microbiota, current research methods of microbiome analysis including culture-dependent and culture-independent tools, whole genome vs. 16srRNA/ITS/Multi-loci-based gene analysis of microbiome, role of human microbiome in health and communicable or non-communicable diseases (Cancer, Diabetes, Malnutrition etc.), human gut microbiota and immunity, Role of microbiome in therapeutic and diagnostic. A brief overview of plant and animal microbiome	12
IV	Host Pathogen interaction Interaction of microorganisms with plants and their effect on plant growth. Plant pathogenesis, Growth, reproduction, survival and	12