

MANIPAL ACADEMY OF HIGHER EDUCATION

# MSc Clinical Virology

## Curriculum

Manipal Institute of Virology, MAHE,  
Manipal

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## *Outcomes Based Education (OBE) Framework*

**Two Year Full Time Post Graduate Program**

MANIPAL INSTITUTE OF VIROLOGY, MAHE, MANIPAL-576104



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## **1. NATURE AND EXTENT OF THE PROGRAM**

### **M.Sc. (Clinical Virology) Degree Programme**

The two-year MSc Clinical Virology program is structured across four semesters for effective theoretical and practical learning. The entire program is of 80 credits. The program awards a degree with an international acclaim and a world-wide recognition.

### **Duration of the Programme**

The programme is of four semesters. Duration of each semester is six months. Each semester constitutes a set of courses and each course depending on the nature and scope of the subject consists of Lectures/Tutorial/Practicals. The student has to carry out a project work in the fourth and final semester of the programme (6 months).

### **Medium**

The medium of instruction and examination is English.

### **Eligibility**

Bachelor's degree in Life Sciences (Microbiology / Biotechnology / Biochemistry / Botany / Zoology/ Molecular Biology / Virology and Immunology) or MBBS / BVSc / BSc-MLT or any other related subjects from a recognized University, with minimum 60% aggregate marks or an equivalent CGPA.

MSc Clinical Virology programme aims at training students in the state of the art virological techniques useful in health, diagnostics, industrial, and academic sectors. Concepts of biosafety practices, outbreak investigations, clinical virology, etc. are also introduced, updated and strengthened through this programme. Students are practically trained to operate high end laboratory equipment for diagnostic and research work. Observation, communication, analysing information, problem-solving, critical thinking, logical reasoning, and perseverance are a few skills inculcated in students during the programme. The curriculum content involves extensive clinical, diagnostic, and laboratory practices in infectious diseases with virological aetiology. Special emphasis is laid on identifying and predicting future technological developments, changes in diagnostic service delivery and future patient/clinician/hospital requirements, to ensure that the curriculum is as robust and sustainable as possible. This is in relation to both scientific content and anticipated future developments and is reflective of the requirements of a specialized postgraduate program.



## 2. PROGRAM EDUCATION OBJECTIVE (PEO)

The overall objectives for M.Sc. Clinical Virology program are as follows.

PEO No.	Education Objectives
PEO 1	Students will be trained in syndromic approach of viral disease diagnosis with special emphasis on molecular and serological techniques.
PEO 2	Students will acquire fundamental and practical knowledge in subjects such as cell biology, molecular virology, virological techniques, biosafety and biosecurity, immunology, data analysis, disaster management, epidemiology and public health.
PEO 3	Students will learn and reflect ethical attitude, strong communication, and effective interpersonal skills in their professional practices and would be able to work cohesively in a team with multidisciplinary backgrounds.
PEO 4	Students will learn the importance of bioethics, research, innovation, and intellectual property rights in research.
PEO 5	Students will be able to achieve professional excellence by using their theoretical and technical competence in virology.
PEO 6	Students will be able to participate in lifelong learning process for a highly productive career and will be able to relate the concepts of virology in disease diagnosis and designing therapeutic strategies.



### 3. GRADUATE ATTRIBUTES

S. No.	Attribute	Description
1	<b>Disciplinary Knowledge</b>	Knowledge of all aspects of virology involving theoretical and practical techniques and other related areas of studies.
2	<b>Understanding different subsets of Virology</b>	Different areas of virology including, molecular virology, cell biology, bioinformatic, epidemiology, biosafety and biosecurity, biostatistics, and bioethics.
3	<b>Measurable Skills and Industry-ready Professionals</b>	Strengthening skills and knowledge regarding current updates in virological research and development in industries and research organizations.
4	<b>Effective and Influencing communication</b>	Efficient in sharing thoughts, ideas and applied skills of communication in various forms such as written and verbal communication.
5	<b>Cooperation/Teamwork</b>	Ability to work in teams as well as independently.
6	<b>Critical/ Reflective thinking &amp; language efficiency</b>	Ability to employ critical and reflective thinking in diagnosing viral infections.
7	<b>Technologically Efficient Professional</b>	Capability to work with advanced techniques and high-end instruments used in diagnosis and research.
8	<b>Research-related Skills</b>	Trained to address research questions through short-term scientific projects.



## 4. QUALIFICATION DESCRIPTORS

### 1. Demonstrate

- (i) a systematic, extensive and coherent knowledge and understanding of virology, related disciplinary areas/subjects, and applications; including a critical understanding of the established theories, principles and concepts, and number of advanced and emerging issues in the field;
- (ii) procedural knowledge that creates different types of professionals related to virology, including research and development, teaching, government and public service;
- (iii) professional and communication skills.

2. Demonstrate comprehensive knowledge about current research, scholarly, and/or professional literature, relating to essential and advanced learning areas pertaining to virological techniques and skills required for identifying problems and related issues.

3. Demonstrate skills in identifying information needs, collection of relevant quantitative and/or qualitative data drawing on a wide range of sources, analysis and interpretation of data using methodologies as appropriate to the course(s) for formulating evidence-based solutions and arguments.

4. Use knowledge, understanding and skills for critical assessment of a wide range of ideas and complex problems and issues relating to virology.

5. Communicate the results of studies undertaken in an academic field accurately in a range of different contexts using the main concepts and techniques of virological studies.

6. Address one's own learning needs relating to current and emerging areas of study, making use of research, development and professional materials as appropriate, including those related to new frontiers of knowledge.

7. Develop the clinical, scientific, technical, management, communication and leadership skills required to run a diagnostic/research laboratory and deliver a high-quality clinical service.

8. Apply one's disciplinary knowledge and transferable skills to new/unfamiliar contexts and to identify and analyze problems and issues and seek solutions to real-life problems.



## 5. PROGRAM OUTCOMES

After successful completion of M.Sc. Clinical Virology program, students will be able to,

PO	Attribute	Competency
PO1	<b>Disciplinary knowledge</b>	Demonstrate comprehensive knowledge and understanding of courses that form a part of the postgraduate programme.
PO2	<b>Communication Skills</b>	Express thoughts and ideas effectively through written and verbal communication; establish communication link with others using appropriate media; share and express personal views confidently; reflect a good listener's trait; read and write analytically; process complex information and present it in a clear and concise manner.
PO3	<b>Critical thinking</b>	Apply a critical thinking process of identifying, analysing and reviewing clinical cases and demonstrate skills in mapping disease diagnosis algorithms.
PO4	<b>Problem solving</b>	Extrapolate from practical trouble-shooting experiences and apply the knowledge in solving various non-familiar problems.
PO5	<b>Analytical reasoning</b>	Evaluate the reliability and relevance of evidence; identify logical flaws and gaps in arguments; analyse and synthesise data from a variety of sources; draw valid conclusions and support them with evidence and examples, and address opposing viewpoints.
PO6	<b>Research-related skills</b>	Inquisitiveness to ask appropriate/relevant questions; ability to recognise and predict cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data; ability to plan, execute and report the results of an experiment or investigation. Ability to work in laboratory culture, learn to work independently and get exposure to scientific writing and publication through six-month dedicated research projects.
PO7	<b>Cooperation/ Teamwork</b>	Demonstrate leadership and teamwork with a positive attitude to effectively manage human resources.
PO8	<b>Scientific reasoning</b>	Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; critically evaluate ideas, evidence and experiences through an open-minded and reasoned perspective.
PO9	<b>Reflective thinking</b>	Integrate theory and practice to develop work habits and attitude necessary for job success through practice school and professional events.



<b>PO10</b>	<b>Information/digital literacy</b>	Use ICT in a variety of learning situations, demonstrate ability to access, evaluate and use relevant information sources; apply appropriate software for analysis of data.
<b>PO11</b>	<b>Self-directed learning</b>	Students will acquire in-depth knowledge and understanding of viruses, the diseases caused by them and the mechanisms thereof. Students will be updated about trending online certificate courses and encouraged to complete such training modules, which help in overall capacity building. Students will be encouraged to participate as resource persons for the virology skill-based training programmes and workshops conducted by MIV.
<b>PO12</b>	<b>Moral and ethical awareness/reasoning</b>	Value ethical practices in both personal and professional situations.
<b>PO13</b>	<b>Lifelong learning</b>	Investigate and provide independent learning skills necessary for continuous learning; use fundamental knowledge and technical competence in virology to achieve professional excellence.
<b>PO14</b>	<b>Multicultural competence</b>	Sensitively react towards values and beliefs of different cultures, effectively engage in a multicultural society and interact respectfully with diverse groups across the globe.



## 6. COURSE CURRICULUM AND STRUCTURE

Course Code	Course	Hours/week			C	Course Code	Course	Hours/week			C
		L	T	P				L	T	P	
<b>Semester – I (Courses: 8)</b>					<b>Duration = 15 weeks</b>	<b>Semester – II (Courses: 7)</b>					<b>Duration = 15 weeks</b>
MIV5101	Cell Biology	1	-	-	1	MIV5201	Epidemiology	2	1	-	3
MIV5102	Basic Virology	2	1	-	3	MIV5202	Molecular Virology and Bioinformatics	2	2	-	4
MIV5103	Biosafety, Biosecurity and Bioethics	2	1	-	3	MIV5203	Virological Techniques	2	2	-	4
MIV5104	Tissue/Cell culture	1	1	-	2	MIV5204	Analytical Tools (Application of GIS and Biostatistics)	1	1	-	2
MIV5105	Systematic Virology	4	2	-	6	MIVEL 5205.1	Emerging Viral Diseases and Public health response	1	2	-	3
MIV5106	Immunology of Viral diseases	2	1	-	3	MIVEL 5205.2	One health approach in Virology				
MIV5107	Practical I (Tissue/Cell Culture)	-	-	2	1	MIV5206	Practical II (Molecular Virology and Virological techniques)	-	-	6	3
MIV5108	Microbiology posting	-	-	2	1	MIV5207	Laboratory Rotation-I	-	-	4	2
						MIV5208	Summer Internship	-	-	-	1
<b>Total</b>		<b>12</b>	<b>6</b>	<b>4</b>	<b>20</b>	<b>Total</b>		<b>8</b>	<b>8</b>	<b>10</b>	<b>22</b>

L: Lectures; T: Tutorials; P: Practicals; C: Credits



Course Code	Course	Hours/week			C	Course Code	Course	Hours/week			C
		L	T	P				L	T	P	
<b>Semester – III (Courses: 7)</b>					<b>Duration = 15 weeks</b>	<b>Semester – IV (Courses: 1)</b>					<b>Duration = 6 months</b>
MIV610 1	Clinical & Diagnostic Virology -I	1	2	-	3	MIV629 9	Research Project	-	-	-	18
MIV610 2	Clinical & Diagnostic Virology -II	1	2	-	3						
MIV610 3	Viral Vaccines & Antiviral Pharmacotherapy	2	2	-	4						
MIV610 4	Insect vectors of Viral diseases	1	-	2	2						
MIV610 5	Virology lab design and management	1	-	-	1						
MIV610 6	Intellectual Property Rights and Patenting	1	-	-	1						
MIV610 7	Comprehensive Practical (Clinical and Diagnostic Virology + Laboratory Rotation-II)	-	-	12	6						
<b>Total</b>		<b>7</b>	<b>6</b>	<b>14</b>	<b>20</b>	<b>Total</b>		<b>-</b>	<b>-</b>	<b>-</b>	<b>18</b>

L: Lectures; T: Tutorials; P: Practicals; C: Credits

