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Post-Graduate Programme

Curriculum and Syllabus for
M.Sc. Microbiology
(With effect from the Academic Year 2023-24)

JUNE 2023

Note: The Board of Studies in Microbiology (PG) designed the syllabus as per Common Model Syllabus provided by TANSCHÉ based on Learning Outcome based Curriculum Framework (LOCF) as prescribed by the UGC.

**TANSICHE REGULATIONS ON LEARNING OUTCOMES - BASED CURRICULUM
FRAME WORK FOR POST GRADUATE EDUCATION**

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| Programme: | M.Sc. MICROBIOLOGY |
| Programme code: | 22PGMB |
| Duration: | 2 Years [PG] |
| Programme Outcomes: | <p>PO1: Disciplinary Knowledge Capable of demonstrating detailed knowledge and expertise in all the disciplines of the subject.</p> <p>PO2: Communication Skills Able to express thoughts, ideas, concepts, scientific information, experiments and its significance effectively in writing and verbal, communicate with confidence to different groups, using appropriate media.</p> <p>PO3: Moral and Ethical Awareness Ability to employ values in conducting one's life, use ethical practice at work, avoiding fabrication, misinterpretation and plagiarism, adhering to intellectual property rights and appreciate ethical solutions for environmental sustainability.</p> <p>PO4: Analytical Reasoning Ability to evaluate the reliability and relevance of evidence, identify flaws, analyze and synthesize data from different sources.</p> <p>PO5: Contribution to Society Solve public issues concerned with public health and safety for the welfare of the society.</p> <p>PO6: Scientific Reasoning Ability to identify, analyze, interpret and draw conclusions from qualitative and quantitative data, critically evaluate ideas, evidences and experiences, with an open mind and reasoned perspective.</p> <p>PO7 : Employability Skill Equip with skills, based on current trends and future expectations for career</p> |

development and placements.

PO8: Entrepreneurial Skill

To create efficient entrepreneurs by accelerating critical thinking, problem solving, decision making and leadership qualities to facilitate startups.

PO9: Research Related Skill

A sense of inquiry and capability for questioning, problem arising, synthesizing and articulating. Ability to recognize cause and effect relationships, define problems, formulate and test hypothesis, analyze, interpret and draw conclusions from data, establish hypothesis, predict cause and effect relationships, ability to plan, execute and report the results of an experiment or investigation.

PO10: Lifelong Learning

Identify the need for skills necessary to be successful in future, through self- paced and self - directed learning aiming at personal development, meeting economic, social and cultural objectives, adapting to changing trends and demands of work place.

PO11: Instrumentation Skill

Able to handle conventional and sophisticated instruments thereby acquiring employability skills.

PO12: Leadership Readiness and Qualities

Capability for building a team, identifying the tasks, setting direction, formulating an inspiring vision, employing skills to reach the right destination, smoothly.

PO13: Information/ Digital Literacy

Ability to use software for interpretation and analysis of data in a variety of learning situations.

PO14: Cooperation and Team Work

Ability to work effectively with diverse teams, facilitate cooperative or coordinated effort on the part of a group and act together as a group or as a team in the interest of a common cause and work efficiently as a member of a team.

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| <p>Programme Specific Outcomes</p> | <p>PSO-1: Placement</p> <p>Prepare the students in varied disciplines like agriculture, industry - medical, pharma, dairy, hotel, food and food processing, immunological, cosmetics, vermitechnology and water treatment for effective and respectful placement.</p> <p>PSO-2: Entrepreneurship</p> <p>To create effective entrepreneur by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations.</p> <p>PSO-3: Research and Development</p> <p>Design and implement HR systems that comply with good laboratory practices, following ethical values, leading the organization towards growth and development. .</p> <p>PSO-4: Contribution to Society</p> <p>To contribute to the development of society and produce microbiological products, by collaborating with stake holders, related to the betterment of environment and mankind at the national and global level.</p> |
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**Credit Distribution for PG Courses
First Year - Semester-I**

| Course | Course Title | Credit | No. of Hours |
|---------------|--|---------------|---------------------|
| Core I | 416C1A: General Microbiology, Physiology and Microbial Diversity | 5 | 7 |
| Core II | 416C1B: Immunology and Microbial Genetics | 5 | 7 |
| Core III | 416C1C: Practical-I - General Microbiology, Physiology, Microbial Diversity, Immunology and Microbial Genetics | 4 | 6 |
| Elective I | 416E1A: Forensic Science 416E1B: Health and Hygiene 416E1C: Microalgal Technology (Among three anyone can be chosen) | 3 | 5 |
| Elective II | 416E1D: Bioinstrumentation, 416E1E: Herbal Technology & Cosmetic Microbiology 416E1F: Essentials of Laboratory Management & Biosafety (Among three anyone can be chosen) | 3 | 5 |
| Total | | 20 | 30 |

First Year - Semester-II

| Course | Course Title | Credit | No. of Hours |
|-----------------------------------|---|---------------|---------------------|
| Core IV | 416C2A: Medical Bacteriology and Mycology | 5 | 6 |
| Core V | 416C2B: Medical Virology and Parasitology | 5 | 6 |
| Core VI | 416C2C: Practical-II - Medical Bacteriology, Mycology, Virology & Parasitology | 4 | 6 |
| Elective III | 416E2A: Epidemiology 416E2B: Clinical and Diagnostic Microbiology 416E2C: Bioremediation (Among three anyone can be chosen) | 3 | 4 |
| Elective IV | 416E2D: Bioenergy 416E2E: Nanobiotechnology 416E2F: Clinical Research (Among three anyone can be chosen) | 3 | 4 |
| SEC-I | 416S2A: Organic Farming and Bio Fertiliser Technology | 2 | 4 |
| Internship* / Industrial Activity | | - | - |
| Total | | 22 | 30 |

* Internship during summer vacation. The credits shall be awarded in Semester – III Statement of Marks

Second Year - Semester-III

| Course | Course Title | Credit | No. of Hours |
|-------------------------------|--|-----------|--------------|
| Core VII | 516C3A: Soil & Environmental Microbiology | 5 | 6 |
| Core VIII | 516C3B: Food and Dairy Microbiology | 5 | 6 |
| Core IX | 516C3C: Research Methodology & Biostatistics | 5 | 6 |
| Core X | 516C3D: Practical III - Soil, Environmental, Food & Dairy Microbiology | 4 | 6 |
| Elective V Industry Module | 516E3A: Fermentation Technology and Pharmaceutical Microbiology | 3 | 3 |
| SEC-II | 516S3A: Entrepreneurship in Microbiology | 2 | 3 |
| | 516S3B: Internship / Industrial Activity | 2 | - |
| | | 26 | 30 |

Second Year-Semester-IV

| Course | Course Title | Credit | No. of Hours |
|--|--|-----------|--------------|
| Core XI | 516C4A: Molecular Biology & Recombinant DNA Technology | 5 | 6 |
| Core XII | 516C4B: Practicals IV - Molecular Biology & Recombinant DNA Technology | 5 | 6 |
| Core XIII | 516C4C: Project with Viva Voce | 4 | 8 |
| Elective VI | 516E4A: Marine Microbiology 516E4B: Bioinformatics 516E4C: Microbial Quality Control and Testing (Among three anyone can be chosen) | 3 | 4 |
| Elective VII | 516E4D: Biosafety, Bioethics and IPR 516E4E: Toxicology 516E4F: Water Conservation and Water Treatment Technologies (Among three anyone can be chosen) | 3 | 4 |
| SEC-III Professional competency Skill | 516S4A: Life Science for Competitive Examinations | 2 | 2 |
| Extension Activity | 516V4A: Field trip | 1 | - |
| | | 23 | 30 |

Overall Credit Distribution for PG Course

| S.No | Course Details | Credit |
|-------------|--|---------------|
| 1 | Core Course [13 Courses X 4/5 Credits] | 61 |
| 2 | Elective Course [7 Courses X 3 Credits] | 21 |
| 3 | Skill Enhancement Course [3 Courses X 2 Credits] | 6 |
| 4 | Internship | 2 |
| 5 | Extension Activity | 1 |
| | | 91 |