



**MALAYSIAN MEDICAL COUNCIL**

**SPECIALTY-SPECIFIC REQUIREMENTS (SSR)**

**(MEDICAL MICROBIOLOGY)**

Prepared By:

Specialty Education Subcommittee (SEC)  
of the Medical Education Committee (MEC),  
Malaysian Medical Council

Approved by the Malaysian Medical Council:

29<sup>th</sup> August 2024

## **Preface**

1. The Specialty-Specific Requirements (SSR) pertain to requirements within each specialty and specify the minimum requirements pertaining to the training curriculum, trainers, educational resources and head of programme.
2. The Specialty-Specific Requirements (SSR) are intricately linked to the MMC Malaysian Standards for Medical Specialist Training 2019, and the Standards and SSR must be read and applied together.

<b>Specialty-Specific Minimum Requirements for Training Curriculum (Based on Area 1.2.4 of Malaysian Standards for Medical Specialist Training) - Medical Microbiology</b>						
<b>Specialty-Specific Requirements</b> (Reference Standard)	<b>Criteria</b>					
1) Minimum entry requirements for postgraduate training  (Standard 3.1.)	1. Fully registered with the Malaysian Medical Council with a current annual practicing certificate.  2. Successful entry evaluation into the programme.					
2) Minimum duration of training programme  (Standard 1.2.4 - Table 2)	Completion of a minimum of 48 months of specialised training in the specialty programme.					
3) Structure of training (rotation/modules)  Training overview  Training rotation/modul	The programme should have a clear pathway encompassing phases of training which shall include the basic and advanced components in Medical Microbiology. <table border="1" style="margin-top: 20px; width: 100%;"> <thead> <tr> <th style="text-align: center;">Core areas</th> <th style="text-align: center;">Minimum Duration (weeks)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Bacteriology</td> <td rowspan="2" style="text-align: center; vertical-align: middle;">144</td> </tr> <tr> <td style="text-align: center;">Virology</td> </tr> </tbody> </table>	Core areas	Minimum Duration (weeks)	Bacteriology	144	Virology
Core areas	Minimum Duration (weeks)					
Bacteriology	144					
Virology						

es and case mix  (Standard 1.2.4 - Table 3 & Table 4)	Immunology	
	Mycology	
	Parasitology	
	General Pathology (Medical Microbiology, Anatomic Pathology, Chemical Pathology, Haematology)	48*
*Effective learning period per year or 12 months is 48 weeks		
4) Assessments  (Standard 2.2.1)	Assessments should <ul style="list-style-type: none"> <li>i. Employ appropriate methods and levels that are well-aligned with learning outcomes. These include a variety of methods and tools such as written assessments, clinical assessments, supervisor’s report, logbook, attendance, training attended, research report, communication skills including methods appropriate to assess ethics and professionalism.</li> <li>ii. Include formative and summative assessments throughout each rotation, semester, or year of study.</li> <li>iii. Include clear criteria for progression to next year of study.</li> <li>iv. Include an exit examination/evaluation</li> </ul>	
5) Additional requirements for completion of training  (Standard 1.2.4)	i. Completion of graduate-level research or clinical audit project.	
6) List of competencies to be acquired	<u><b>Generic competencies</b></u>	

<p>upon completion of training</p> <p>(Standard 1.1.4)</p>	<p>Able to:</p> <ul style="list-style-type: none"> <li>i. Diagnose, investigate and manage common medical microbiology cases whilst considering social, health economics and preventive aspects.</li> <li>ii. Work independently and in teams competently and professionally.</li> <li>iii. Practice good ethical conduct.</li> <li>iv. Practice good and effective communication skills.</li> <li>v. Perform critical review, plan and conduct scientific research.</li> <li>vi. Exemplify self-advancement through continuous academic and/or professional development including digital health.</li> <li>vii. Apply evidence-based medicine in the field of medical microbiology.</li> <li>viii. Demonstrate exemplary leadership qualities in the multi-disciplinary team management of medical microbiology cases.</li> <li>ix. Demonstrate an entrepreneurial mindset, creative problem-solving and resilience.</li> </ul> <p><b><u>Specific specialty competencies</u></b></p> <ul style="list-style-type: none"> <li>i. Manage laboratory procedures in medical microbiology, including virology and immunology.</li> <li>ii. Interpret and appraise microbiology tests and results and discuss with healthcare providers involved in patient care.</li> <li>iii. Illustrate the rationale of antimicrobial treatment for infectious diseases and Antimicrobial Stewardship.</li> <li>iv. Outline the management of healthcare-associated infections, including Infection Prevention and Control.</li> <li>v. Conduct quality management in the medical microbiology laboratory.</li> </ul>
--	---

**Note: These criteria represent the minimum standards. Each educational programme provider may exercise their autonomy to state criteria above and beyond these minimum standards.**

Specialty-Specific Minimum Requirements for Training Centres and Head of Programme (Based on Areas 3-6 of Malaysian Standards for Medical Specialist Training) - Medical Microbiology								
Item No	Specialty-Specific Requirements (Reference Standard)	Criteria						
4	Trainer-to-trainee ratio  (Standard 3.1.3)	1 : 4						
5	Minimum qualifications and experience of trainers  (Standard 4.1.2)	<ul style="list-style-type: none"> <li>i. Registered with National Specialist Register.</li> <li>ii. Completed training-of-trainer course/equivalent</li> </ul>						
6	Minimum requirements for educational resource  (Standard 5.1.1)	<p>The diagnostic facilities and equipment requirement of the programme training centres must <b>collectively</b> be able to accommodate the following minimum requirement:</p> <ul style="list-style-type: none"> <li>i. Physical facilities: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Physical facilities</th> </tr> </thead> <tbody> <tr> <td>Infrastructure for electronic communication</td> </tr> <tr> <td>Seminar/ tutorial rooms</td> </tr> <tr> <td>Trainee workspace</td> </tr> <tr> <td>Computer room</td> </tr> <tr> <td>Library of reference books or journals (physical and/or virtual).</td> </tr> </tbody> </table> </li> <li>ii. Service areas: <p>The laboratory(ies) must be accepted or approved by relevant body(ies) for diagnostic microbiology laboratory or equivalent services.</p> </li> </ul>	Physical facilities	Infrastructure for electronic communication	Seminar/ tutorial rooms	Trainee workspace	Computer room	Library of reference books or journals (physical and/or virtual).
Physical facilities								
Infrastructure for electronic communication								
Seminar/ tutorial rooms								
Trainee workspace								
Computer room								
Library of reference books or journals (physical and/or virtual).								

		Areas	Services	
		Laboratory	<p>Microscopy and staining methods</p> <p>(eg Gram stain, acid-fast stains, India ink, spore stains), cell counts</p>	
			<p>Culture and identification tests:</p> <ul style="list-style-type: none"> <li>-aerobic and anaerobic cultures for clinical specimens</li> <li>-bacterial identification methods using biochemical tests, immunological tests and identification kits</li> <li>-automated blood culture systems</li> <li>-automated identification systems</li> </ul>	
			<p>Antimicrobial susceptibility tests (AST) eg disc diffusion method, E-test, broth dilution, automated AST.</p>	
			<p>Serological tests for important infectious diseases including Hepatitis B, Hepatitis C, HIV, Dengue, Syphilis.</p>	
			<p>Serology diagnostic methods for antigen and antibody detection including</p> <ul style="list-style-type: none"> <li>-rapid diagnostic tests</li> </ul>	

			<p>-immunoassays eg enzyme (EIA), chemiluminescence (ECLIA)</p>
			<p>Viral culture method (optional)</p>
			<p>Immunofluorescence / UV microscopy</p>
			<p>Molecular diagnostic techniques</p>
			<p>Molecular / viral load tests by real-time-PCR eg HIV, Hepatitis B and C</p>
			<p>Immunology tests</p> <ul style="list-style-type: none"> <li>-routine tests eg RF, ANA, anti-dsDNA</li> <li>-specialised tests eg ASMA, AMA, ANCA, ENA</li> <li>-immunoglobulins, complements</li> <li>-tests for primary immunodeficiency (optional)</li> </ul>
			<p>Mycology</p> <ul style="list-style-type: none"> <li>-microscopy for fungal identification</li> <li>-culture and identification tests</li> <li>-non-culture methods eg antigen detection, molecular, automated identification methods.</li> <li>-anti-fungal susceptibility testing</li> </ul>



	Parasitology tests for infections such as malaria, filariasis, intestinal helminths, intestinal protozoa
	Cultures and other tests for environmental specimens regarding the control of hospital infection.
	Sterilisation and disinfection
	Media preparation (optional)
	Laboratory Information System
Others	Hospital infection prevention and control programme

iii. Equipment:

Equipment
Biosafety Cabinet Class II
Microscopes
Incubator
Laboratory grade refrigerators for specimen and reagent storage
Freezers -20°C, -70°C
Automated blood culture system
Automated identification system (optional)
Densitometer (optional)
Autoclave and sterilizers
Fume hood
pH meter

Pipettors
Spectrophotometer
Automated analyzer for serological tests
Molecular / PCR set-up
Centrifuge
Vortex
Balance (optional)
Shakers / rotator (optional)
Electrophoresis apparatus (optional)
Water bath (optional)
UV-viewer (optional)

iv. Case load:

The case load of the programme training centres must **collectively** be able to accommodate the following minimum requirements:

Areas	Minimum Quantity (cases/ trainee/ year)
Cultures	1000
Serological tests	500

The case mix shall include Bacteriology, Virology, Immunology, Mycology and Parasitology cases.

Areas	Minimum Quantity (cases/ trainee / year)
Cases discussions or consultations	200

7	Minimum qualifications and experience of Head of Programme  (Standard 6.2.2)	i. 5 years or more of working experience after national specialist registration.  ii. Experience in administration and/or academic management.
---	--	--

**Note: These criteria represent the minimum standards. Each educational programme provider may exercise their autonomy to state criteria above and beyond these minimum standards.**

### **Glossary for Lab Based**

\*Relevant body(ies) refers to Department of Standards Malaysia, SIRIM and etc.

## ACKNOWLEDGEMENT

### **Authors:**

#### **Specialty Education Subcommittee (SSC) Edu Medical Microbiology 2022 – 2024**

1. Prof. Madya Dr. Noor Zetti Bt Zainol Rashid (Chair)
2. Prof. Dr. Syafinaz Bt Amin Nordin
3. Prof. Madya Dr. Azian Harun
4. Prof. Madya Dr. Fadzilah Mohd Nor @ Ghazali
5. Dr. Suhaila Baharuddin
6. Dr. Adilahtul Bushro Zaini
7. Dr. Azura Hussin

#### **Specialty Education Subcommittee (SSC) Edu Medical Microbiology 2024 – 2026**

1. Prof. Madya Dr. Noor Zetti Bt Zainol Rashid
2. Prof. Madya Dr. Azian Harun
3. Prof. Madya Dr. Fadzilah Mohd Nor @ Ghazali
4. Dr. Suhaila Baharuddin
5. Dr. Adilahtul Bushro Zaini

### **Editors:**

#### **Medical Education Committee (MEC)**

1. Prof. Datuk Dr. Rohaizat Bin Yon (Chair)
2. Prof. Dato' Dr. Mafauzy bin Mohamed
3. Prof. Dr. Zaleha Abdullah Mahdy
4. Prof. Datin Dr. Yong Rafidah binti Abdul Rahman
5. Prof. Dr. G. R. Letchuman Ramanathan
6. Dato' Dr. Jiffre bin Din
7. Dato' Dr. Jafri Malin bin Abdullah
8. Prof. Dr. Azad Hassan Bin Abdul Razack
9. Prof. Dato' Dr. Yang Faridah binti Abdul Aziz
10. Dr. Sri Wahyu Binti Taher
11. Prof. Dr. Sharifah Sulaiha Binti Syed Aznal
12. Prof. Dr. Shatriah Binti Ismail
13. Prof. Dr. Lee Way Seah
14. Dr. Rafidah Binti Abdullah

#### **Specialty Education Subcommittee (SEC)**

1. Prof. Dr. G. R. Letchuman Ramanathan (Chair)
2. Prof. Dr. Roslina Abd Manap
3. Dr. Hirman bin Ismail
4. Prof. Dr. Jamiyah binti Hassan
5. Prof. Dr. Nazimah Idris
6. Dr. Giri Shan
7. Dr. Hanif Hussein
8. Prof. Madya Dr. Bahiyah Abdullah
9. Datuk Seri Dr. Paras Doshi