

# SUMANDEEP VIDYAPEETH

(Declared as Deemed to be University under Section 3 of the UGC Act 1956)

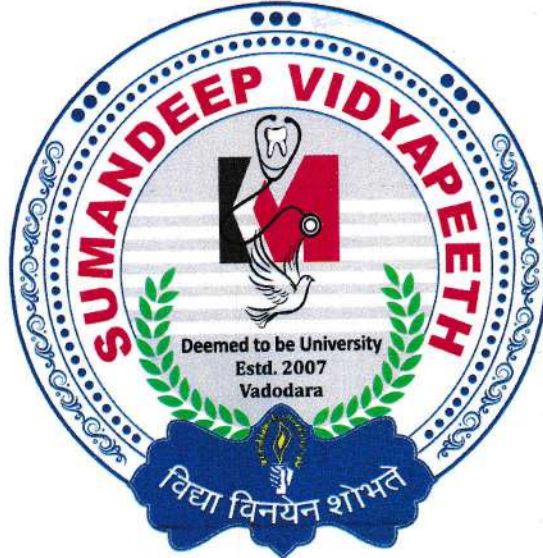
Accredited by NAAC with a CGPA of 3.53 out of four-point scale at 'A' Grade

Category – I deemed to be university under UGC Act - 2018

At & Post Piparia, Tal: Waghodia 391760 (Gujarat) India.

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## CURRICULUM

### Doctor of Medicine

### (M.D.)

### PHYSIOLOGY

Attested CTC

*Charan*  
15/2/2021

Vice-Chancellor

Sumandeep Vidyapeeth

An Institution Deemed to be University

VIII, Piparia, Taluka: Waghodia.

Dist. Vadodara-391 760. (Gujarat)

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AMENDED UP TO DECEMBER -2020

### Programme outcome : MD

The purpose of MD education is to create specialists who would provide high quality health care and advance the cause of science through research & training. The goal of postgraduate medical education shall be to produce competent specialists and/or Medical teachers.

### Programme specific outcome : MD

**POS 1.** Scholars shall recognize the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives of the national health policy.

**POS 2.** Scholars shall have acquired the basic skills in teaching of the medical and paramedical professionals.

**POS 3.** Practice the specialty concerned ethically and in step with the principles of primary health care.

**POS 4.** Demonstrate sufficient knowledge of the basic sciences relevant to the concerned specialty.

**POS 5.** Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.

**COURSE OUTCOME (CO):** A post graduate student having qualified the MD (Physiology) examination shall achieved to

1. 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.
2. Understand and deal with all aspects of general, systemic and applied Physiology.
3. Understand general principles of medical education (use of appropriate teaching techniques and resources).
4. Explain how the knowledge of physiology can be effectively used in a various clinical settings to solve diagnostic and therapeutic problems.
5. Interpret and evaluate research publications critically.
6. Use the library facilities (Literature database using computer, CD ROM, internet search and any other available newer techniques).
7. Conduct relevant clinical/experimental research which may have significant bearing on human health and patient care.
8. Interpret the research findings in the light of its basic and applied significance.
9. Acquire skills in conducting collaborative research in the field of physiology with allied sciences, clinical sciences and biomedical engineering.
10. Interact with the allied departments and render services in advanced laboratory investigations.
11. Serve as interface with society at large.
12. Acquire administrative skills to set up concerned department / laboratories and initiate purchase procedure and procure necessary items for running such laboratories.
13. Function as a member of a teaching or research team.

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## GOAL

The purpose of this programme is to standardize physiology teaching at post graduate level through out country so that it will benefit in achieving uniformity in under graduate teaching as well. Accordingly the training in MD physiology should be distinctive from that in M.Sc , Ph.d (physiology) where the approach to the subject is primarily experimental.

## **PROGRAMME OBJECTIVE**

- A. Candidate upon successfully qualifying in MD physiology Examinations should be able to:
- Be a competent physiologist
  - Effectively teach under graduate medical and Para medical students the basic Physiological mechanisms of the human body with reference to their implications in the Pathogenesis of diseases (Pathophysiology) and the physiological basis of their Management
  - Conduct such clinical / experimental research as would have significant bearing on Human health and patient care
  - Interact with the allied departments by rendering services in advanced laboratory Investigations
  - Acquire skills in conducting collaborative research in the field of physiology and allied Sciences
  - Must be able to demonstrate to the students how the knowledge of physiology can be used in a variety of clinical settings to solve diagnostic and therapeutic problems.

## **SPECIFIC LEARNING OBJECTIVES**

- Effectively teach undergraduate medical students the basic physiological mechanisms of human body, with reference to their Implications in the pathogenesis of diseases (Pathophysiology) and their management.
  - Conduct such clinical and experimental research as would have a significant bearing On human health and patient care.
  - Encourage interaction with the allied departments by rendering services in advanced laboratory investigations and relevant expert opinion.
  - Encourage the student to participate in various workshops/seminars/journal clubs/demonstration in the allied departments , to acquire various skills for collaborative research.
  - Uphold the prestige of the discipline amongst the fraternity of doctors
- To introduce Basic life support (BLS) and Advanced Cardiac Life Support (ACLS) training for all the First year Postgraduate Resident Doctors from academic year 2017-18. (Board of Studies letter no.: SBKSMIRC/Dean/1777(A)/2017, dated 28/11/2017 and Vide Notification of Board of Management Resolution Ref: No.: SV/8813/2017-18, dated 06/04/2018)*

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15/2/2021

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## DEPARTMENTAL RESOURCES

It be mandatory for the department to develop at least one of the following laboratories. The facilities outlined under each laboratory are only the minimal requirements. In addition to the facilities, the laboratory should be involved in active research in one or more well defined fields.

## CLINICAL NEUROPHYSIOLOGY LABORATORY

- (1) Electroencephalography
- (2) Evoked potential recording
- (3) Electromyography
- (4) Nerve conduction studies

## CARDIO-RESPIRATORY LABORATORY

- (1) Electrocardiography and Holter
- (2) Pulse Plathysmography
- (3) GSR recorder
- (4) Blood gas analyzer
- (5) Equipments for measuring pulmonary Diffusion capacity and FRC besides usual Spirometric measurements
- (6) Whole body Plathysmography

## METABOLIC / ENDOCRINOLOGY / REPRODUCTIVE BIO-MEDICINE LABORATORY

This laboratory will perform various tests pertaining gastrointestinal,renal,metabolic endocrinal and Reproductive Bio medicine.

- (1) Spectro photometer
- (2) pH meter
- (3) Ellisa reader /washer
- (4) Luminometer
- (5) Semi auto analyzer

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## SYLLABUS FOR THEORY TRAINING

- 1) Physiology of cell ,various cellular mechanisms.. Genetic control mechanisms.
- 2) Various principles involved in physiological phenomenon, e.g. Hemodynamics, Bio electrical potentials, Body fluids, methods of measurements
- 3) Interaction of human body in ambient environment including High altitude and Deep sea.
- 4) Blood and Immunity
- 5) Cardio vascular system
- 6) Respiratory system
- 7) Gastrointestinal tract and Dietary requirements
- 8) Excretion , pH and water and electrolyte balance
- 9) Reproduction and family planning / fetal and neonatal physiology
- 10) Nerve muscle physiology
- 11) Endocrine physiology
- 12) Central nervous system
- 13) Special senses
- 13) Sports physiology
- 14) Yoga and meditation
- 15) History of physiology
- 16) Comparative physiology

## APPLIED PHYSIOLOGY INCLUDING RECENT ADVANCES

- 1) Pathophysiology pertaining to systemic physiology
- 2) Physiological basis of various evaluation tests
- 3) Statistics
- 4) Recent advances
- 5) Growth and development including aging.

Candidates are posted in the bio chemistry department of the college/ where facilities are available on rotation basis.

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This college /department is equipped with general facilities like internet access and departmental library, well stocked with books and journals, especially those related to its field of research.

*Sharan*  
15/2/2021  
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## **POST GRADUATE TRAINING**

Based on the available facilities , Department has prepared a list of Postgraduate Experiments pertaining to basic and applied physiology. Active learning should form the main stay of Post graduate training. There are lectures for Post graduates (atleast 20 per year), along with seminar ,symposia, group discussions, journal clubs. The post graduate students regularly attend the ward rounds of various clinical departments and glean cases of interest for discussion with the physiology faculty. They should render special investigative services in their respective area of specialization. Our college have a medical education unit to generate teaching resource material for UG and evolving of problems solving modules.

### **EBES Integration:**

All post graduates after enrolment will be exposed to organized evidence searching skills lectures along with teaching of clinical epidemiology, biostatistics and research methodology.

All the post graduate Journal Clubs will be carried out on a prescribed Evidence Based format with emphasis on critical appraisal. A designated teacher/facilitator will asses every post graduate student for each JC presentation.

All PG seminars will have evidence embedded in the presentation and all references relating to the subject matter will be incorporated. AT the end of the seminar all the references will be listed and the seminar will be assessed by the facilitator.

In the OPD/ward/ICU/OT/Practical Skills/Equivalent activity in pre- Para clinical department, every post graduate student will be exposed to at least one encounter of role modeling in which a consultant after raising a relevant query will search for its evidence and demonstrate evidence searching methodologies, its importance and utility to the student.

## **POST GRADUATE EXAMINATIONS**

The post graduate examination are held in 3 parts.

**Thesis** , to be submitted by each candidate at least 6 months before the date of commencement of the Theory Examination.

### **(1) Theory**

**There should be 4 theory papers:-**

**Paper 1:** General physiology including History of physiology

**Paper 2:** Systemic physiology (system providing transport, nutrition and energy ) including comparative physiology

**Paper 3:** Systemic physiology ( system concern with procreation ,regulations and Neural control)

**Paper 4:** Applied physiology including recent advan

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**Paper 4:**

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**Paper 1** GENERAL AND CELLULAR PHYSIOLOGY INCLUDING  
GENETIC BASIC AND HISTORICAL PERSPECTIVES:

- 1) Physiology of cell ,various cellular mechanisms.. Genetic control mechanisms.
- 2) Various principles involved in physiological phenomenon, e.g. Hemodynamics, Bio electrical potentials, Body fluids, methods of measurements.
- 3) Interaction of human body in ambient environment including High altitude and Deep sea.
- 4) Sports physiology
- 5) Yoga and meditation
- 6) History of physiology

**Paper 2** SYSTEMIC PHYSIOLOGY (SYSTEMS PROVIDING TRANSPORT ,  
NUTRITION AND ENERGY )

- 1) Blood and Immunity
- 2) Cardio vascular system
- 3) Respiratory system
- 4) Gastrointestinal tract and Dietary requirements
- 5) Excretion , pH and water and electrolyte balance
- 6) Comperative physiology

**Paper 3** SYSTEMIC PHYSIOLOGY (SYSTEMS CONCERNED WITH  
PROCREATION ,REGULATION AND NEURAL CONTROL)

- 1) Reproduction and family planning / fetal and neonatal physiology
- 2) Nerve muscle physiology
- 3) Endocrine physiology
- 4) Central nervous system
- 5) Special senses

**Paper 4** ( APPLIED PHYSIOLOGY INCLUDING RECENT ADVANCES)

- 1) Pathophysiology pertaining to systemic physiology
- 2) Physiological basis of various evaluation tests
- 3) Statistics
- 4) Recent advances
- 5) Growth and development including aging.

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**(3) Practicals**

**Spread over 2 days and include the following components:**

- 1) Problem solving exercises pertaining to Clinical physiology
- 2) Performing and reporting two special investigations.
- 3) Animal experiments, illustrating mechanisms, physiological concepts and their applications to humans.
- 4) Microteaching session for assessing communication skills
- 5) Viva voce

**SYLLABUS FOR PRACTICAL TRAINING**

**Animal experiments**

**Amphibian**

- 1) Free load and after load
- 2) Effect of repeated stimulation( study of phenomenon of fatigue)
- 3) Properties of cardiac muscle- long refractory period. All or none law
- 4) Extrasystole and Compensatory pause, Beneficial effect
- 5) Regulation of Heart, Vagus dissection and effect of Vagal stimulation
- 6) Action of acetyl choline, adrenaline and nicotine on heart
- 7) Perfusion of isolated frog's heart-role of sodium, potassium, calcium ions

**Mammalian Experiments**

- 1) General management of Mammalian Experiments
- 2) Recording of Blood pressure and Respiration on dog and also the effects

of

various factors

- 3) Recording of effect of stimulation of Vagus nerve on Blood pressure and Respiration in dog.
- 4) Stimulation of central and peripheral end of Vagus on Arterial pressure after vagotomy.
- 5) Effect of drugs i.e. Adrenaline and Acetyl choline on Blood pressure and Respiration in dog.
- 6) Intestinal movement and tone
- 7) Effect of adrenaline on Intestinal movement and tone
- 8) Effect of occlusion of carotid arteries on Blood pressure and Respiration
- 9) Effect of stimulation of Splanchnic nerve(distal end) on Arterial pressure

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## **Human physiology**

### **Clinical physiology**

- 1) Elementary principles of clinical Examination
- 2) Methods of Inspection/ Palpation/ Percussion/ Auscultation
- 3) Plan of conduction and scheme of recording
- 4) General Examination

### **Cardio vascular system**

- 1) Clinical Examination of circulatory system
- 2) Examination of pulse, blood vessels and measurements of blood pressure

### **Respiratory system**

- 1) Clinical Examination of respiratory system

### **Abdominal system**

- 1) Clinical Examination of abdomen

### **Central nervous system**

- 1) Clinical Examination of nervous system and its physiological basis
- 2) Examination of higher mental functions
- 3) Clinical Examination of the special senses including cranial nerves
- 4) Tests of hearing and deafness
- 5) Sensory functions
- 6) Motor functions
- 7) Reflex functions

### **Ophthalmology**

- 1) Clinical Examination of Eye and Papillary reflex
- 2) Visual acuity
- 3) Perimetry
- 4) Accomodation
- 5) Fundoscopy
- 6) Colour vision and Colour blindness

### **Laboratory procedures:-**

#### **Haematology**

- 1) Haemocytometry
- 2) Determination of reticulocyte count, platelet count , WBC count, RBC count Eosinophil count in normal and diseased state
- 3) Differential count of WBC
- 4) Hemoglobinometry- Spectroscopy
- 5) Blood grouping and Cross matching
- 6) Determination of Bleeding time and Clotting time
- 7) Hemolysis and fragility tests

**Attested CTC**

*Sharan*  
15/11/2021

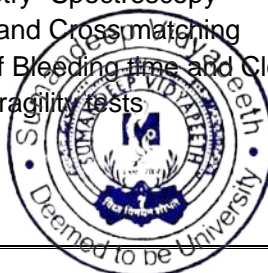
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### **Cardiovascular system**

- 1) Electrocardiography and its interpretation

### **Respiratory system**

- 1) Spirometry
- 2) Assessment of Ventilatory function
- 3) Breath holding and Endurance tests
- 4) Recording of lung function test by Computerized or Electronic Spirometer
- 5) Stethography
- 6) Resusciation and Artificial respiration

### **Reproductive system**

- 1) Determination of Ovulation time by Basal body temperature chart, Cervical smear, and Vaginal smear
- 2) Pregnancy diagnostic tests- Immunological tests
- 3) Sperm count

### **Nerve muscle physiology**

- 1) Ergography
- 2) Recording of EMG – Nerve conduction both sensory and motor

### **Others**

- 1) Construction of dietary chart for growing children, hypertensive patients and diabetes malitus patients
- 2) Tests for physical fitness
  - a) Lab harvard step test
- 3) Bicycle ergometry
  - a) Trademill protocols leading to determination of Vo2 max
  - b) Cardio respiratory response to whole body exercise

### **Clinical Biochemistry**

- 1) Estimation of normal and abnormal constituents of urine
- 2) Estimation of blood sugar
- 3) Estimation of serum calcium
- 4) Kidney function tests
- 5) Liver function tests
- 6) Gastric function tests (excluding fractional test meal)
- 7) Glucose tolerance test

### **Scheme of Examination (MD Course)**

**Degree: M.D. (PHYSIOLOGY)**

**University: Sumandeep Vidyapeeth, Piparia**

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**Dissertation:** Topic will be assigned for dissertation work. After getting approval from the institutional ethical committee, the student is expected to complete and submit it to the University for Assessment Purpose Six months before the expected date of University Examination.

*(Signature)*  
**Vice-Chancellor**

15/2/2021



**Theory Examination: (400 Marks)**

Paper number	Topics	Marks	Time
I	<b>GENERAL AND CELLULAR PHYSIOLOGY INCLUDING GENETIC BASIC AND HISTORICAL PERSPECTIVES:</b>	100	3 Hours
II	<b>SYSTEMIC PHYSIOLOGY (SYSTEMS PROVIDING TRANSPORT , NUTRITION AND ENERGY )</b>	100	3 Hours
III	<b>SYSTEMIC PHYSIOLOGY (SYSTEMS CONCERNED WITH PROCREATION ,REGULATION AND NEURAL CONTROL)</b>	100	3 Hours
IV	<b>( APPLIED PHYSIOLOGY INCLUDING RECENT ADVANCES)</b>	100	3 Hours

**Note: The distribution of topics in each paper is arbitrary. There may be overlapping of relevant topics in question papers**

**Each Paper shall have 04 Questions; all compulsory; No options.**

Question-1: Long Question	(1 or 2 parts)	20 marks
Question-2: Long Question	(1 or 2 parts)	20 marks
Question-3: Long Question	(1 or 2 parts)	20 marks
Question-4: Long Question	(1 or 2 parts)	20 marks
Question-5: Short notes	(04)	20 marks

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**Practical Examination:**

**(450 Marks + 150 marks oral including table work) = 600 marks**

**Duration: Minimum 2 days**

Exercise number	Description	Marks	Time	Assessment
1	Problem solving exercises pertaining to Clinical physiology. (Long Exercise)	200	1 hour	All four examiners
2	Performing and reporting two special investigations. (Short Exercise)	100	30 minutes for each case and each exercise	Pair-I Pair-II
3	Animal Experiments, illustrating mechanisms, physiological concepts and their applications to humans.	100	30 minutes each	Pair-I Pair-II
4	Microteaching session for assessing communication skills	50	30 minutes	All four examiners
5	Viva voce	150	1 hour	All four examiners

**Passing standards: Theory and Practical 50 % each separately**



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