# Program and Course Structure

## School of Medical Science and Research

## MSc (Medical Microbiology)
## Session:2020-22

## 1. Standard Structure of the Program at University Level

### 1.1 Vision, Mission and Core Values of the University

#### Vision of the University

To serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship.

#### Mission of the University

1. Transformative educational experience
2. Enrichment by educational initiatives that encourage global outlook
3. Develop research, support disruptive innovations and accelerate entrepreneurship
4. Seeking beyond boundaries

#### Core Values

- Integrity
- Leadership
- Diversity
- Community

## Vision of the School

To serve the society by being a premier institute that promotes a comprehensive approach to human health through excellence inacademics, research and clinical care

## Mission of the School

- Provide a transformative educational experience in Medical Science
- Develop skills and competencies to create global leaders in clinical care
- Promote innovative and collaborative research through intellectual and technological advancement
- Establish a center for excellence in preventive, promotive and curative health care

## Core Values

- Integrity
- Leadership
- Ethics
- Community Health

## 1.3 Programme Educational Objectives (PEO)

### 1.3.1 Writing Programme Educational Objectives (PEO)

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

A post graduate student having qualified the MD (Medicine) examination should be able to:

PEO1. Practice efficiently internal medicine specialty, backed by scientific knowledge including basic sciences and skills.
PEO2. Diagnose and manage majority of conditions in his specialty (clinically and with the help of relevant investigations).
PEO 3. Exercise empathy and a caring attitude and maintain professional integrity, honesty and high ethical standards.
PEO 4. Plan and deliver comprehensive treatment using the principles of rational drug therapy.
PEO 5. Plan and advise measures for the prevention and rehabilitation of patients belonging to his specialty.
PEO 6. Manage emergencies efficiently by providing Basic Life Support (BLS) and Advanced Life Support (ALS) in emergency situations.
PEO 7. Recognize conditions that may be outside the area of the specialty/ competence and refer them to an appropriate specialist.
PEO 8. Demonstrate skills in documentation of case details including epidemiological data.
PEO 9. Play the assigned role in the implementation of National Health Programs.
PEO 10. Demonstrate competence in basic concepts of research methodology and clinical epidemiology; and preventive aspects of various disease states.
PEO 11. Be a motivated 'teacher' - defined as one keen to share knowledge and skills with a colleague or a junior or any learner.
PEO 12. Continue to evince keen interest in continuing education irrespective of whether he/she is in a teaching institution or is practicing and use appropriate learning resources.
PEO 13. Be well versed with his medico-legal responsibilities.
PEO 14. Undertake audit, use information technology tools and carry out research - both basic and clinical, with the aim of publishing the work and presenting the work at scientific forums.
PEO 15. The student should be able to recognize the mental condition characterized by self absorption and reduced ability to respond to the outside world (e.g. Autism), abnormal functioning in social interaction with or without repetitive behaviour and/or poor communications, etc.

### 1.3.2 Map PEOs with Mission Statements:

| PEO Statements | School Mission 1 | School Mission 2 | School Mission 3 | School Mission 4 |
|---|---|---|---|---|
| **PEO1:** | 3 | 3 | 2 | 3 |
| **PEO2:** | 3 | 3 | 3 | 3 |
| **PEO3:** | 2 | 2 | 1 | 3 |
| **PEO4:** | 2 | 3 | 2 | 2 |
| **PEO5** | 3 | 3 | 2 | 3 |
| **PEO6** | 3 | 2 | 2 | 3 |
| **PEO7** | 3 | 3 | 2 | 3 |
| **PEO8** | 2 | 2 | 2 | 2 |
| **PEO9** | 3 | 3 | 2 | 3 |
| **PEO10** | 1 | 2 | 1 | 2 |
| **PEO11** | 3 | 3 | 2 | 3 |
| **PEO12** | 3 | 3 | 1 | 1 |
| **PEO13** | 2 | 3 | 1 | 2 |
| **PEO14** | 3 | 2 | 2 | 3 |
| **PEO15** | 2 | 3 | 2 | 1 |

### 1.3.3 Program Outcomes (PO's)

#### A. Cognitive Domain

**By the end of the course, the student should have acquired knowledge (cognitive domain), professionalism (affective domain) and skills (psychomotor domain) as given below:**

PO1. Basics of human anatomy as relevant to clinical practice e.g. surface anatomy of various viscera, neuro-anatomy, important structures/organs location in different anatomical locations in the body; common congenital anomalies.

PO2. Basic functioning of various organ-system, control of vital functions, pathophysiological alteration in diseased states, interpretation of symptoms and signs in relation to patho-physiology.

PO3. Common pathological changes in various organs associated with diseases and their correlation with clinical signs; understanding various pathogenic processes and possible therapeutic interventions possible at various levels to reverse or arrest the progress of diseases.

PO4. Knowledge about various microorganisms, their special characteristics important for their pathogenetic potential or of diagnostic help; important organisms associated with tropical diseases, their growth pattern/life-cycles, levels of therapeutic interventions possible in preventing and/or eradicating the organisms.

PO5. Knowledge about pharmacokinetics and pharmaco-dynamics of the drugs used for the management of common problems in a normal person and in patients with diseases kidneys/liver etc. which may need alteration in metabolism/excretion of the drugs; rational use of available drugs.

PO6. Knowledge about various poisons with specific reference to different geographical and clinical settings, diagnosis and management.

PO7. Research Methodology and Studies, epidemiology and basic Biostatistics.

PO8. National Health Programmes.

PO9. Biochemical basis of various diseases including fluid and electrolyte disorders; Acid base disorders etc.

PO10. Recent advances in relevant basic science subjects.

PO11. Preventive and environmental issues, including principles of preventive health care, immunization and occupational, environmental medicine and bioterrorism.

PO12. Aging and Geriatric Medicine including Biology, epidemiology and neuropsychiatric aspects of aging.

PO13. Clinical Pharmacology - principles of drug therapy, biology of addiction and complementary and alternative medicine.

PO14. Genetics - overview of the paradigm of genetic contribution to health and disease, principles of Human Genetics, single gene and chromosomal disorders and gene therapy.

PO15. Approach to patient with different systemic diseases; Immunology, Cardiovascular diseases, Respiratory system, Nephrology, Gastrointestinal diseases, Liver and gall bladder diseases, Hematologic diseases, Oncology, Metabolic diseases, Nutritional diseases, Endocrinology, Rheumatic diseases, Infectious diseases, Neurology, Psychiatry, Dermatology

**B Affective domain**

A post graduate student having qualified the MD (Medicine) examination should be able to

PO16. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
PO17. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
PO18. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.
C**. Psychomotor Domain** The student should acquire competencies in the following tasks:
PO19. Clinical Assessment Skills
PO20. Procedural skills
PO21. Laboratory-Diagnostic Abilities
PO22. Interpretation Skills

### 1.3.4 Mapping of Program Outcome Vs Program Educational Objectives

| | PEO1 | PEO2 | PEO3 | PEO4 | PEO5 | PEO6 | PEO7 | PEO8 | PEO9 | PEO10 | PEO11 | PEO12 | PEO13 | PEO14 | PEO15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PO1 | 3 | 3 | 2 | 2 | 1 | 2 | 1 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 2 |
| PO2 | 2 | 2 | 2 | 1 | 3 | 1 | 3 | 3 | 3 | 2 | 2 | 1 | 3 | 2 | 3 |
| PO3 | 2 | 2 | 1 | 3 | 1 | 1 | 1 | 3 | 2 | 3 | 3 | 1 | 2 | 1 | 2 |
| PO4 | 1 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 1 | 3 | 2 | 3 |
| PO5 | 3 | 3 | 1 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 |
| PO6 | 2 | 2 | 1 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 3 |
| PO7 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 1 | 1 | 3 | 3 |
| PO8 | 3 | 3 | 3 | 3 | 1 | 1 | 2 | 3 | 3 | 2 | 3 | 2 | 1 | 2 | 2 |
| PO9 | 3 | 3 | 2 | 3 | 1 | 2 | 3 | 1 | 1 | 1 | 3 | 3 | 1 | 1 | 1 |
| PO10 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 |
| PO11 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 |
| PO12 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 1 | 1 | 3 | 2 | 3 | 1 | 2 |
| PO13 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 |
| PO14 | 3 | 2 | 2 | 3 | 1 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 3 |
| PO15 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 3 | 2 | 3 | 3 | 3 |
| PO16 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 1 | 3 | 3 | 1 | 3 | 2 | 2 |
| PO17 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 1 | 3 | 3 | 2 | 3 | 2 | 1 |
| PO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 3 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | | | | | | | | | | | | | | | |
| PO19 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 |
| PO20 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | "-" | "-" | 2 | 3 | 1 | 3 | 3 | 1 |
| PO21 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 1 | 1 | 2 | 2 | 1 | 3 | 3 | 2 |
| PO22 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 3 | 3 | 2 | 3 | 2 | 3 |

| **School: SMSR** | | **Batch:** |
|---|---|---|
| **Program: MD MEDICINE** | | **Current Academic Year: 2019-20** |
| 1 | Programme Code | SMS1601 |

## Syllabus

**Course contents:**

**Basic Sciences**

1. Basics of human anatomy as relevant to clinical practice
- surface anatomy of various viscera
- neuro-anatomy
- important structures/organs location in different anatomical locations in the body
- common congenital anomalies

2. Basic functioning of various organ-system, control of vital functions, pathophysiological alteration in diseased states, interpretation of symptoms and signs in relation to pathophysiology.
3. Common pathological changes in various organs associated with diseases and their correlation with clinical signs; understanding various pathogenic processes and possible therapeutic interventions possible at various levels to reverse or arrest the progress of diseases.
4. Knowledge about various microorganisms, their special characteristics important for their pathogenetic potential or of diagnostic help; important organisms associated with tropical diseases, their growth pattern/life-cycles, levels of therapeutic interventions possible in preventing and/or eradicating the organisms.
5. Knowledge about pharmacokinetics and pharmaco-dynamics of the drugs used for the management of common problems in a normal person and in patients with diseases kidneys/liver etc. which may need alteration in metabolism/excretion of the drugs; rational use of available drugs.
6. Knowledge about various poisons with specific reference to different geographical and clinical settings, diagnosis and management.
7. Research Methodology and Studies, epidemiology and basic Biostatistics.
8. National Health Programmes.
9. Biochemical basis of various diseases including fluid and electrolyte disorders; Acid base disorders etc.
10. Recent advances in relevant basic science subjects.

**Systemic Medicine**

11. Preventive and environmental issues, including principles of preventive health care, immunization and occupational, environmental medicine and bio-terrorism.
12. Aging and Geriatric Medicine:
- Biology
- epidemiology
- neuro-psychiatric aspects of aging

13. Clinical Pharmacology:
- principles of drug therapy
- biology of addiction
- complementary and alternative medicine

14. Genetics:
- overview of the paradigm of genetic contribution to health and disease

- principles of Human Genetics
- single gene and chromosomal disorders
- gene therapy

15. Immunology:
- innate and adaptive immune systems
- mechanisms of immune mediated cell injury
- transplantation immunology

16. Cardio-vascular diseases:
- Approach to the patient with possible cardio-vascular diseases
- heart failure
- arrhythmias
- hypertension
- coronary artery disease
- valvular heart disease
- infective endocarditis
- diseases of the myocardium and pericardium
- diseases of the aorta and peripheral vascular system

17. Respiratory system:
- approach to the patient with respiratory disease
- disorders of ventilation
- asthma
- Congenital Obstructive Pulmonary Disease (COPD)
- Pneumonia
- pulmonary embolism
- cystic fibrosis
- obstructive sleep apnoea syndrome and diseases of the chest wall, pleura and mediastinum

18. Nephrology:
- approach to the patient with renal diseases
- acid-base disorders
- acute kidney injury
- chronic kidney disease
- tubulo-interstitial diseases
- nephrolithiasis
- Diabetes and the kidney
- obstructive uropathy and treatment of irreversible renal failure

19. Gastro-intestinal diseases:
- approach to the patient with gastrointestinal diseases
- gastrointestinal endoscopy
- motility disorders
- diseases of the oesophagus
- acid peptic disease
- functional gastrointestinal disorders
- diarrhea
- irritable bowel syndrome
- pancreatitis and diseases of the rectum and anus

20. Diseases of the liver and gall bladder:

 approach to the patient with liver disease
 acute viral hepatitis
 chronic hepatitis
 alcoholic and non-alcoholic steatohepatitis
 cirrhosis and its sequelae
 hepatic failure and liver transplantation
 diseases of the gall bladder and bile ducts

21. Haematologic diseases:
 Haematopoiesis
 Anaemias
 leucopenia and leucocytosis
 myelo-proliferative disorders
 disorders of haemostasis and haemopoietic stem cell transplantation

22. Oncology:
 Epidemiology
 biology and genetics of cancer
 paraneoplastic syndromes and endocrine manifestations of tumours
 leukemias and lymphomas
 cancers of various organ systems and cancer chemotherapy

23. Metabolic diseases - inborn errors of metabolism and disorders of metabolism.

24. Nutritional diseases - nutritional assessment, enteral and parenteral nutrition, obesity and eating disorders.

25. Endocrine - principles of endocrinology, diseases of various endocrine organs including diabetes mellitus.

26. Rheumatic diseases:
 approach to the patient with rheumatic diseases
 osteoarthritis
 rheumatoid arthritis
 spondyloarthropathies
 systemic lupus erythematosus (SLE)
 polymyalgia
 rheumatic fibromyalgia and amyloidosis

27. Infectious diseases:
 Basic consideration in Infectious Diseases
 clinical syndromes
 community acquired clinical syndromes
 Nosocomial infections
 Bacterial diseases - General consideration, diseases caused by gram – positive bacteria, diseases caused by gram - negative bacteria

o miscellaneous bacterial infections
o Mycobacterial diseases
o Spirochetal diseases
o Rickettsia
o Mycoplasma and Chlamydia
o viral diseases
o DNA viruses

o DNA and RNA respiratory viruses
o RNA viruses
 fungal infections, protozoal and helminthic infections .
28. Neurology - approach to the patient with neurologic disease, headache, seizure disorders and epilepsy, coma, disorders of sleep, cerebrovascular diseases, Parkinson's disease and other movement disorders, motor neuron disease, meningitis and encephalitis, peripheral neuropathies, muscle diseases, diseases of neuromuscular transmission and autonomic disorders and their management.
29. The mental condition characterized by complete self absorption with reduced ability to communicate with the outside world (Autism), abnormal functioning in social interaction with or without repetitive behaviour and/or poor communication etc.
30. Dermatology:
 Structure and functions of skin
 infections of skin
 papulo-squamous and inflammatory skin rashes
 photo-dermatology
 erythroderma
 cutaneous manifestations of systematic diseases
 bullous diseases
 drug induced rashes
 disorders of hair and nails
 principles of topical therapy

## Illustration of Structured Training-

| Time Period | Description/Levels | Content | Responsibilities |
|---|---|---|---|
| Ist Month | Orientation | Basic cognitive skills | 1. Combined duties<br>2. Supervised procedures |
| Ist Year | Beginners | Procedural abilities OPD & ward work | History sheet writing<br>- Clinical abilities,<br>-Procedural abilities (PA, PI)*,<br>- Laboratory |

| | | | |
|---|---|---|---|
| | | | -diagnostic (All PI)<br>-Communication skills O,A,PA<br>- BLS & ACLS |
| IInd Year | Intermediate | Intermediate degree of cognitive abilities Specialised procedural skills Emergency | Independent duties<br>- All procedures<br>-Respiratory management abilities (All PI)<br>- Communication skills (PA, PI)<br>- Writing thesis<br>- Teaching UGs |
| III Year | | Special skills Intensive critical care | Advanced levels of independent duties,<br>- casualty calls,<br>- ICU, NICU,<br>- UG teaching |
| | | | |

# Mode of examination

ASSESSMENT FORMATIVE ASSESSMENT,

During the training programm 16 Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills,

interpersonal skills, professionalism, self directed learning and ability to practice in the system.

General Principles Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and practical/clinical examination. Quarterly assessment during the MD training should be based on:

1. Journal based / recent advances learning
2. Patient based /Laboratory or Skill based learning
3. Self directed learning and teaching
4. Departmental and interdepartmental learning activity
5. External and Outreach Activities / CMEs.

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

SUMMATIVE ASSESSMENT,

namely, assessment at the end of training The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.

The Post graduate examination shall be in three parts:

1. Thesis –

   Every post graduate student shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the post graduate student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature. Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. Theory:

The examinations shall be organised on the basis of 'Grading'or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D./ MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period. There will be four theory papers, as below:

Paper I: Basic Medical Sciences (at the end of first year of training)

Paper II: Medicine and allied specialties including pediatrics, dermatology & psychiatry

Paper III: Tropical Medicine and Infectious Diseases

Paper IV: Recent Advances in Medicine

3. Clinical / Practical and Oral/viva voce Examination:

The final clinical examination should include: • cases pertaining to major systems • stations for clinical, procedural and communication skills • Log Book Records and day-to-day observation during the training • Oral/viva

voce examination shall be comprehensive enough to test the post graduate student's overall knowledge of the subject

Recommended Reading Text Books (latest edition)

• API Text book of Medicine • Davidson's Principles and Practice of Medicine • Harrison's Principles & Practice of Medicine • Oxford Text book of Medicine • Kumar & Clark : Book of Clinical Medicine • Cecil : Text Book of Medicine Reference books • Hurst : The Heart • Braunwald - Heart Disease: A Textbook of Cardiovascular Medicine • Marriot's Practical Electrocardiography • Crofton and Douglas : Respiratory Diseases

Clinical Methods • Hutchinson's Clinical Methods • Macleod's Clinical examination • John Patten : Neurological Differential Diagnosis • Neurological examination in Clinical Practice by Bickerstaff

**Annexure I**

**Postgraduate Students Appraisal Form Pre / Para /Clinical Disciplines**

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM……TO……

| Sr. No. | PARTICULARS | Not Satisfactory | Satisfactory | More Than Satisfactory | Remarks |
|---|---|---|---|---|---|
| | | 1 2 3 | 4 5 6 | 7 8 9 | |
| 1 | Journal based / recent advances learning | | | | |
| 2 | . Patient based /Laboratory or Skill based learning | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 3 | Self directed learning and teaching | | | | |
| 4 | Departmental and interdepartmental learning activity | | | | |
| 5 | External and Outreach Activities / | | | | |
| 6 | CMEs | | | | |
| 7 | Thesis / Research work | | | | |
| 8 | Log Book Maintenance | | | | |

**Publications** **Yes/ No**

Remarks*_____

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_____ _____ *REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.

SIGNATURE OF ASSESSEE SIGNATURE OF CONSULTANT SIGNATURE OF HOD