

# **Program and Course Structure**

**School of Medical Science and Research**

**MD (Physiology)**

**Session:2021-24**

**Program Code:SMS0201**

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

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### **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

## 1.2 Vision and Mission of the School

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### Vision of the School

To serve the society by being a premier institute that promotes a comprehensive approach to human health through excellence in academics, 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)**

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#### **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 (Physiology) examination should be able to:

**PEO1.** Understand and deal with all aspects of general, systemic and applied Physiology.

**PEO2.** Teach effectively the basic physiological mechanisms of human body with reference to their implications in the pathogenesis of diseases (pathophysiology) affecting various organ systems and the physiological basis of their management to undergraduate medical, paramedical and all other basic science students.

**PEO3.** Understand general principles of medical education (use of appropriate teaching techniques and resources). 2

**PEO4.** Explain how the knowledge of physiology can be effectively used in a various clinical settings to solve diagnostic and therapeutic problems.

**PEO5.** Interpret and evaluate research publications critically.

**PEO6.** Use the library facilities (Literature database using computer, CD ROM, internet search and any other available newer techniques).

**PEO7.** Conduct relevant clinical/experimental research which may have significant bearing on human health and patient care.

**PEO8.** Have acquired skills in effectively communicating with the students and colleagues from various medical and paramedical fields.

**PEO9.** Acquire skills in conducting collaborative research in the field of physiology with allied sciences, clinical sciences and biomedical engineering.

**PEO10.** Interact with the allied departments and render services in advanced laboratory investigations.

**PEO11.** Serve as interface with society at large.

**PEO12.** Acquire administrative skills to set up concerned department / laboratories and initiate purchase procedure and procure necessary items for running such laboratories.

**PEO13.** Function as a member of a teaching or research team.

### 1.3.2 Map PEOs with Mission Statements:

PEO Statements	School Mission 1	School Mission 2	School Mission 3	School Mission 4
PEO1:	3	2	2	3
PEO2:	3	3	2	3
PEO3:	3	2	1	3
PEO4:	3	3	2	3
PEO5	3	3	3	3
PEO6	3	1	1	3
PEO7	3	3	3	3
PEO8	1	3	3	2
PEO9	3	3	3	3
PEO10	3	3	1	3
PEO11	3	3	“”	3
PEO12	3	3	“”	3
PEO13	3	3	2	3

### 1.3.3 Program Outcomes (PO's)

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#### A. Cognitive Domain

A post graduate student having qualified the MD (Physiology) examination should be able to  
PO1. Teach the basic physiological mechanisms of human body with reference to their implications in the pathogenesis of diseases (pathophysiology) and their management to undergraduate medical and paramedical students.

PO2. Conduct such clinical and experimental research, as would have a significant bearing on human health and patient care.

PO3. Interact with other departments by rendering services in advanced laboratory investigations and relevant expert opinion.

PO4. Participate actively in various workshops/seminars/journal clubs/demonstration in the allied departments, to acquire various skills for collaborative research.

PO5. Contribute to society by imparting physiological understanding of health problems.

PO6. Plan a research study and conduct basic and clinical systemic investigations.

#### B. Affective domain

A post graduate student having qualified the MD (Physiology) examination should be able to  
PO7. Demonstrate self-awareness and personal development in routine conduct.

(Self-awareness)

PO8. Communicate effectively with peers, students and teachers in various teaching-learning activities. (Communication)

**PO9.** Demonstrate

a) Due respect in handling human subjects (Ethics & Professionalism)

b) Humane touch while demonstrating living surface marking in subject/patient  
(Ethics & Professionalism)

**PO10.** Acquire capacity of not letting his/her personal beliefs, prejudices and limitations come in the way of duty.

**PO11.** Appreciate the issues of equity and social accountability while exposing students to early clinical exposure (Equity and social accountability)

#### C. Psychomotor Domain

The student should acquire competencies in the following tasks:

**PO12.** Hematology Experiments

**PO13.** Animal Experiments (All animal experiments must be compliant with Govt. of India Regulations, notified from time to time). Experiments in Amphibian /Dog/Cat should be conducted by computer assisted simulation models/ facilities. Other experiments should be performed as permissible by CPCSEA guidelines.

**PO14.** Mammalian Experiments

**PO15.** Clinical examinations

**PO16.** Writing a dissertation and a research paper

**PO17.** Making presentations at conferences

**PO18.** Appropriately using various teaching learning methods.

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

	PEO1	PEO2	PEO3	PEO4	PEO5	PEO6	PEO7	PEO8	PEO9	PEO10	PEO11	PEO12	PEO13
<b>PO1</b>	3	3	3	3	1	1	1	“”	“”	“”	“”	“”	“”
<b>PO2</b>	2	2	“”	1	3	1	3	“”	3	1	“”	1	3
<b>PO3</b>	2	2	1	3	1	“”	1	3	2	3	“”	1	2
<b>PO4</b>	1	2	3	3	3	2	2	3	3	“”	“”	1	3
<b>PO5</b>	3	3	3	3	“”	1	3	“”	3	“”	3	“”	3
<b>PO6</b>	3	2	1	1	3	3	3	2	3	“”	“”	“”	3
<b>PO7</b>	“”	2	3	“”	“”	1	“”	2	1	1	“”	“”	1
<b>PO8</b>	3	3	3	“”	“”	“”	“”	3	2	2	“”	2	1
<b>PO9</b>	2	3	“”	“”	“”	“”	“”	3	3	“”	2	“”	3
<b>PO10</b>	“”	3	3	2	“”	“”	“”	2	2	2	3	3	3
<b>PO11</b>	“”	3	3	“”	“”	“”	“”	2	3	3	3	3	3
<b>PO12</b>	3	2	“”	3	1	“”	“”	“”	“”	“”	“”	“”	“”
<b>PO13</b>	3	3	“”	3	1	“”	“”	“”	“”	“”	“”	“”	“”
<b>PO14</b>	3	3	“”	3	1	“”	“”	“”	“”	“”	“”	“”	“”
<b>PO15</b>	3	3	“”	3	1	“”	“”	“”	“”	“”	“”	“”	“”
<b>PO16</b>	“”	3	“”	“”	3	3	3	“”	3	3	“”	“”	3
<b>PO17</b>	“”	3	“”	“”	3	3	3	2	3	3	“”	2	3
<b>PO18</b>	3	3	3	“”	3	2	“”	3	“”	“”	“”	“”	1

<b>School: SMSR</b>	<b>Batch:</b>
<b>Program: MD PHYSIOLOGY</b>	<b>Current Academic Year: 2019-20</b>
1	Programme Code SMS0201



## Syllabus

### Course contents:

#### **Paper-I: General and Cellular Physiology including Genetic Basis and Historical perspectives:**

1. Physiology of cell, various cellular mechanisms and genetic control mechanisms.
2. Various principles of Physics and Physical Chemistry involved in physiological phenomenon e.g. haemo-dynamics, bio-electrical potentials, body fluids, methods of measurements.
3. History of Physiology.
4. Biostatistics, Biophysics, Biochemistry, Micro-anatomy.
5. Growth and Development including aging.
6. Excretion, pH, water and Electrolyte balance.

#### **Paper-II: Systemic Physiology (system providing transport, nutrition and energy) including comparative Physiology.**

1. Blood and Immunity.
2. Cardiovascular System.
3. Respiratory System.
4. Gastro- Intestinal Tract (GIT) and dietary requirements.

#### **Paper-III: Systemic Physiology (system concerned with procreation, regulation and neural control)**

1. Nerve-Muscle Physiology including muscle mechanics
2. Endocrine Physiology
3. Nervous System (Central, peripheral and autonomic)
4. Special Senses
5. Reproduction & family planning/foetal & neonatal Physiology

#### **Paper-IV: Applied Physiology including recent advances**

1. Patho-physiology pertaining to systemic Physiology
2. Physiological basis of various clinical investigation tests
3. Interaction of human body in ambient environment- high altitude, space and deep sea
4. Sports physiology
5. Yoga and Meditation
6. Recent advances relevant to Physiology
7. Social responsibilities of physiologists

## **ASSESSMENT**

**FORMATIVE ASSESSMENT** ie., during the training 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 clinical examination.

### **Quarterly Assessment during the MD training programme 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** ie, 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 examinations should be conducted in 3 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 Examination**

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 should be 4 theory papers:

**Paper I:** General Physiology including history of Physiology

**Paper II:** Systemic Physiology (system providing transport, nutrition and energy)

**Paper III:** Systemic Physiology (system concerned with regulation, neural control and procreation)

**Paper IV:** Applied Physiology including recent advances

## 3. **Practical and oral examination**

Practical examination should be spread over two days and include the following components:

1. Objective Structured Practical Exam (OSPE)/ Spotting
2. Problem solving exercises pertaining to Clinical Physiology
3. Performing and reporting two special laboratory investigations
4. Two animal experiments (one long and one short) illustrating mechanisms, physiological concepts and their applications to humans. (Subject to current regulation of Government of India regarding animal usage). This is optional. It is advisable to use simulated experiments for this purpose.
5. Two human experiments (one long and one short), dealing with clinical physiology as would have significant bearing on human health and patient care.
6. Micro-teaching session for assessing communication skills.

**Viva-voce examination should include the following components:**

- (i) Theoretical discussion (General and systemic Physiology)
- (ii) Teaching techniques

- (iii) Thesis
- (iv) Eminent Physiologists (Foreign/Indian)
- (v) Journals (Indian/Foreign)
- (vi) Recent advances

**Recommended Reading Books (latest edition)**

1. A.C. Guyton – Text book of Medical Physiology 2. W.F. Ganong – Review of Medical Physiology 3. Vernon B. Mountcastle – Medical Physiology Vol. I & II 4. William’s Textbook of Endocrinology 5. J.E. Cotes- Respiratory Physiology 6. D.T. Harris – Experimental Physiology 7. Wintrobe’s – Clinical Hematology 8. Brown B.L. – Cell signaling, Biology and medicine of signal transduction 9. Berne and Levy- Medical Physiology 10. Textbook of Medicine by Harrison 11. API Textbook of Medicine

**Journals** 03-05 international Journals and 02 national (all indexed) journals

**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\* \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

\*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