



ST. XAVIER'S COLLEGE – MUMBAI
(Est. 1869)

(An Autonomous College affiliated with the University of Mumbai)

Syllabus for Postgraduate Programme as per
National Education Policy (NEP-2020)

Programme: MSc in Microbiology

Academic year 2023–2024



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PRINCIPAL
ST. XAVIER'S COLLEGE
AUTONOMOUS
MUMBAI - 400 001.

Preamble:

The National Education Policy 2020 (NEP 2020), as put forth by the Ministry of Human Resource Development (MHRD), is anchored in a set of fundamental principles.

These principles serve as the guiding tenets of the education system and encompass the following key elements:

NEP 2020 advocates for a student-centric approach to education, offering a broad spectrum of courses with emphasis placed on outcome-based learning, ensuring a well-rounded education.

Half of the coursework is designed for conceptual and theoretical understanding, with the other half dedicated to practical application through student engagement in activities, apprenticeships, and internships. Pedagogical methods prioritize problem-centered and project-based learning and activities.

NEP 2020 promotes the integration of technology into teaching, learning, and evaluation processes. It also highlights the need to strengthen research pedagogy within each discipline. The policy emphasizes the integration of skilling and employability initiatives into the curriculum and teaching-learning processes. This integration helps to prepare students for real-world employment opportunities.

NEP 2020 supports flexibility within academic programs, allowing students to exit after every year. Credit transfer mechanisms and the accumulation of credits in the Academic Bank of Credits (ABC) provide learners with options to tailor their educational journey according to their needs and aspirations. The overarching goal of NEP 2020 is to achieve equality in education. To do so, it recognizes equity as a process that fosters inclusivity and ensures that all students feel a sense of belonging in the educational system.

The framework of the choice-based credit system

Major Subject: It is the primary area of specialization that a student chooses to focus on during their postgraduate studies. It forms the core of their curriculum, allowing them to delve deeply into a specific field of knowledge and build expertise in that particular subject area.

Elective Course: Students can choose to study from a list of available options, often as part of their PG degree requirements. These courses provide students with the flexibility to select topics that cater to their interests, academic objectives, and career goals.

Research Methodology: In research methodology, students will explore advanced techniques and approaches for conducting rigorous academic research. This comprehensive study will equip them with the skills and knowledge needed to design, implement, and analyze research studies in their respective fields of study.

On-Job Training (OJT)/Internship/Field Project (FP)/Research Project (RP)/Dissertation: These are essential components of experiential learning in higher education. These hands-on

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experiences provide students with practical exposure, allowing them to apply theoretical knowledge in real-world contexts, thereby fostering skill development and deepening their understanding of their chosen fields.

Credit Framework

Aided & Economics, Public Policy, AIC PGP Credit Structure for 2023-24								
Level	Sem	Major		RM	OJT, FP	RP	Cum Cr/Sem	Degree/Cum Cr
		Mandatory	Elective					
6 (2023-24)	Sem 1	12	4	4	2	0	22	PG Diploma after TY
	Sem 2	12	4	0	6	0	22	
	Cum Cr	24	8	4	8	0	44	
6.5 (2024-)	Sem 3	12	4	0	0	6	22	PG Degree after TY or after FYUG
	Sem 4	12	4	0	0	6	22	
	Cum Cr	24	8	0	0	12	44	
88 credits (2 years) after TY or 44 credits (1 year) after FYUGP								



Programme Outcomes aligned to the Vision and Mission of St. Xavier's College (Autonomous), Mumbai (Master's degree programme)

The completion of a two-year post-graduation program at St. Xavier's College equips students with a range of valuable skills and competencies.

1. Disciplinary knowledge and Core competencies/skills:
 - Gain a deep understanding of the subject-related curriculum.
 - Demonstrate advanced skills and knowledge in their academic field of study.
2. Critical and Creative thinking:
 - Reflect critically on acquired knowledge and skills within their core competencies.
 - Generate creative and resourceful ideas to explore new possibilities.
3. Problem-solving and Analytical reasoning:
 - Identify, investigate, and analyze problems effectively.
 - Collect and interpret relevant qualitative or quantitative data.
 - Formulate evidence-based solutions based on their analysis.
4. Research-related skills:
 - Apply research acumen and skills in identifying research issues.
 - Design research studies and interpret the results.
 - Communicate the findings of their studies effectively and accurately.
5. Social Application of Research and Development:
 - Utilize their core competencies and skills to improve social and environmental conditions.
6. Industry-related skills:
 - Acquire skills and techniques relevant to their chosen industry.
 - Demonstrate maturity and professional ethics in managing responsibilities.
7. Ethical and Moral Integrity:
 - Practice values such as honesty, transparency, and accountability.
 - Commit to interpersonal and social ethics.
8. Collaboration, Teamwork, and Multidisciplinary competence:



- Apply their knowledge and mentoring skills in individual, team, or leadership roles.
- Manage ventures in monodisciplinary, interdisciplinary, or multidisciplinary settings.

9. Leadership and Management:

- Demonstrate effective strategic planning skills.
- Exhibit efficient organizational and transformational leadership abilities.

10. Social Concern:

- Show empathy and care for marginalized and disadvantaged individuals.
- Display respect, compassion, and concern for others.

11. Social and Environmental Well-being:

- Investigate and design strategies to enhance the well-being of society and the environment.

12. Self-motivation and Lifelong learning:

- Cultivate a passion for continuous personal and professional growth.

These outcomes reflect the holistic approach taken by St. Xavier's College to develop well-rounded individuals who are equipped to contribute positively to society, exhibit strong leadership qualities, and adapt to the demands of a dynamic world.

Abbreviations:

- OJT: On-job training
- RP: Research Project
- FP: Field Project

List of Courses offered from Semesters I-II in Microbiology

Level	Semester	Major Course titles	Elective Course titles	OJT	RP	FP
6.0	Sem 1	1.Molecular Genetics 2.Microbial Biochemistry 3.Immunology	1. Cell Biology: Structure, Transport and Junctions 2. Building the Entrepreneurial Mindset: Opportunities and Challenges	-	Research methodology and Biostatistics	Field Project - Soil analysis

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	Sem 2	1. Advances in Molecular Genetics and genomic applications 2. Protein and Metabolic biochemistry 3. Virology	1. Biostatistics and bioinformatics 2. Building the Entrepreneurial Mindset: Opportunities and Challenges	-	-	Field Project - Isolation and characterization of microorganisms from different environmental niches
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Composition of the Board of Studies in Microbiology 2023 – 2024

Sr.No.	Composition	Name
1	Head of the Department concerned (Chairman)	Dr. Sangeeta Chavan
2	Entire faculty of each specialisation	Dr. Karuna Gokarn Dr. Aparna Shetye Dr. Pampi Chakraborty Kaushik Inamdar Alister Dsouza
3	Two subject experts (other University)	Dr. Dipshikha Chakravortty Dr. Avik Chakraborty
4	VC nominee	Dr. Anuradha Pendse
5	Representative from industry/corporate sector/allied	Dr. Abhishek Mule
6	PG meritorious alumnus	Dr. Shamlan Reshamwala
7	(a) Experts from outside the college (co-opted)	-
	(b) Other members of staff of the same faculty	Dr. Lolly Jain

Two-Year Postgraduate Programme in Microbiology

Year of Implementation	Semester	Course Code	BOS Date	Academic Council Date
2023-2024	1	PSMIC6001CR1	15/07/2023	06/10/2023
	1	PSMIC6002CR1	15/07/2023	06/10/2023
	1	PSMIC6003CR1	15/07/2023	06/10/2023
	1	PSMIC6001RM1	15/07/2023	06/10/2023
	1	PSMIC6001EL1	15/07/2023	06/10/2023
	1	PSMIC6002EL1	15/07/2023	06/10/2023
	1	PSMIC6001FP1	15/07/2023	06/10/2023



2023-2024	2	PSMIC6004CR1	25/11/2023	
	2	PSMIC6005CR1	25/11/2023	
	2	PSMIC6006CR1	25/11/2023	
	2	PSMIC6003EL1	25/11/2023	
	2	PSMIC6002FP1	25/11/2023	

Programme Specific Outcomes

Upon completion of the courses the student would

1. Demonstrate thorough knowledge of advances in various fields of Microbiology
2. Summarize the learnings from model prokaryotic and eukaryotic systems and apply this knowledge to other systems.
3. Demonstrate expertise in laboratory skills required in the study of Microbiology
4. Competently apply instrumental and analytical techniques to improve understanding of Microbiology
5. Convert acquired knowledge about the roles and significance of microorganisms to develop solutions to diverse problems in society
6. Select a scientific problem based on literature survey, state a hypothesis, design a strategy, execute experiments with appropriate controls and gather data for a project alone or in group under supervision
7. Analyze the data acquired through various means using relevant qualitative and quantitative analyses and draw suitable inference/s
8. Contribute to existing knowledge in the field of Microbiology through a variety of formats ranging from written to oral
9. Be conscious of ethical issues in various fields of Microbiology including scientific communication and practice science accordingly.
10. Develop professional goals in diverse fields of Microbiology and work towards them.
11. Become self-sufficient and motivated in terms of building their knowledge and skills

repertoire

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