



# AMRITA

## VISHWA VIDYAPEETHAM

A Multi Campus University with 'A' Grade Accreditation by

**Amrita Institute of Medical Sciences**

**SCHOOL OF MEDICINE**

**Kochi, Kerala, India-682 041**

## MBBS CURRICULUM

### &

## ACADEMIC CALENDAR

**XVII Batch - 2018 Admission**

**(Revised with effect from 2017-2018 onwards)**

**Managed by**

**Mata Amritanandamayi Math**

**Amritapuri, Kollam,**

**Kerala. INDIA-690 525**



A Super Specialty Tertiary Care Hospital Accredited by ISO 9001-2008, NABL



**Satguru Mata Amritanandamayi Devi**  
***Our Chancellor***

“In the gurukulas of ancient rishis, when the master spoke it was love that spoke; and at the receiving end disciple absorbed nothing but love. Because of their love for their Master, the disciples’ hearts were like a fertile field, ready to receive the knowledge imparted by the Master. Love given and love received. Love made them open to each other. True giving and receiving take place where love is present. Real listening and ‘sradha’ is possible only where there is love, otherwise the listener will be closed. If you are closed you will be easily dominated by anger and resentment, and nothing can enter into you”.



**Sampoosya Swamiji**  
**Sri Amritaswaroopananda Puri,**  
***Vice Chairman,***  
***Mata Amritanandamayi Math***

Aum Amriteswaryai Namah

Dear Brothers and Sisters,

It is with great joy that we heartily welcome you to our most Beloved Amma's beautiful temple of learning and pure love. Born out of her Holiness Sri Mata Amritanandamayi Devi's boundless love and compassion, this place has the power to transform you from what you are in to what you desire to be. Many are the helping hands which will support you mentally, emotionally, intellectually and spiritually in that process.

This is not an institution but a place of worship, a sacred place where you will be able to experience a tangible presence of God's love and purity, provided you have the right attitude. Nurtured and nourished by Amma, the great transformer of human minds, this unique place is to provide you with the most conducive atmosphere to develop both your head and heart.

Amma says, "Though important, human effort is not everything. It is God's grace that adds beauty and perfection to our actions. Love is the channel through which grace flows. Help yourself for love to unfold and grace to flow".

Dear brothers and sisters, you are here not to fail in life, but to win a victory over all the impediments that might arise in the future. Out there, it is not an easy world that awaits you. You need to have tremendous strength to march forward in life.

Remember, the greatest failure that can ever happen is falling a prey to our own weakness. That alone is the biggest threat, the stumbling block that prevents us from rising up in life. Focus your energies on your studies while drawing inspiration from Amma's life and techniques.

Listen to Amma's words of wisdom, "Education is not to become special, but to become humble, so that you can keep the doors of your heart always open, letting knowledge flow into you instantly".

May the light of Amma's pure love guide you throughout your life.

With Love and Prayers

**Swami Amritaswarupananda**



**Sampoojya Swami**  
**Poornamritananda Puri,**  
*Gen: Secretary,*  
***Mata Amritanandamayi Trust***

“A loving smile, a kind word, a display of genuine concern by medical practitioners will definitely complement the curative power of the medicines. It is Amma’s wish that her children in the medical profession are considered by society to be role models of selfless service, self-sacrifice and patience.”



**Dr.Prem Nair. M.D,**  
**Dip. AB (Med), Dip AB(Gastro),**  
**FACP, FACG**  
***Medical Director, AIMS***

Aum Amriteshwaryai Namah!

The practice of Medicine has been changing tremendously over the past 50-60 years, with changing demands in the teaching/learning process, explosion of medical knowledge and medical technology, need for research in Medicine, emphasis on quality and patient care outcomes, need for life-long learning, as well as inculcating values in medical practice.

The syllabus and curriculum of the Medical Council of India has been keeping pace with these standards by periodic revisions. Within the broad ambit of the course work stipulated, a team of committed faculty and students have been regularly updating and innovating our syllabus and curriculum since the inception of our Medical School.

The curriculum standards that have been made and implemented have been designed to prepare students for the future of health care. Our aim has been to provide them with the tools to serve a diverse patient population living with complex chronic conditions, to work as part of a team; to keep up with an ever growing body of knowledge.

The syllabus and Curriculum committee work has resulted in revisions that emphasise integration throughout the four and half years of training and between course and clinical rotations; limits the time students spend in lecture; and provides ample opportunity for self directed learning. Lectures and reading provide students with essential information on diseases and conditions. But seeing the impact those diseases have on patients provides context and make the information take up permanent residence in students mind. Students at Amrita now experience this concurrently, spending afternoon in clinical areas related to their lectures in the morning.

Informatics is now a vital tool in the hands of teachers and students to effectively bring knowledge graphically to the learner and with greater ease for the teacher. It also permits moving knowledge to the point of care and reduce the need for memorisation. This has been ably incorporated in our curriculum revision. Physicians need to develop interpersonal skills and personal qualities that make a remarkable difference in patient care outcomes. Our value based education modules help develop attributes of compassion, humaneness, respectfulness and thoroughness. Emphasis is also made on interpretation of new literature and research methodology needed for clinicians and academicians.

Simulaid play an important role in the training of the medical undergraduates. A skill laboratory equipped with most modern simulaid and mannequins has been set up for providing hands on training to the medical students, interns and postgraduates.

Although, no curriculum can be a finished product, our enthusiastic faculty and students will con-

tinuously be innovating to meet the changing needs of health care. We will also be looking at student outcomes to find out the effectiveness of our standards.

Let me congratulate Prof. Ajay Balachandran and his team for their outstanding efforts in this area of vital importance. May our Beloved AMMA's grace be a guiding light in our pursuit of excellence in healthcare.

In Amma's service

**Dr. Prem Nair**

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## **Curriculum Committee**

**Dr. Prem Nair**  
Medical Director

**Dr. Col. Vishal Marwaha**  
Principal, Chair

**Dr. Ajay B.**  
Secretary

### **Members**

**Dr. C. Jayakumar**, Professor & Head, Paediatrics

**Dr. Sajitha Krishnan**, Professor, Dept. of Biochemistry

**Dr. George Mathews**, Associate Professor, Gen. Surgery

**Mr. Aman Bhardwaj**, Interns Representative

**Mr. Pranav Nair**, Students Representative



<b>Heads of the Departments</b>		
1.	Allied Health Sciences	Sri. MV Thampi
2.	Anaesthesiology	Dr. Lakshmi Krishnakumar
3.	Anatomy	Dr. Minnie Pillay
4.	Audiology and Speech Pathology	Dr. G. Prem
5.	Biochemistry	Dr. N. Leela Menon
6.	Cardiac Anaesthesia	Dr. Aweek Jayant
7.	Cardiac Surgery	Dr. Praveen Varma
8.	Cardiology	Dr. T. Rajesh
9.	Clinical Psychology	Dr. Gitanjali Natarajan
10.	Community Medicine	Dr. K. Vijayakumar
11.	Dermatology	Dr. Sreedevan
12.	Emergency Medicine	Dr. K.P. Gireesh Kumar
13.	Endocrinology	Dr. Harish Kumar
14.	Forensic Medicine & Toxicology	Dr. V.V. Pillai
15.	Gastro Surgery /Vascular Surgery	Dr. Puneet Dhar
16.	General Medicine	Dr. M.G.K. Pillai
17.	General Surgery	Dr. Rajasekharan Pillai
18.	Gynaec Oncology	Dr. D.K. Vijayakumar
19.	Head & Neck	Dr. Subramania Iyer
20.	Medical Gastroenterology	Dr. Rama P. Venu
21.	Medical Oncology	Dr. K. Pavithran
22.	Master of Hospital Administration	Dr. Dinesh Nair
23.	Microbiology	Dr. Anilkumar V.
24.	Nephrology	Dr. Rajesh R. Nair
25.	Neurology	Dr. A. Anand Kumar
26.	Neuro Surgery	Dr. Sajesh Menon
27.	Nuclear Medicine	Dr. Shanmugha Sundaram
28.	Obtetrics & Gynaecology	Dr. K. Radhamony
29.	Ophthalmogy	Dr. Gopal S. Pillai
30.	Orthopaedics	Dr. K.K. Chandrababu
31.	Oto-rhino-laryngology	Dr. Madhumita Kumar
32.	Paediatric Cardiology	Dr. R. Krishnakumar
33.	Paediatric Genetics	Dr. Sheela Nampoothiri
34.	Paediatric Surgery	Dr. Mohan K. Abraham
35.	Pain & Palliative	Dr. Charu Singh
36.	Pathology	Dr. Ajit Nambiar
37.	Paediatrics	Dr. C. Jayakumar
38.	Pharmacology	Dr. Thresiamma Thomas
39.	Physical Medicine & Rehabilitation	Dr. Surendran K
40.	Physiology	Dr. Saraswathy L
41.	Plastic Surgery	Dr. Subramania Iyer
42.	Psychiatry	Dr. P.C. Kesavankutty Nayar
43.	Public Health	Dr. K.V. Beena
44.	Pulmonary Medicine	Dr. P.T. James
45.	Radiation Therapy	Dr. Debnarayan Dutta
46.	Radiodiagnosis & Imaging	Dr. Srikanth Moorthi
47.	Urology	Dr. Appu Thomas



**Dr. Col. Vishal Marwaha,  
MD ,DNB (Medicine)  
*Principal, School of Medicine***

## **FOREWORD**

Amrita School of Medicine was established in 2002 with an intake of 100 students. This is the first Medical School in the Private Sector in Kerala to get MCI recognition. Our first batch of MBBS students completed their internship in March 2008. This year we are enrolling **17<sup>th</sup> batch** of students. For the last 14 years, our eminent teachers, paramedical and administrative staff and Ashramites worked hard to make Amrita School of Medicine, what it is now. In the field of value based education, high-tech research, patient care and charity work, we could establish a good standard.

In our country Science and Spirituality always go hand in hand. **As our Chancellor AMMA says “We all know that the real goal of education is not to create people who understand only the language of technology; the main purpose of education should be to impart a culture of the heart, a culture based on spiritual values.”** We have strived hard to fulfill this vision by combining Spirituality and Education.

Amrita School of Medicine have students from all over India and abroad and about 30 to 40% students are from outside the state. With the guidance of our Chancellor and Guiding Light, AMMA and with the regular value based education classes, we feel that we are fulfilling the Vision envisaged by Amma.

The aim of medical education is to produce medical graduates who are professionally competent and have compassion and care. They must serve the society with utmost diligence and empathy.

I would also like to express my sincere thanks to the Board of Trustees, Medical Director – Dr. Prem Nair, Administrative Director – Mr. Ron Gottsegen, Secretary-Curriculum Committee- Dr. Ajay B., all the administrators and staff and all the Ashramites for their support, which helped us to attain curricular and extracurricular excellence.

In Amma

**Dr.(Col.) Vishal Marwaha**



**Dr. Ajay B. M.D**  
**Professor of Forensic Medicine**  
***Secretary, Curriculum Committee***

**PREFACE**

I have great pleasure to welcome you, the **XVII Batch of MBBS** students to this prestigious institution on behalf of the curriculum committee. You have chosen a noble profession which embodies the values of compassion, love and devotion. During your training in this centre, you will acquire not only knowledge and skills, but also the right values, attitude and ability to communicate. I wish every one of you all the very best on this day of entry to our alma mater.

The vision of Sri Mata Amritanandamayi Devi, our Chancellor and Amma, is reflected by the Mata Amritanandamayi Math, and its philanthropic and educational activities all over the globe. Amrita Institute of Medical Sciences and Research Centre, Kochi stands foremost among the many prestigious institutions under the Math.

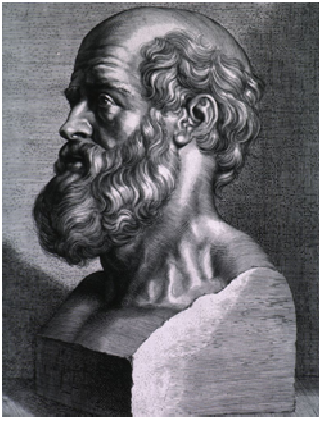
Established in 1998, AIMS has developed into a Centre of Excellence in medical care and education. Amrita school of Medicine was started in the year 2002 with an intake of 100 students. Other health professions training programmes like, dentistry, nursing, and pharmacy were also started in 2003. University Grants Commission has conferred the status of a Deemed University (“Amrita Viswa Vidyapeetham”) on the group of institutions under the Math, including Amrita school of Medicine. The mission statement of the University is to provide value based education and to mould the character of the young learners. The educational system of AVVP will make them excellent citizens who will uphold value systems of honesty, integrity, sincerity and compassion. Post-graduate courses have been started in all the specialties and also courses in super specialties.

The regulations of the Medical Council of India contain broad guidelines to develop the curriculum. The main objective is to create health professionals having knowledge, skills, values, the correct attitude and professionalism to take on the challenges of the present and the future. Bioethics, Medical Informatics, Telemedicine, Research methodology including animal welfare, Clinical epidemiology and Yoga have been included in the curriculum. A full fledged skill laboratory to impart hands on training to the learners has been set up. This will be helpful for our medical graduates in their clinical practice in future, helpful to emerge as competent professionals. I am sure; this curriculum will help the teachers as well as the learners to plan their teaching-learning activities. The specific goals enumerated in each discipline will be of great help in the acquisition of the required knowledge and skills.

I am very grateful to Dr. Prem Nair, the Medical Director, Dr. (Col) Vishal Marwaha, Principal, my fellow curriculum committee members, heads of all the departments and all members of the faculty for contributing to the making of this document. I place on record our sincere gratitude to Prof. Alexander John, my predecessor, for his guidance in matters pertaining to Curriculum development.

In Amma

**Dr. Ajay B.**



*Hippocrates (460-377 BC) the Greek Physician is regarded as the 'Father of Medicine'. He separated the field of Medicine from magic and made it a noble profession. A corpus of writings is traditionally attributed to him. The Hippocratic Oath, is most famous work in the Hippocratic Corpus. It is a landmark declaration of medical ethics, which largely remains relevant even today.*

## **Hippocratic Oath**

I swear by Apollo the Healer, by Asclepius, by Hygieia, by Panacea, and by all the gods and goddesses, making them my witnesses, that I will carry out, according to my ability and judgment, this oath and this indenture.

To hold my teacher in this art equal to my own parents; to make him partner in my livelihood; when he is in need of money to share mine with him; to consider his family as my own brothers, and to teach them this art, if they want to learn it, without fee or indenture; to impart precept, oral instruction, and all other instruction to my own sons, the sons of my teacher, and to indentured pupils who have taken the physician's oath, but to nobody else.

I will use treatment to help the sick according to my ability and judgment, but never with a view to injury and wrong-doing. Neither will I administer a poison to anybody when asked to do so, nor will I suggest such a course. Similarly I will not give to a woman a pessary to cause abortion. But I will keep pure and holy both my life and my art. I will not use the knife, not even, verily, on sufferers from stone, but I will give place to such as are craftsmen therein.

Into whatsoever houses I enter, I will enter to help the sick, and I will abstain from all intentional wrong-doing and harm, especially from abusing the bodies of man or woman, bond or free. And whatsoever I shall see or hear in the course of my profession, as well as outside my profession in my intercourse with men, if it be what should not be published abroad, I will never divulge, holding such things to be holy secrets.

Now if I carry out this oath, and break it not, may I gain for ever reputation among all men for my life and for my art; but if I break it and forswear myself, may the opposite befall me.

## **DECLARATION OF GENEVA**

“I SOLEMNLY PLEDGE to dedicate my life to the service of humanity; THE HEALTH AND WELL-BEING OF MY PATIENT will be my first consideration; I WILL RESPECT the autonomy and dignity of my patient; I WILL MAINTAIN the utmost respect for human life; I WILL NOT PERMIT considerations of age, disease or disability, creed, ethnic origin, gender, nationality, political affiliation, race, sexual orientation, social standing or any other factor to intervene between my duty and my patient; I WILL RESPECT the secrets that are confided in me, even after the patient has died; I WILL PRACTISE my profession with conscience and dignity and in accordance with good medical practice; I WILL FOSTER the honour and noble traditions of the medical profession; I WILL GIVE to my teachers, colleagues, and students the respect and gratitude that is their due; I WILL SHARE my medical knowledge for the benefit of the patient and the advancement of healthcare; I WILL ATTEND TO my own health, well-being, and abilities in order to provide care of the highest standard; I WILL NOT USE my medical knowledge to violate human rights and civil liberties, even under threat; I MAKE THESE PROMISES solemnly, freely and upon my honour..”

*This Declaration, a modified form of the Hippocratic Oath, was adopted by the General Assembly of the World Medical Association in 1948. It was amended in 1968, 1983, 1994, and 2017.*

## **INTERNATIONAL CODE OF MEDICAL ETHICS**

*The International Code of Medical Ethics is a code based on the Declaration of Geneva. It was adopted by the General Assembly of the World Medical Association at London in 1949, amended in 1968, 1983 and 2006.*

### **Duties of Physicians in General**

**A PHYSICIAN SHALL** always exercise his/her independent professional judgment and maintain the highest standards of professional conduct.

**A PHYSICIAN SHALL** respect a competent patient's right to accept or refuse treatment.

**A PHYSICIAN SHALL** not allow his/her judgment to be influenced by personal profit or unfair discrimination.

**A PHYSICIAN SHALL** be dedicated to providing competent medical service in full professional and moral independence, with compassion and respect for human dignity.

**A PHYSICIAN SHALL** deal honestly with patients and colleagues, and report to the appropriate authorities those physicians who practice unethically or incompetently or who engage in fraud or deception.

**A PHYSICIAN SHALL** not receive any financial benefits or other incentives solely for referring patients or prescribing specific products.

**A PHYSICIAN SHALL** respect the rights and preferences of patients, colleagues, and other health professionals.

**A PHYSICIAN SHALL** recognize his/her important role in educating the public but should use due caution in divulging discoveries or new techniques or treatment through non-professional channels.

**A PHYSICIAN SHALL** certify only that which he/she has personally verified.

**A PHYSICIAN SHALL** strive to use health care resources in the best way to benefit patients and their community.

**A PHYSICIAN SHALL** seek appropriate care and attention if he/she suffers from mental or physical illness.

**A PHYSICIAN SHALL** respect the local and national codes of ethics.

### **Duties of Physicians to Patients**

**A PHYSICIAN SHALL** always bear in mind the obligation to respect human life.

**A PHYSICIAN SHALL** act in the patient's best interest when providing medical care.

**A PHYSICIAN SHALL** owe his/her patients complete loyalty and all the scientific resources available to him/her. Whenever an examination or treatment is beyond the physician's capacity, he/she should consult with or refer to another physician who has the necessary ability.

**A PHYSICIAN SHALL** respect a patient's right to confidentiality. It is ethical to disclose confidential information when the patient consents to it or when there is a real and imminent threat of harm to the patient or to others and this threat can be only removed by a breach of confidentiality.

**A PHYSICIAN SHALL** give emergency care as a humanitarian duty unless he/she is assured that others are willing and able to give such care.

**A PHYSICIAN SHALL** in situations when he/she is acting for a third party, ensure that the patient has full knowledge of that situation.

**A PHYSICIAN SHALL** not enter into a sexual relationship with his/her current patient or into any other abusive or exploitative relationship.

### **Duties of Physicians to Colleagues**

**A PHYSICIAN SHALL** behave towards colleagues as he/she would have them behave towards him/her.

**A PHYSICIAN SHALL NOT** undermine the patient-physician relationship of colleagues in order to attract patients.

**A PHYSICIAN SHALL** when medically necessary, communicate with colleagues who are involved in the care of the same patient. This communication should respect patient confidentiality and be confined to necessary information.

# MEDICAL UNDERGRADUATE CURRICULUM

## Medical Council of India Regulations on Graduate Medical Education, 1997

Medical Council of India is the statutory body which regulates the standard of medical education in India. The MCI regulations prescribe specifications regarding the conduct of medical courses and examinations. In 1997 MCI has made new regulations for the graduate curriculum.

The MBBS Course which spreads over 4½ academic years is divided into 9 semesters of six months duration. The first two semesters form the Phase I. Mainly the basic subjects of Anatomy, Physiology and Biochemistry are taught in the first phase. Instruction in the subject Community Medicine also begins in Phase I and extends up to the VII semester. Phase II consists of three semesters viz. III, IV and V. Pathology, Microbiology, Pharmacology and Forensic Medicine are the subjects included in the course of instruction. Clinical posting in Medicine, Surgery and Obstetrics & Gynaecology begin in the III semester. Phase III consists of semester VI, VII, VIII and IX. General Medicine and Medical specialities, General Surgery and Surgical specialities and Obstetrics & Gynaecology are taught during this phase. Exposure to Dentistry, Anaesthesiology and Emergency medicine is also given. Clinical postings in all the clinical specialities are included in this phase.

Educational methodology adopted for training the learners gives less importance to didactic lectures. To promote active learning the teaching sessions will be more interactive. The basic disciplines will impart integrated teaching in relevant subject areas. Emphasis will be given to vertical and horizontal integration. During the study of basic sciences applied clinical aspects will be given more importance. Modern teaching tools like audiovisual aids, computer aided teaching, self learning packages will be incorporated in the teaching programmes. Students will be exposed to modern trends and recent advances in computer informatics. Mini research projects will be given to students to familiarize with the research methodology and Clinical Epidemiology.

Periodical evaluations will be conducted to assess the performance of the learners. Weightage for the internal assessment will be 20% of the total marks in each subject. A student must secure at least 35% marks of the total marks fixed for internal assessment (for theory and practical) in a particular subject in order to be eligible to appear in the final university examination of that subject.

University examinations in theory and practical/clinical will be held at the end of Semesters II, V, VII and IX. The evaluation will be objective. The items will be objective/objective structured to assess the knowledge and skills of the students. Viva voce examination will be conducted in all the subjects to assess the attitude and communication skills, management abilities and ability in problem solving.

The first professional examinations will be conducted in the last month of semester II. A student has to pass all the Phase I subjects viz. Anatomy, Physiology and Biochemistry before joining the Phase II training.

**Failed candidates will have to undergo additional course in the failed subjects. A supplementary examination will be conducted within six months in the failed subjects. The candidates who fail again will have to join their junior batch and appear for the next University examination along with them.**

The II Professional examination will be held in the last month of Semester V. The student has to appear for Pathology, Microbiology, Pharmacology and Forensic Medicine. III Professional examination has 2 parts. Part I will be held at the end of Semester VII. The subjects are Ophthalmology, Otorhinolaryngology and Community Medicine. Students have to secure a pass in all the subjects of the second Professional examination before appearing for the Part I subjects of III Professional examination. But the students can undergo the Phase III training. A pass in the Part I subjects of the II Professional examination is not compulsory to continue the Phase III training. But before appearing for the III Professional part II subjects viz. Medicine, Surgery, Obstetrics & Gynaecology and Paediatrics, passing all the part I subjects is compulsory.

# **MBBS COURSE – GENERAL RULES FOR THE UNIVERSITY EXAMINATIONS**

## **1. Eligibility to Appear for the University Examination**

### **1.1 Attendance**

A minimum of 75% attendance in a subject including attendance in non-lecture teaching, i.e. seminars, group discussions, tutorials, demonstrations, practical, hospital (Tertiary, Secondary, Primary) posting, bed side clinics etc. is compulsory to appear for the University Examination.

**75% of attendance (physical presence) in Practical/Clinical and 75% in Theory is mandatory.** Medical leave or other types of sanctioned leaves will not be counted as physical presence.

Attendance will be counted from the date of commencement of the session to the last day of theory classes/practical classes/clinical posting. In case a student joins the course late, the attendance will be counted from date of commencement of the course and not from the date of his/her joining it. Hence, students joining late should take special care to attend classes regularly and thereby obtain the minimum percentage of attendance (physical presence).

The Repeaters (additional students) also should obtain the same attendance for the additional term by attending extra classes like tutorials, assignments, special classes etc. Such extra classes will be arranged by the HODs concerned in accordance with the facilities in the Departments and the special needs of the students.

### **1.2 Internal Assessment**

The student must secure a minimum of 35% of the total marks allotted for Internal Assessment in a subject to appear for the University Examination in that subject. The Repeaters are required to appear for periodical class tests conducted for them by the HODs. If they improve their previous Internal Assessment marks, such improved marks will be taken as the Internal Assessment for the ensuing examination. In case any student absents from such class test or secures less mark than the one scored in the previous term, the Internal Assessment secured in the previous regular term will be considered as the Internal Assessment for the ensuing examination.

## **2. Valuation of Theory – Written Papers**

### **2.1 Internal Examiners Meeting**

Internal Examiner's meeting will be arranged by the Head of the Department concerned immediately after the University Theory examination. Scheme of valuation and guidelines will be prepared and the same will be communicated to the External Examiners before valuation. This procedure is to ensure uniformity in valuation.

### **2.2 Central Valuation:**

Valuation work will be undertaken by the examiners in the premises of the Examination Control Division in the Health Care Campus.

### **2.3 Single Valuation with Provision for Revaluation (on the Request of a Failed Candidate)**

Revaluation is only for failed candidates. After revaluation, the higher mark will be considered. If the difference is more than 20%, answer paper will be subjected to third valuation.

## **3. Criteria for Pass:**

Minimum marks required for a pass in the University examination is as follows:

Theory	- 45%
Theory + Viva Voce	- 50%
Practical/Clinical	- 50%
Aggregate of Theory + Viva Voce + Practical + Internal Assessment marks (Theory & Practical)	- 50%



An Example:

Subject : ANATOMY

Distribution of Marks for University Examination and Internal Assessment

		Mark	Total Mark	Minimum for a pass
University	Theory 1	50	100	45
	Theory 2	50		
	Theory + Viva		120	60
	Practical	40		20
Internal Assessment	Theory	20		
	Practical	20		

### 3.1 Pass with Merit:

A candidate passing the entire professional examination is placed in one of the following classes based on the percentage of the grand total of marks in all the subjects of that examination:

Second Class	:	Less than 65 %
First Class	:	65 % or more, but less than 75 %
Distinction	:	75 % and more

A candidate passing the entire course is placed in Second class/First class/Distinction based on the cumulative percentage of the aggregate marks of all the subjects in the I, II and III (Final) professional examinations.

### 3.2 Criteria for granting Grace Marks:

As per MCI regulation, 5 marks can be awarded as grace mark in one subject only in order to enable the candidate to pass one segment of examination.

The above rules are made applicable for the MBBS course for all the University Examinations conducted by the Amrita Vishwa Vidyapeetham University.

**Dr.(Col.) Vishal Marwaha**  
**Principal**

## **GENERAL CONSIDERATIONS AND TEACHING/LEARNING APPROACH**

1. Graduate medical curriculum is oriented towards training students to undertake the responsibilities of a physician of first contact who is capable of looking after the preventive, promotive, curative and rehabilitative aspects of medicine.
2. With wide range of career opportunities available today, a graduate has a wide choice of career opportunities. The training though broad based and flexible should aim to provide an educational experience of the essentials required for health care in our country.
3. To undertake the responsibilities of service situations which is a changing condition and of various types, it is essential to provide adequate placement training tailored to the needs of such services as to enable the graduates to become effective instruments of implementation of those requirements. To avail of opportunities and be able to conduct professional requirements, the graduate shall endeavour to acquire basic training in different aspects of medical care.
4. The importance of the community aspects of health care and of rural health care services is to be recognized. This aspect of education and training of graduates should be adequately recognized in the prescribed curriculum. Its importance has been systematically upgraded over the past years and adequate exposure to such experience should be available throughout all the three phases of education and training. This has to be further emphasized and intensified by providing exposure to field practice areas and training during internship is to enable the fresh graduates to function efficiently under such settings.
5. The educational experience should emphasize health and community orientation instead of only disease and hospital orientation or being concentrated on curative aspects. As such, all the basic concepts of modern scientific medical education are to be adequately dealt with.
6. There must be enough experience to be provided for self learning. The methods and techniques that would ensure this must become a part of teaching-learning process.
7. The medical graduates of modern scientific medicine shall endeavour to become capable of functioning independently in both urban or rural environment. They shall endeavour to give emphasis on fundamental aspects of the subjects taught and on common problems of health and disease avoiding unnecessary details of specialization.
8. The importance of social factors in relation to the problem of health and diseases should receive proper emphasis throughout the course and to achieve this purpose, the educational process should also be community based than only hospital based. The importance of population control and family welfare planning should be emphasized throughout the period of training with the importance of health and development duly emphasized.
9. Adequate emphasis is to be placed on cultivating logical and scientific habits of thought, clarity of expression and independence of judgment, ability to collect and analyse information and to correlate them.
10. The educational process should be placed in a historic background as an evolving process and not merely as an acquisition of a large number of disjointed facts without a proper perspective. The history of Medicine with reference to the evolution of medical knowledge both in this country and the rest of the world should form a part of this process.
11. Lectures alone are generally not adequate as a method of training and are a poor means of transferring/acquiring information and even less effective at skill development and in generating the appropriate attitudes. Every effort should be made to encourage the use of active methods related to demonstration and on first hand experience. Students will be encouraged to learn in small groups, through peer interactions so as to gain maximal experience through contacts with patients and the communities in which they live. While the curriculum objectives

often refer to areas of knowledge or science, they are best taught in a setting of clinical relevance and hands on experience for students who assimilate and make this knowledge a part of their own working skills.

12. The graduate medical education in clinical subjects should be based primarily on out-patient teaching, emergency departments and within the community including peripheral health care institutions. The out-patient departments should be suitably planned to provide training to graduates in small groups.
13. Clinics should be organized in small groups of preferably not more than 10 students, so that a teacher can give personal attention to each student with a view to improve his skill and competence in handling the patients.
14. Proper records of the work should be maintained which will form the basis for the students internal assessment and should be available to the inspectors at the time of inspection of the college by the Medical Council of India.
15. Maximal efforts have to be made to encourage integrated teaching between traditional subject areas using a problem based learning approach starting with clinical or community cases and exporting the relevance of various pre-clinical disciplines in both understanding and resolution of the problem. Every attempt be made to de-emphasize compartmentalization of disciplines so as to achieve both horizontal and vertical integration in different phases.
16. Every attempt is to be made to encourage students to participate in group discussion and seminars to enable them to develop personality, character, expression and other faculties which are necessary for medical graduates.

# **MEDICAL UNDERGRADUATE TRAINING PROGRAMME: OBJECTIVES**

## **National Goals**

At the end of undergraduate program, the medical student shall endeavour to be able to:

- a. Recognise 'health for all' as a national goal and health right of all citizens and by undergoing training for medical profession fulfill his/her social obligations towards realization of this goal.
- b. Learn every aspect of National policies on health and devote himself/herself to its practical implementation.
- c. Achieve competence in practice of holistic medicine, encompassing promotive, preventive, curative and rehabilitative aspects of common diseases.
- d. Develop scientific temper, acquire educational experience for proficiency in profession and promote healthy living.
- e. Become exemplary citizen by observation of medical ethics and fulfilling social professional obligations, so as to respond to national aspirations.

## **Institutional Goals:**

**I. These institutional goals were evolved by our medical institution in consonance with the national goals to define the kind of trained manpower (or professionals) we intend to produce. The undergraduate students coming out of our institute should:**

- a. Be competent in diagnosis and management of common health problems of the individual and the community, commensurate with his/her position as a member of the health team at the primary, secondary or tertiary levels, using his/her clinical skills based on history, physical examination and relevant investigations.
- b. Be competent to practice preventive, promotive, curative and rehabilitative medicine in respect to the commonly encountered health problems.
- c. Appreciate rationale for different therapeutic modalities, be familiar with the administration of the "essential drugs" and their common side effects.
- d. Be able to appreciate the socio-psychological, cultural, economic and environmental factors affecting health and develop humane attitudes towards the patients in discharging one's professional responsibilities.
- e. Possess the attitude for continued self learning and to seek further expertise or to pursue research in any chosen area of medicine, action research and documentation skills.
- f. Be familiar with the basic factors which are essential for the implementation of the National Health Programmes including practical aspects of the following:-
  - i Family Welfare and Maternal and Child Health (MCH)
  - ii Sanitation and water supply
  - iii Prevention and control of communicable and non-communicable diseases.
  - iv Immunization
  - v Health Education.
  - vi IPHS standard of health at various level of service delivery, medical waste disposal.
  - vii Organizational institutional arrangements.
- g. Acquire basic management skills in the area of human resources, materials and resource management related to health care delivery, general and hospital management, principal inventory skills and counseling.
- h. Be able to identify community health problems and learn to work to resolve these by designing, instituting corrective steps and evaluating outcome of such measures.
- i. Be able to work as a leading partner in health care teams and acquire proficiency in communication skills.
- j. Be competent to work in a variety of health care settings.

- k. Have personal characteristics and attitudes required for professional life such as personal integrity, sense of responsibility and dependability and ability to relate to or show concern for other individuals.

## II. The Medical Graduate Should be Equipped to Acquire the Skills as Detailed Below:

### I. Clinical Evaluation

- To be able to take a proper and detailed history.
- To perform a complete and thorough physical examination and elicit clinical signs.
- To be able to properly use the stethoscope, Blood Pressure Apparatus, Auroscope, Thermometer, nasal speculum, Tongue Depressor, Weighting Scales, Vaginal Speculum etc.
- To be able to perform internal examination-Per Rectum (PR), per Vaginum (PV) etc.
- To arrive at a proper provisional clinical diagnosis.

### II. Bed side Diagnosis Tests:

- To be and interpret Haemoglobin (Hb), Total Count (TC), Erythrocytic Sedimentation Rate (ESR), blood smear for parasites and urine examination/albumin/sugar/ketones.
- Stool exam for ova and cysts.
- Gram staining and Ziehl- Nielsen staining for AFB.
- To do skin smear for lepra bacilli.
- To do and examine a wet film vaginal smear for Trichomonas.
- To do a skin scraping and Potassium Hydroxide (KOH) stain for fungus infections.
- To perform and read Mantoux Test.

### III. Ability to carry out Procedures:

- To conduct CPR (Cardiopulmonary Resuscitation) and First aid in newborns, children and adults.
- To give Subcutaneous (SC)/Intramuscular (IM)/Intravenous (IV) injections and start Intravenous (IV) infusions.
- To pass a Nasogastric tube and give gastric lavage.
- To administer oxygen-by mask/catheter.
- To administer enema.
- To pass a urinary catheter - male and female.
- To insert flatus tube.
- To do pleural tap, ascitic tap & lumbar puncture, insert intercoastal tube to relieve tension pneumothorax.
- To relieve cardiac tamponade.
- To control external Haemorrhage.

### IV. Anaesthetic Procedure:

- Administer local anaesthesia and nerve block.
- Be able to secure airway potency, administer Oxygen by Ambu bag.

### V. Surgical Procedures:

- To apply splints, bandage and plaster of Paris (POP) slabs.
- To do incision and drainage of abscesses.
- To perform the management and suturing of superficial wounds.
- To carry on minor surgical procedures, e.g, excision of small cysts and nodules, circumcision reduction of paraphimosis, debridement of wound etc.
- To perform vasectomy.
- To manage anal fissures and give injections for piles.

### VI. Mechanical Procedures:

- To perform through antenatal examination and identify high risk pregnancies.
- To conduct a normal delivery.
- To apply low forceps and perform and suture episiotomies.
- To insert and remove IUDs and to perform tubectomy.

## **VII. Paediatrics**

- To assess new borns and recognise abnormalities and I.U. retardation;
- To perform immunization;
- To teach infant feeding to mothers;
- To monitor growth by the use of 'road to health chart' and to recognize development retardation;
- To assess dehydration and prepare and administer Oral Rehydration Therapy (ORT)
- To recognise ARI clinically.

## **VIII. ENT Procedures:**

- To be able to remove foreign bodies;
- To perform nasal packing for epistaxis;
- To perform trachesotomy;

## **XI. Ophthalmic Procedures:**

- To invert eyelids;
- To give subconjunctival injection;
- To perform appellation of eye-lashes;
- To measure the refractive error and advise correctional glasses;
- To perform nasolacrimal duct syringing for potency.

## **X. Dental Procedures:**

- To perform dental extraction

## **XI. Community Health:**

- To be able to supervise and motivate, community and para-professionals for corporate efforts for the health care;
- To be able to carry on managerial responsibilities, e.g. Management of stores, indenting and stock keeping and accounting;
- Planning and management of health camps;
- Implementation of national health programmes;
- To effect proper sanitation measures in the community, e.g. disposal of infected garbage, chlorination of drinking water;
- To identify and institute control measures for epidemics including its proper data collecting and reporting;

## **XII. Forensic Medicine including Toxicology**

- To be able to carry on proper medicolegal examination and documentation of injury and age reports.
- To be able to conduct examination for sexual offences and intoxications;
- To be able to preserve relevant ancillary materials for medico legal examination;
- To be able to identify important post-mortem findings in common un-natural deaths.

## **XIII. Management of Emergencies:**

- To manage acute anaphylactic shock;
- To manage peripheral vascular failure and shock;
- To manage acute pulmonary oedema and LVF;
- Emergency management of drowning, poisoning and seizures;
- Emergency management of bronchial asthma and status asthmaticus;
- Emergency management of hyper pyrexia;
- Emergency management of comatose patient regarding airways, positioning prevention of aspiration and injuries;
- Assess and administer emergency management of burns.

## **PROGRAM OUTCOMES**

**PO1** Recognize 'health for all' as a national goal and health right of all citizens and by undergoing training for medical profession fulfill his/her social obligations towards realization of this goal.

**PO2** Learn every aspect of National policies on health and devote himself/herself to its practical implementation

**PO3** Achieve competence in practice of holistic medicine, encompassing promotive, preventive, curative and rehabilitative aspects of common diseases.

**PO4** Develop scientific temper, acquire educational experience for proficiency in profession and promote healthy living.

**PO5** Become an exemplary citizen by observation of medical ethics and fulfilling social and professional obligations, so as to respond to national aspirations.

## **PROGRAM SPECIFIC OUTCOMES**

**PSO1:** Be competent in diagnosis and management of common health problems of the individual and the community, commensurate with his/her position as a member of the health team at the primary, secondary or tertiary levels, using his/her clinical skills based on history, physical examination and relevant investigations.

**PSO2:** Be competent to practice preventive, promotive, curative and rehabilitative medicine in respect to the commonly encountered health problems.

**PSO3:** Appreciate rationale for different therapeutic modalities; be familiar with the administration of the "essential drugs" and their common side effects.

**PSO4:** be able to appreciate the socio-psychological, cultural, economic and environmental factors affecting health and develop humane attitude towards the patients in discharging one's professional responsibilities.

**PSO5:** Possess the attitude for continued self-learning and to seek further expertise or to pursue research in any chosen area of medicine, action research and documentation skills.

**PSO6:** Implementation of the National Health Programs including practical aspects of the following:

- (i) Family Welfare and Maternal and Child Health (MCH)
- (ii) Sanitation and water supply
- (iii) Prevention and control of communicable and non-communicable diseases.
- (iv) Immunization.
- (v) Health Education
- (vi) IPHS standard of health at various level of service delivery, medical waste disposal.
- (vii) Organizational institutional arrangements.

**PSO7:** Acquire basic management skills in the area of human resources, materials and resource management related to health care delivery, General and hospital management, principal inventory skills and counseling.

**PSO8:** be able to identify community health problems and learn to work to resolve these by designing, instituting corrective steps and evaluating outcome of such measures.

**PSO9:** be able to work as a leading partner in health care teams and acquire proficiency in communication skills.

**PSO10:** be competent to work in a variety of health care settings.

**PSO11:** Have personal characteristics and attitudes required for professional life such as personal integrity, sense of responsibility and dependability and ability to relate to or show concern for other individuals.

**PSO12:** All efforts must be made to equip the medical graduate to acquire the skills as detailed in APPENDIX B of the Medical Council of India Regulations on Graduate Medical Education 1997.



# LEARNING SKILLS - TIPS TO LEARN BETTER

**Dr. V. Kanthaswamy**

***Addl. Controller of Examinations***

**N.B:-** This SECTION will help you to understand the basic principles of learning, obtain maximum benefit from various methods of teaching/learning and face examinations without fear.

## I. General Principles

Learning is an active process accomplished by students at individual rates and by individual means. **Motivation** is the most potent force that drives you to learn. It is natural that desire to learn varies from person to person. Nevertheless, good learning habits generate interest and desire to learn. What follows are some factors which create interest and facilitate learning.

- **Objectives:** Learning is more efficient when it is directed at clearly defined objectives. Hence you should know beforehand what achievements you are aiming at in terms of knowledge, skills and attitudes.
- **Relevance:** Learning is maximal when the material to be learned or the task to be mastered is relevant to our needs. Try to find out why you have to learn the particular topic and how it is going to be useful in your future work.
- **Active participation:** You should involve in body and mind in what is going on in a learning situation. Such participation aids learning and helps retention of the material learned.
- **Repetition:** It is helpful for mastering skills and also for memorization of unrelated facts.
- **Feedback:** You should seek and obtain from your teachers and classmates periodic information about your learning outcome. Knowledge of one's good performance as well as mistakes help learning.
- **Emotional factor:** Learning is better if the environment is informal and non-threatening. Try to develop good relationship with your teachers, classmates and others.
- **Setting:** Learning is better if it takes place in an environment similar to the one wherein you will apply your knowledge in future. Hence, you should never miss bedside teaching, clinical lectures and community health work.

We learn from several sources and by several means. The above-mentioned principles apply, in general, to all of them.

## II. How to Read

We learn from many sources, Viz: people, books, audio-visual media etc. The most important source is books/print medium. As students you are bound to spend a lot of time reading. While reading, you have probably had the experience of realizing that you have turned over the last few pages without taking anything in. You could hardly recognise anything after the first page! This doesn't mean that you can't concentrate or your memory is very bad. It happens to everybody. The mind tends to go into "neutral" as early as 30 seconds after starting to read a book.

This tendency can be countered and you can get the most out of reading a book by developing a reading habit that aims at **understanding, memorizing and recollecting** the material given in a text book. Such reading can be called "**reading actively**".

Being active when reading doesn't just happen. It has to be planned for. **SQ 4R** is a useful method of planning your reading, so that it is more active, more purposeful and more productive.

**SQ4R** stands for: **SURVEY QUESTION READ RECOLLECT REVIEW REINFORCE**

## Review

Here the purpose is to check how well you recollected. Do a quick repeat of the previous 4 steps:

- Look again at the headings and summaries.
- Remind yourself of all the questions you asked. Can you answer them all?
- Re-read the text to see that you have recollected everything of importance.

Complete your recollection by filling in points you have left out in your previous exercise and correct any faults.

## Reinforce

When you learn fresh material try to recollect and review material you have already read. This is reinforcement which ensures that you do not forget. The time you take for this exercise will become less and less as you go on with this process.

## Reading faster

By adopting the SQ 4R you can do **better** reading. But, how can you read **faster**? The answer lies in the following:-

1. Practise reading faster.
2. Increase your vocabulary.

**N.B :-** How quickly you get through the reading material is not as important as how much of the material gets through to you!

## III. How to Learn from Lectures

Lecture is a widely used method of teaching. Its greatest advantage is that it conveys to the students a well-organised body of factual information in a relatively short time. You should take maximum advantage of a lecture.

### What you should do **BEFORE** the Lecture

- Find out what the topic for the lecture is.
- Quickly peruse the concerned chapter in your textbook.
- Frame a few questions relating to the subject. You can change the section headings to questions. (The question format, either seen or heard, makes you think and creates curiosity to learn).

### What you should do **DURING** the Lecture

- Listen attentively. Try to integrate various facts that you hear from the teacher and make sense out of them. Involve by mentally posing questions to yourself.
- Observe the teacher. His/her gestures, emphasis, repetitions, writing or drawing on the black board etc. help you to understand and remember the important points being highlighted.
- Listen to the questions and answers. Try to participate in such exercises. They help to clarify difficult and confusing issues and hence facilitate understanding.
- **Note-taking** - Do it with a sense of proportion. Writing everything on your note book – like a stenographer- without looking at the teacher is a bad learning habit (i) Leave a wide margin (about 1/3rd the width of the writing page) on the left and write only on the right side of the margin. (ii) Write only key words or points. Note down ideas concisely. Copying diagrams is helpful.
- Quickly review your lecture notes whenever you get a few minutes. (e.g.: when attendance is being taken at the end)

### What you should do **AFTER** the Lecture

- Review your notes as soon as possible (definitely within 24 hours). You forget most of what you heard during this period. Hence you need to boost your memory at this time.

- Read the same material once or twice again within the next 48 hours. This method tends to slow your progress, but it helps you to remember more.
- **Note-making-** This is not recopying your original notes in good hand, but reworking on them by
  - (i) framing questions on the margin;
  - (ii) using your text book to supplement what you have in your notes.

**P.S:** If the lecture is not audible, have your hearing tested or sit where you can hear.  
If the lecture is still not audible, politely tell your teacher.

#### **IV. Group discussion**

This is commonly called TUTORIAL. The group consists of 20 to 30 students and a teacher who acts as the group leader. In a properly held group discussion, the students actively participate in the learning process. The role of the teacher is to encourage the students to speak, regulate the pace of discussion and to provide information only when required. It is a powerful method to develop understanding, problem-solving ability, critical enquiry and communication skills. These factors are of paramount importance in your professional development and future career as health care providers.

To obtain the maximum benefit from a Tutorial or Group discussion, you should follow certain rules of the game:

- The topic or problem is given beforehand. It may be the subject matter covered in the previous lectures. Come well prepared for discussion.
- The teacher's strategy is to ask questions and elicit answers to help you understand the material. You must respond and **actively participate**.
- You should ask questions when you are in doubt. Another student may provide the answer. Likewise, you should readily answer those questions posed by others if you know the answer. The exercise should proceed as an active exchange ie give and take.
- Listen to the discussion going on. When the teacher asks someone to summarise, you may seize the opportunity and speak. This is a good way to test your own ability to explain.
- You should not dominate the whole discussion, nor should you observe grand silence. Participation should be equitable.
- Check your behaviour. Contribute to the creation of a friendly and relaxed atmosphere. Personal differences should not be carried to the discussion class. "Behave unto others, as you would have others behave unto you".
- Follow the instructions of the teacher who is there to guide you in the learning process.

#### **V. Practical**

**The first and foremost purpose** of doing a practical is to **develop skills**. The expression "Skills" used here denotes neuromuscular or psychomotor abilities. They are not competencies related to cognitive functions like recall of information, comprehension, problem solving etc., nor are they related to affective functions like feelings, values, attitudes etc. To illustrate: Suppose a doctor adjusts a microscope, estimates Hb content of blood, elicits knee jerk, extracts a tooth, tests urine for albumin, does a lumbar puncture or performs similar acts, he is demonstrating his skills. Such skills are very useful to you when you practise as a doctor.

#### **How to acquire skills?**

Hearing a lecture, reading a book or participating in group discussion regarding certain skills will not help you to develop such skills. Skill learning involves the following steps:-

- Observe the act when the teacher is demonstrating.
- Do it under supervision.
- Practise it a number of times.
- Seek feedback from the teacher. He will tell you how well you are doing.

An effective way of skill learning is to develop a **checklist** for a particular skill and get evaluated by a teacher or another student using that checklist. For example, Microscopic examination of a slide involves various steps Viz: Positioning of the microscope, fixing the slide in the mechanical stage, putting the proper eye piece, adjusting the objective, choosing the mirror, adjusting the condenser etc. These various components of the total skill will go into the checklist. They are performed and evaluated.

In learning Clinical Skills, students can perform the act on one another or on models/dummies as appropriate. e.g.: Routine physical examination, recording BP and body temperature, performing Cardio-Pulmonary Resuscitation (CPR) etc. This ensures development of proficiency/ mastery in you and also avoids bodily discomfort to the patients.

**The second purpose** of doing a practical is to **help you understand and remember** what you have learned in lecture and tutorial classes. For example: When you are dissecting a certain part of the body, you can visualize the structures and their relationships. **Seeing** reinforces what you have learned by **hearing**. Furthermore, since you are doing the practical there is personal involvement. This makes the learning **active** and therefore **more durable**.

***“IF YOU HEAR, YOU FORGET  
IF YOU SEE, YOU REMEMBER  
IF YOU DO, YOU LEARN”*** (Chinese proverb)

## **VI. Clinical Work**

You acquire clinical competence by working in the hospitals and health centres. The work consists of attending out-patient clinics, ward rounds, clinical lectures, operations and other procedures. You will also be posted to in-patient cases. The professional atmosphere with patients and their relatives, doctors and other health professionals provide the real-life setting in which you are going to function as a doctor in the near future. This is bound to create interest in you to learn.

During clinical posting, you will acquire new information and ability for problem solving. You develop skills in physical examination and the performance of many procedures. But, there is one other dimension of clinical competence, Viz: **attitudes, values and communication skills** – which can be learned only in the clinical setting. A doctor who shows care, sympathy and compassion for the patient and relatives is most acceptable to the community at large. Critical thinking and readiness to admit one’s mistakes are hallmarks of a learned person.

### **How to develop such qualities?**

Reading, listening to lectures and doing laboratory work will not help. Sound professional attitudes, values and behaviour patterns develop by the following means:

1. Observe the behaviour of your clinical teacher, particularly those who show concern care, sympathy and other qualities of the heart. You will develop a strong desire to follow their footsteps. Look for **role-models**.
2. Interact with your teachers, classmates, patients, their relatives, paramedical and other staff. Such interaction helps you to develop communication skills.

## **VII. How to face examination**

Examinations are a part of student’s life and they often determine his fate. Failure in a qualifying examination diminishes his future prospects. Hence most of the students approach examinations with some fear. Here, he will consider the ways and means of how to face an examination and give your best.

These can be grouped under 2 headings, Viz: preparing before the exam and answering during the exam.

### **Before examination**

Success depends on the preparation which includes the following:-

- Knowing the assessment system followed for the Sessional and Final examination;
- Effective study techniques over a period. Follow the guidelines provided above.
- Collect the last 5 years' questions and prepare complete answers. Read through them.
- Conduct mock examinations. You may select questions and ask your friend to answer them and vice versa. Wrong answers must be corrected after discussing with friends and teachers.
- **Tackle anxiety** – Mid anxiety helps to motivate learning and gives the necessary drive to meet the stress of an examination. But too much anxiety bordering on fear is destructive.

The best way to reduce anxiety is to prepare well for the examination. Some of you will need to indulge in certain non-academic activities **for a change**. You may do breathing or other physical exercises, go out for a walk, listen to music, talk to friends, meditate for a few minutes etc.

- Keep all examination equipment ready (e.g. Pens, colour pencils, scale etc.). Don't forget your wrist watch. Preparation of a checklist is helpful.

### **During examination**

Do not start writing the answer as soon as you get the question paper. Relax.

- Read the instructions carefully.
- Read all the questions.
- Allot time for each.
- Plan your answers.
- Write legibly.
- Underline important points.
- Draw diagrams wherever appropriate.
- Utilise the last few minutes to check your answer and make necessary corrections.

The above guidelines apply to theory/written examinations with essay and short notes questions. Evaluation is somewhat subjective. Hence your method of presentation is very important.

**N.B:-** Do not take any drug. It will be more harmful than helpful.

## **PHASE I Semester I & II**

### **The Phase I has 2 Semesters.**

The Phase I subjects are Anatomy, Physiology, Biochemistry and Community Medicine. Training in Community Medicine extends from the 1st Semester to the 7th Semester. During the 1st semester, Community Medicine classes will be held on all Saturdays for 12 weeks. Therefore the teaching schedule changes from the 13th week.

The teaching programme of the basic sciences Anatomy, Physiology and Biochemistry extends over 40 weeks, excluding the last 8 weeks set apart exclusively for the final examinations. There will be 232 teaching days with 7 hours of instruction, from 8 am to 4 P.M. everyday. Approximately 1628 teaching hours will be available. In actual practice this may be less as holidays are to be excluded. The distribution of teaching hours is given below.

### **Total Hours of Lectures/Practical/Innovative Sessions:**

<b>Subject</b>	<b>Lecture Hours</b>	<b>Practical/ Innovative Sessions- Hours</b>	<b>Total</b>
<b>Anatomy</b>	258	392	<b>650</b>
<b>Physiology</b>	160	320	<b>480</b>
<b>Biochemistry</b>	80	160	<b>240</b>
<b>Community Medicine</b>		60	<b>60</b>

# **ANATOMY (1MB.AN)**

## **Goal**

The main aim of teaching Anatomy to undergraduate medical students is to provide comprehensive knowledge of gross and microscopic structures and development of the human body so as to understand the anatomical basis of various disease presentations, thus enabling them to practice medicine and communicate effectively.

## **Competencies**

The Indian Medical Graduate will acquire the knowledge and skills necessary to attain the following competencies.

1. Identify the normal disposition, gross structure and clinically relevant inter-relationships of various structures in the human body and comprehend the functional correlations, and cross sectional anatomy, so as to apply the knowledge of the same in medical and surgical scenarios.
2. Identify, assign sides, state articulations and relevant attachments of all bones.
3. Mark the topography of clinically relevant structures on the living body and understand the contextual relevance of surface anatomy.
4. Should understand the principles of imaging techniques, and should be able to identify and locate structures in a given skiagram, CT scan etc.
5. Identify the microscopic structure of various tissues and organs in the human body and correlate the structure with the functions as a prerequisite for understanding their pathology in disease.
6. Should acquire basic knowledge of operating computers and should be able to make a powerpoint presentation for symposiums, seminars or conferences.
7. Demonstrate the ability to work as a team following professional etiquette and demeanour towards self, peers and guides/ facilitators.

## **Educational Objectives**

### **A. Knowledge**

At the end of first year, a graduating student should:

1. Be able to comprehend the structure, functions, and connections of the nervous system to analyse the integrative and regulative functions of organs and organ systems and should be able to localize the site of lesions according to deficits.
2. Have knowledge of basic principles of embryology and stages involved in the development of the organs and organ systems from the time of conception till birth so as to comprehend the developmental basis of occurrence of major variations, abnormalities and congenital anomalies.
3. Recognize the critical stages of normal human development and the effects of common teratogens, genetic mutations and environmental hazards on the same.
4. Comprehend the basic principles of genetic inheritance, karyotyping genetic counselling and have basic knowledge of common genetic syndromes.
5. Have knowledge of the anatomical basis of common clinical procedures like injections, biopsies and diagnostic/interventional procedures.
6. Comprehend the sacredness of human body donation, follow bioethical principles and accord the cadaver the dignity and respect deserved.
7. Understand the principles of handling bio hazardous materials and policy of biomedical waste disposal.
8. Be aware as to how to handle a light microscope proficiently

### **B. Skills**

At the end of the course the student shall be able to:

- a) Localize pulsations of important arteries and also structures against which pressure can

- be applied in case of bleeding from a particular artery.
- b) To elicit superficial and deep reflexes, muscle power, and movements of joints.
  - c) To locate the site of lumbar puncture, sternal puncture, pericardial tapping, liver biopsy etc.
  - d) To locate veins for venipuncture.
  - e) To locate sites for emergency tracheostomy.

### **C. Integration**

Through horizontal integration with other basic sciences departments, the students should be able to comprehend the regulation and integration of functions of the organs and systems in the human body and through vertical integration with various clinical departments, interpret the anatomical basis of disease processes.

### **Course Outcomes**

CO1: Attain comprehensive knowledge of gross and microscopic structures in the human body.

CO2: Attain comprehensive understanding of development of the human body.

CO3: Have an understanding of the anatomical basis of various disease presentations.

CO4: Be able to use the anatomical knowledge in the practice of medicine.

CO5: Competency to identify the normal disposition, gross structure and clinically relevant inter-relationships of various structures in the human body and comprehend the functional correlations, and cross sectional anatomy, so as to apply the knowledge of the same in medical and surgical scenarios.

CO6: Ability to identify, assign sides, state articulations and relevant attachments of all bones.

CO7: Ability to mark the topography of clinically relevant structures on the living body and understand the contextual relevance of surface anatomy.

CO8: Knowledge of the principles of imaging techniques, and should be able to identify and locate structures in a given skiagram, CT scan etc.

CO9: Competence to identify the microscopic structure of various tissues and organs in the human body and correlate the structure with the functions as a prerequisite for understanding their pathology in disease.

CO10: Ability to work as a team following professional etiquette and demeanor towards self, peers and guides/ facilitators.



## I. Syllabus

### Details of the course

Duration	:	- 2 semesters (each of 120 working days)
	Semester I	- 24 weeks
	Semester II	- 16 weeks
Total number of hours	:	650
Lectures	:	236 hours
Integrated teaching	:	22 hours
Symposiums/group discussion	:	38 hours
Practicals (including innovative sessions)	:	328 hours
Formative assessment	:	26 hours approximately

Sl. No.	Schedule of Lectures	Hours
<b>I</b>	<b>Introduction/General Anatomy</b>	<b>14 hrs</b>
	1. Introduction to Anatomy	1
	2. Introduction to Anatomical Nomenclature	1
	3. Skin and fascia	1
	4. Cardiovascular system	1
	5. Lymphatic system	1
	6. Nervous system	2
	7. Muscular system	1
	8. Introduction to skeleton and classification of bones	1
	9. Osteology - Terminology	1
	10. Parts of a growing long bone and blood supply	1
	11. Ossification of bones	1
	12. Joints	2
<b>II</b>	<b>Embryology (General &amp; Systemic)</b>	<b>30 hrs</b>
	1. Introduction to embryology	1
	2. Spermatogenesis	1
	3. Oogenesis	1
	4. Menstrual cycle	1

	5. Fertilization	1
	6. Implantation and cleavage	1
	7. Formation of germ layers to folding of embryonic disc	3
	8. Placenta and membranes	1
	9. Twinning	1
	10. Teratology	1
	11. Development of pharyngeal arches	1
	12. Development of pharyngeal pouches	1
	13. Development of face	2
	14. Development of CNS	1
	15. Development of respiratory system	1
	16. Development of heart	3
	17. Pharyngeal arch arteries	1
	18. Development of veins	1
	19. Foetal circulation	1
	20. Development of foregut	1
	21. Development of midgut	1
	22. Development of hindgut	1
	23. Development of kidney, ureter, urinary bladder	1
	24. Development of genital system	2
	<b>Integrated Teaching</b>	<b>2 hrs</b>
	Departments - Fetal Medicine, Genetics, Neonatology, Paediatric Surgery, Paediatric Cardiology	2
<b>III</b>	<b>Upper Limb</b>	<b>21 hrs</b>
	1. Pectoral region	1
	2. Mammary gland	1
	3. Axilla	1
	4. Brachial plexus	1
	5. Scapular region	1
	6. Shoulder joint	1
	7. Front of arm	1
	8. Back of arm	1
	9. Cubital fossa	1
	10. Front of forearm	1
	11. Palm	2
	12. Palmar spaces	1
	13. Back of forearm	1
	14. Elbow joint and radio- ulnar joints	1
	15. Wrist and first carpometacarpal joint	1
	16. Median and ulnar nerves	2
	17. Radial and axillary nerves	1

	18. Venous and lymphatic drainage of upper limb	1
	19. Brachial plexus injuries	1
	20. X-Rays of upper limb	1
	<b>Integrated Teaching</b>	<b>2 hrs</b>
	Departments – Radiology & Orthopaedics	2
	<b>Symposiums/Group Discussions</b>	<b>5 hrs</b>
	Brachial plexus injuries	1
	Nerves of upper limb	1
	Mammary gland	1
	Shoulder joint	1
	Intrinsic muscles of hand	1
<b>IV</b>	<b>Lower Limb</b>	<b>17 hrs</b>
	1. Femoral triangle	1
	2. Medial compartment of thigh	1
	3. Gluteal region	2
	4. Back of thigh	1
	5. Popliteal fossa	1
	6. Hip joint	1
	7. Front of leg & dorsum of foot	1
	8. Lateral compartment of leg	1
	9. Back of leg	1
	10. Venous and lymphatic drainage of lower limb	1
	11. Knee joint	2
	12. Ankle and subtalar joints	1
	13. Sole	1
	14. Arches of foot	1
	15. X-Rays of lower limb	1
	<b>Integrated Teaching</b>	<b>2 hrs</b>
	Departments – Radiology & Orthopaedics	2
	<b>Symposiums/Group Discussions</b>	<b>5 hrs</b>
	1. Femoral hernia	1
	2. Movements of hip joint	1
	3. Movements of knee joint	1
	4. Subtalar joints	1
	5. Venous drainage of lower limb	1
<b>V</b>	<b>Abdomen</b>	<b>22 hrs</b>
	1. Anterior abdominal wall	1
	2. Rectus sheath	1
	3. Inguinal canal	1
	4. Testis and spermatic cord	1
	5. Peritoneum	2

	6. Subphrenic spaces	1
	7. Stomach - Coeliac trunk	1
	8. Small intestine and superior mesenteric artery	1
	9. Large intestine, Caecum, appendix	1
	10. Duodenum	1
	11. Portal vein and porto- caval anastomosis	1
	12. Pancreas	1
	13. Liver	1
	14. Extrahepatic biliary apparatus	1
	15. Suprarenal gland	1
	16. Kidney	1
	17. Ureter	1
	18. Diaphragm including development	1
	19. Posterior abdominal wall	2
	20. X-Rays of abdomen	1
	<b>Integrated Teaching</b>	<b>5 hrs</b>
	Departments - General Surgery, OBG, Radiology, Urology, GI Surgery & Gastroenterology Physiology and Biochemistry	5
	<b>Symposiums/Group Discussions</b>	<b>5 hrs</b>
	1. Inguinal canal	1
	2. Rectus sheath	1
	3. Diaphragm	1
	4. Subphrenic spaces	1
	5. Prostate	1
<b>VI</b>	<b>Pelvis and Perineum</b>	<b>11 hrs</b>
	1. Introduction to perineum and perineal pouches	1
	2. Ischiorectal fossa	1
	3. Ovary and uterine tube	1
	4. Uterus	1
	5 Ureter	1
	6. Urinary bladder	1
	7. Prostate	1
	8. Urethra	1
	9. Anal canal.	1
	10. Pelvic diaphragm	1
	11. Vessels and nerves of pelvic cavity	1
	<b>Integrated Teaching</b>	<b>1 hrs</b>
	Departments - OBG, General surgery, Radiology, Urology,	1
	<b>Symposiums/Group Discussions</b>	<b>2 hrs</b>
	1. Pelvic diaphragm	1
	2. Perineal pouches	1

<b>VII</b>	<b>Thorax</b>	<b>12 hrs</b>
	1. Introduction to thoracic wall & typical intercostal space	1
	2. Pleura	1
	3. Lung	1
	4. Introduction to mediastinum and superior mediastinum	1
	5. Pericardium	1
	6. Heart- surface features	1
	7. Right atrium	1
	8. Blood supply of heart	1
	9. Posterior mediastinum	2
	10. Thoracic sympathetic chain	1
	11. X-Rays of thorax	1
	<b>Integrated Teaching</b>	<b>2 hrs</b>
	Departments - C.V.T.S, Pulmonology, Cardiology & Radiology, Physiology and Biochemistry	2
	<b>Symposiums/Group Discussions</b>	<b>6 hrs</b>
	1. Typical intercostal space	1
	2. Heart-External features, blood supply, interior of chambers	1
	3. Lungs	1
	4. Oesophagus	1
	5. Azygos system of veins	1
	6. Superior mediastinum	1
<b>VIII</b>	<b>Head and Neck</b>	<b>39 hrs</b>
	1. Scalp	1
	2. Superficial dissection of face	1
	3. Deep cervical fascia	1
	4. Posterior triangle	2
	5. Suboccipital triangle	1
	6. Submental and digastric triangles	1
	7. Carotid and muscular triangles	2
	8. Hypophysis cerebri	1
	9. Dural folds	1
	10. Dural venous sinuses , cavernous sinus in detail	1
	11. Midline structures of neck, thyroid gland	1
	12. Scalenous anterior and its relations, subclavian artery	2
	13. Extraocular muscles	1
	14. Vessels and nerves of orbit	1
	15. Parotid gland	1
	16. Muscles of mastication	1
	17. Mandibular nerve	1
	18. Maxillary artery	1
	19. Temporomandibular joint	1

	20. Submandibular region	1
	21. Introduction to pharynx and nasopharynx	1
	22. Oropharynx and palatine tonsil	1
	23. Soft palate	1
	24. Nasal cavity, nasal septum	1
	25. Lateral nasal wall	1
	26. Maxillary nerve and pterygopalatine ganglion	1
	27. Paranasal air sinuses	1
	28. Larynx	1
	29. Tongue	1
	30. Middle ear	2
	31. Internal ear	1
	32. Eyeball	2
	33. Lymph nodes of head and neck	1
	34. X-Rays of head and neck	1
	<b>Integrated Teaching</b>	<b>3 hrs</b>
	Departments - Radiology, ENT, Neurosurgery, Ophthalmology, Head & Neck Surgery Physiology	<b>3</b>
	<b>Symposiums/Group Discussions</b>	<b>8 hrs</b>
	1. Cranial nerves-3,4,5,6 &7	<b>5</b>
	2. Cervical fascia	<b>1</b>
	3. Hyoglossus and its relations	<b>1</b>
	4. Nasal cavity	<b>1</b>
<b>IX</b>	<b>Brain and Spinal Cord</b>	<b>37 hrs</b>
	1. Introduction to brain	<b>1</b>
	2. Spinal cord – External features and blood supply	<b>1</b>
	3. Spinal cord – Internal features	<b>1</b>
	4. Ascending tracts of spinal cord and brain stem	<b>2</b>
	5. Descending tracts of spinal cord and brain stem	<b>2</b>
	6. Meninges of brain and cisterns	<b>1</b>
	7. Medulla	<b>2</b>
	8. Pons	<b>1</b>
	9. Midbrain	<b>1</b>
	10. Cerebellum	<b>1</b>
	11. 4 <sup>th</sup> ventricle	<b>1</b>
	12. Cerebrum – Sulci, gyri	<b>2</b>
	13. Cerebrum - Functional areas	<b>2</b>
	14. White matter of cerebrum	<b>1</b>
	15. Internal capsule	<b>1</b>
	16. 3 <sup>rd</sup> ventricle & Interpeduncular fossa	<b>1</b>

	17. Lateral ventricle	1
	18. Thalamus	1
	19. Metathalamus, epithalamus	1
	20. Basal ganglia	1
	21. Arterial supply of cerebrum	1
	22. Venous drainage of brain	1
	23. Oculomotor Nerve	1
	24. 4 <sup>th</sup> and 6 <sup>th</sup> cranial nerves	1
	25. 9 <sup>th</sup> cranial nerve	1
	26. 7 <sup>th</sup> cranial nerve	2
	27. 11 <sup>th</sup> and 12 <sup>th</sup> cranial nerve	1
	<b>Integrated Teaching</b>	<b>3 hrs</b>
	Departments –Medicine, Neurology, Neurosurgery, Radiology & Surgery Physiology	<b>3</b>
	<b>Symposiums/Group Discussions</b>	<b>7 hrs</b>
	1. Spinal Cord—Cross section – Cervical, Thoracic, Lumbar & Sacral levels	1
	2. Brain (i) Mid sagittal section, (ii) Horizontal at I.V. foramen	1
	3. Cross section of brain (iii) At anterior commissure, (iv) At mammillary body	1
	4. Medulla levels (i) Pyramidal decussation, (ii) Sensory decussation & (iii) Inferior olivary nucleus	2
	5. Pons levels (i) Upper part, (ii) Lower part	1
	6. Midbrain levels (i) Superior colliculus, (ii) Inferior colliculus	1
<b>X</b>	<b>Histology (General &amp; Systemic)</b>	<b>30 hrs</b>
	1. Simple epithelium	1
	2. Stratified epithelium	1
	3. Connective tissue	1
	4. Cartilage	1
	5. Bone	1
	6. Muscle tissue	1
	7. Nervous tissue	2
	8. Blood vessels	1
	9. Lymph node and thymus	1
	10. Spleen and tonsil	1
	11. Skin	1
	12. Salivary glands	1
	13. General plan of GIT, Oesophagus	1
	14. Tongue	1
	15. Stomach - Fundus, pylorus	1
	16. Duodenum, Jejunum, Ileum	1
	17. Large intestine, Appendix	1

	18. Liver, gall bladder	1
	19. Pituitary and thyroid gland	1
	20. Suprarenal gland and Pancreas	1
	21. Trachea and lung	1
	22. Kidney, ureter, urinary bladder	1
	23. Testis, epididymis	1
	24. Prostate, Vas deference	1
	25. Uterus, uterine tube	1
	26. Ovary, Mammary gland	1
	27. Placenta, umbilical cord	1
	28. Retina, Cornea	1
	29. Cerebrum, Cerebellum	1
	<b>Horizontal Integration</b> Physiology	<b>2 hrs</b>
<b>XI</b>	<b>Genetics</b>	<b>3 hrs</b>
	1. Genetics	3

Sl. No	Schedule of Practical/Demonstrations	Hours
<b>I</b>	<b>Upper Limb</b>	<b>37 hr</b>
	1. Introduction to skeleton and classification of bones	2
	2. Osteology - Clavicle, Sternum	2
	3. Osteology - Scapula, Humerus	2
	4. Pectoral region	2
	5. Axilla	2
	6. Brachial plexus	2
	7. Scapular region	2
	8. Front of arm, cubital fossa	4
	9. Osteology – radius, ulna	2
	10. Front of forearm	2
	11. Palm	4
	12. Osteology – Skeleton of hand	1
	13. Back of arm	2
	14. Back of forearm	2
	15. Joints of upper limb	4
	16. X- rays & Surface markings	2
<b>II</b>	<b>Lower Limb</b>	<b>34 hrs</b>
	1. Introduction to bones of lower limb, hip bone	3
	2. Femur	2
	3. Front of thigh, Femoral triangle	4
	4. Medial compartment of thigh	2



	5. Gluteal region	4
	6. Back of thigh	2
	7. Osteology –Tibia, patella	2
	8. Osteology – Fibula	1
	9. Popliteal fossa	2
	10. Back of leg	2
	11. Front of leg & Dorsum of foot	4
	12. Lateral compartment of leg	2
	13. Osteology -Skeleton of foot	2
	14. X-rays & Surface markings	2
<b>III</b>	<b>Abdomen</b>	<b>45 hrs</b>
	1. Introduction to pelvis, sacrum, lumbar vertebrae - osteology	4
	2. Anterior abdominal wall	2
	3. Rectus sheath	2
	4. Inguinal canal	3
	5. Testis and spermatic cord	2
	6. Peritoneal folds	2
	7. Subphrenic spaces	2
	8. Stomach and coeliac trunk	2
	9. Small intestine and superior mesenteric artery	2
	10. Caceum and appendix	2
	11. Large intestine and inferior mesenteric artery	2
	12. Duodenum	2
	13. Pancreas	2
	14. Liver	2
	15. Extrahepatic biliary system	2
	16. Suprarenal gland	2
	17. Kidney	2
	18. Ureter	2
	19. Diaphragm	2
	20. Posterior abdominal wall	2
	21. X-rays & Surface markings	2
<b>IV</b>	<b>Pelvis, Perineum</b>	<b>18 hrs</b>
	1. Osteology of sacrum, bony pelvis	2
	2. Ischiorectal fossa	2
	3. Uterine tube and ovary	2
	4. Uterus	2
	5. Urinary bladder	2
	6. Prostate	2
	7. Pelvic diaphragm	2

	8. Vessels and nerves of pelvis	2
	9. Superficial and deep perineal pouches	2
<b>V</b>	<b>Thorax</b>	<b>21 hrs</b>
	1. Osteology of thorax	2
	2. Thoracic wall including osteology in detail	4
	3. Lungs & pleura	2
	4. Pericardium	2
	5. Heart including surfaces, chambers & blood supply	4
	6. Mediastinum	2
	7. Posterior mediastinum	3
	8. X-rays & Surface markings	2
<b>VI</b>	<b>Head and Neck</b>	<b>85 hrs</b>
	1. Introduction to skull	1
	2. Norma verticalis, norma occipitalis	2
	3. Scalp	2
	4. Norma frontalis	2
	5. Superficial dissection of face	2
	6. Posterior triangle	4
	7. Osteology – mandible	2
	8. Osteology – cervical vertebrae, hyoid bone	2
	9. Suboccipital triangle	2
	10. Submental triangle	2
	11. Digastric triangle	2
	12. Carotid and muscular triangle	4
	13. Cranial fossa	6
	14. Dural folds	2
	15. Dural venous sinuses	2
	16. Midline structures of neck	2
	17. Thyroid gland	2
	18. Scalenous anterior and its relations , subclavian artery	2
	19. Extraocular muscles	2
	20. Orbit-vessels and nerves	2
	21. Parotid gland	2
	22. Norma Lateralis	2
	23. Muscles of mastication	2
	24. Infratemporal fossa	3
	25. Submandibular region	2
	26. Pharynx	2
	27. Norma basalis	4
	28. Nasal septum	2

	1. Lateral nasal wall	2
	2. Larynx	2
	3. Tongue	2
	4. Middle ear	2
	5. Eyeball	2
	6. Parietal and occipital bone	2
	7. Frontal, Maxilla	2
	8. Sphenoid & Temporal bone	2
	9. Foetal skull	1
	10. X-Rays & Surface markings of head and neck	2
<b>VII</b>	<b>Brain</b>	<b>26 hrs</b>
	1. Spinal cord	2
	2. Medulla	1
	3. Pons	1
	4. Midbrain	1
	5. Cerebellum	1
	6. 4 <sup>th</sup> ventricle	2
	7. Cerebrum – sulci ,gyri and functional areas	4
	8. White matter of cerebrum	2
	9. Lateral ventricle	2
	10. Third ventricle	2
	11. Interpeduncular fossa & circle of willis	2
	12. Thalamus, metathalamus	2
	13. Arterial supply of cerebrum	2
	14. Brain sections	2
<b>VIII</b>	<b>Histology (General &amp; Systemic)</b>	<b>60 hrs</b>
	1. Simple epithelium	2
	2. Stratified epithelium	2
	3. Connective tissue	2
	4. Cartilage	2
	5. Bone	2
	6. Muscle tissue	2
	7. Nervous tissue	4
	8. Blood vessels	2
	9. Lymph node and thymus	2
	10. Spleen and tonsil	2
	11. Skin	2
	12. Salivary glands	2
	13. General plan of GIT, Oesophagus	2
	14. Tongue	2

	15. Stomach - Fundus, pylorus	2
	16. Duodenum, Jejunum, Ileum	2
	17. Large intestine, Appendix	2
	18. Liver, gall bladder	2
	19. Pituitary and thyroid gland	2
	20. Suprarenal gland and Pancreas	2
	21. Trachea and lung	2
	22. Kidney, ureter, urinary bladder	2
	23. Testis, epididymis	2
	24. Prostate, Vas deference	2
	25. Uterus, uterine tube	2
	26. Ovary, Mammary gland	2
	27. Placenta, Umbilical cord	2
	28. Retina, Cornea	2
	29. Cerebrum, Cerebellum	2
<b>IX</b>	<b>Genetics Chart Discussion</b>	<b>2 hrs</b>

### Assessment

**Formative:** Regular periodic region wise assessments both theory and practical are conducted in addition to three sessional examinations.

**Summative :** University examination, both theory and practical

The **tentative dates** for internal assessment, university examinations and study holidays are mentioned below.

#### Schedule of Internal Assessment and University Examinations:

1 <sup>st</sup> Internal Assessment (Theory and Practical)	2 <sup>nd</sup> Internal Assessment (Theory and Practical)	Final Internal Examination (Theory and Practical)	University Examination (Theory)	University Examination (Practical)
1 <sup>st</sup> /2 <sup>nd</sup> week of November 2018	Last week of February/1 <sup>st</sup> week of March 2019	2/3 <sup>rd</sup> week of June 2019	3 <sup>rd</sup> week of July 2019	Last week of July 2019

1. Study leave for final sessional examination – 1st June onwards
2. Study leave for University examination- 4th July onwards.

#### Distribution of Marks for Internal Assessment and University Examinations.

University Examination					Internal Assessment		
Theory-I	Theory-II	Viva	Practical	Total	Theory	Practical	Total
50	50	20	40	160	20	20	40

**Total final marks = University examination marks + internal assessment marks = 160 + 40 = 200 marks**

**Ist MBBS Degree Examination in Anatomy (1st Professional Examination in Anatomy).**

**Theory – Division of Topics**

<b>Paper I (50 Marks)</b>	<b>Paper II (50 Marks)</b>
<p><b>Section -A</b> Abdomen, pelvis &amp; perineum -25 marks (Including relevant embryology and histology)</p> <p><b>Section -B</b> Lower limb - 12 marks General embryology } General anatomy } 13 marks General histology }</p>	<p><b>Section -A</b> Head &amp; Neck, Brain &amp; Spinal cord - 28 marks * Including relevant embryology &amp; histology</p> <p><b>Section -B</b> Upper limb &amp; Thorax - 20- marks Genetics - 3 marks * Including relevant embryology &amp; histology from the above topics.</p>

**Distribution of Practical Topics and Marks**

<b>Practical No.</b>	<b>Name of the practical</b>	<b>Marks</b>	
<b>Practical - I</b>	<b>Gross Anatomy/Dissection</b>		
	a) Spotting – 10 numbers		<b>10</b>
	b) Discussion – 2 prosected specimens		<b>10</b>
	1) Above diaphragm	<b>5</b>	
	2) Below diaphragm	<b>5</b>	
<b>Practical - II</b>	<b>Histology</b>		
	a) Spotting – 09 numbers + 1 genetics card		<b>10</b>
	b) Discussion – 2 slides		<b>10</b>
	1) General histology	<b>5</b>	
	2) Systemic histology	<b>5</b>	
	<b>Grand Total</b>		<b>40</b>

**Viva Voce :** Total 20 marks added to theory score .

Four stations - 5 marks each.

1. Osteology
2. Embryology
3. Radiology
4. Surface Anatomy

**Items for Histology Practicals:**

1. Heamtoxylin and Eosin pencils
2. Histology Record

**Instruments for Dissection:**

1. **Surgical scalpel** with removable blades/ knife Handle No: 4/ No: 3 (Knife should be suitable to the handle fitting correctly)
2. **Forceps** – Small with pointed tip - 11 cm length-1 No.  
Medium Sized with single tooth-14 cm length- No.  
Medium sized non-toothed-14 cm length-1 No.
3. **Scissors** – Straight - 14 cm length-1 No. Small with curved tip- 11 cm length-1
4. **Gloves**

<b>Recommended Books</b>				
<b>Name of the Books</b>		<b>Author</b>	<b>Edn</b>	<b>Publishers</b>
<b>Gross Anatomy</b>				
<b>Textbooks:</b>				
*	Cunningham's Manual of Practical Human Anatomy Regional & Applied - Vol: I, II & III*	G.J. Romanes	Latest	Oxford Medical Publications
*	Clinical Anatomy for Medical Students*	B.D. Chaurasia	Latest	CBS Publishers & Distributors
<b>Reference Books:</b>				
	Clinical Anatomy for Medical Students	Richard Snell A. Halim	Latest	Lippincott Williams & Wilkins
	Clinically Oriented Anatomy	Keith L. Moore	Latest	Modern Publishers, New Delhi
	Clinical Anatomy (A problem solving approach) -Volume- I & II	Neeta V.Kulkarni	Latest	Jaypee publishers
	Essentials of Human Anatomy - 3 Volumes	A.K.Dutta	Latest	Lippincott Williams & Wilkins
	Human Anatomy- Volume I,II & III.	Inderbir singh	Latest	Current Book International
	Textbook of Anatomy-3 volumes	Peter L. Williams	Latest	Jaypee
	Gray's Anatomy	Anne M. R. Agur	Latest	Churchill Livingstone
	Atlas of Human Anatomy	Frank H.Netter	Latest	Elsevier
	Gray's Anatomy for Students	Richard L. Drake, A. Wayne Vogt, Adam W.M. Mitchell	Latest	Elsevier
<b>Embryology</b>				
<b>Textbook:</b>				
*	Human Embryology*	Inderbir singh	Latest	Macmillan
<b>Reference Books:</b>				
	Langman's Medical Embryology	T.W.Sadler	Latest	Lippincott Williams & Wilkins
	The Developing human clinically oriented embryology	Keith L. Moore K. V. N. Persaud	Latest	Elsevier
<b>Neuro Anatomy</b>				
<b>Textbook:</b>				
*	Text book of Human Neuro Anatomy*	I.B. Singh	Latest	Jaypee
<b>Reference Books:</b>				
	Clinical Neuroanatomy for Medical Students	Richard Snell	Latest	Lippincott Williams & Wilkins
	Neuro Anatomy Textbook	Vishram Singh	Latest	Elsevier
<b>Histology</b>				
<b>Textbook:</b>				
*	Histology*	I.B. Singh	Latest	Jaypee
<b>Reference Books:</b>				
	Atlas of Histology with Functional Correlations	De Fiore	Latest	Lippincott Williams & Wilkins
	Histology a Text and Atlas	Michael H.Ross Edward J Reith	Latest	Lippincott Williams & Wilkins

**\*The students need to buy ONLY the books marked**

# HUMAN PHYSIOLOGY (1MB.PY)

## GOAL

The broad goal of teaching Physiology for undergraduate students aims at providing the student

1. Comprehensive knowledge of the normal functions of all organ systems of the body.
2. Facilitate an understanding of the physiological basis of health and disease.
3. Understand basic biophysical principles involved in functioning of body organs in normal and diseased conditions

## COMPETENCIES

The Indian Medical Graduate will acquire the knowledge and skills necessary to attain the following competencies.

### Core competencies

- Ability to explain the normal functioning of all organs and organ systems in human body and its alterations in diseased state, co relating the same with classical clinical features and outline the basic principles of management.
- Ability to perform detailed clinical examination of each system in a systematic manner and interpret the findings.
- Ability to accurately measure blood pressure in humans.
- Ability to perform all basic haematology laboratory tests and interpret the results and outline the possible causes for the abnormal results.
- Ability to draw and explain normal recordings of ECG, Spirogram, Audiogram, Stethography, Perimetry, Physiograph and interpret basic abnormalities.
- Draw and explain normal skeletal muscle and cardiac muscle graphs and variations in different physiological states.

### Non core competencies

- Ability to explain the technical aspects of all lab tests in haematology and principles underlying the test.
- Ability to explain how to perform human physiology experiments like ECG, Spirogram, Audiogram, Stethography, Perimetry, Physiograph.
- Ability to explain method of recording of amphibian skeletal and cardiac muscle graph.

## OBJECTIVES

### Knowledge

- Outline the structure and function of cell membrane (briefly) and the physiological role of different organelles.
- To explain functional anatomy of all organs and organ systems, specific functions of each and the role in homeostasis.
- Interactions of different organ system for well co-ordinated total body functions (maintenance of milieu interior)
- Outline the basic physiological responses and adaptations to exercise, altitude and gravitational forces.
- 

### Skills

At the end of the course the student shall be able to:

- Conduct experiments designed for study of physiological phenomena.
- Interpret experimental / investigative data.

Distinguish between normal and abnormal data derived as a result of tests which he/she has performed and observed in the laboratory.

### **Integration**

Minimum of 6 vertical integration sessions per year and horizontal integration as and when feasible.

### **Course Outcomes**

CO1: Ability to describe the structure of cell membrane with reference to ion channels. Homeostasis, Transport across cell membrane and Bioelectric potentials

CO2: Ability to discuss the classification of muscles-Morphology of skeletal muscle, Mechanisms of muscle contraction

CO3: Ability to explain the Morphology and properties of a neuron. Neuroglia, Action potential, Nerve injuries.

CO4: Ability to discuss the Body fluid compartments, Homeostasis, Plasma proteins, RBC, WBC, Platelets, Coagulation of Blood, Blood Group, Lymph and Tissue fluid.

CO5: Ability to explain Mechanism of Breathing, surfactant. Ventilation, Pulmonary Circulation, Transport of gases, Regulation of respiration, Hypoxia, exercise, artificial respiration

CO6: Ability to describe Functional anatomy of heart and blood vessels, Properties of Cardiac muscle, Cardiac cycle, Normal ECG, Cardiac output, Haemodynamics. Blood pressure, Regional circulation,. Shock.

CO7: Ability to discuss organisation of nervous system and functions. Synapse, Reflex action. Sensory system, Motor System, and higher functions of brain.

CO8: Ability to describe the physiology of vision, audition, smell and taste

CO9: Ability to discuss the secretory and motor functions of gastrointestinal tract

CO10: Ability to explain the role of kidney in formation of urine, regulation of pH and body fluid volume and also clinical implications

CO11: Ability to describe the mechanism of action, functions and abnormalities in secretion of endocrine glands.

CO12: Ability to describe the development of male and female characteristics, hormonal changes, menstrual cycle, fertilization, pregnancy and contraceptive methods.

CO13: Ability to perform common hematological tests and interpret the results.

CO14: Ability to perform common human physiology experiments and interpret the results

CO15: Ability to draw amphibian skeletal and cardiac muscle graphs and discuss the physiological basis.



## **Teaching Schedule**

**Duration of the Course: 2 Semesters**

### **Teaching Hours**

Total teaching hours	: 480	
Lectures	: 160 Hrs.	Practicals : 320
Innovative sessions*	: Part of practicals	

(\*Tutorials, seminars, structured discussion, integrated teaching, formative evaluation and revision)

### **Schedule of Lectures**

#### **Topic**

#### **1. General and Nerve-Muscle Physiology 12 Hrs**

Structure of cell membrane with reference to ion channels. Transport across cell membrane, simple diffusion, facilitated diffusion, uniport, antiport, primary active transport, secondary active transport, endocytosis, exocytosis. Bioelectric potentials-RMP, Action potential- definition, ionic basis, measurement.

##### **Nerve Physiology**

Morphology and properties of a neuron. Stimulus-definition & types, Neuroglia- classification and functions – Action potential, Ionic basis, measurement and properties ( monophasic and bi - phasic APs). Propagation of action potential. Conduction of impulses in Myelinated and unmyelinated nerve fibres. Velocity of conduction of nerve impulses. Classification of nerve fibres. The peripheral nerve. Compound action potential. Nerve injuries. Degeneration and regeneration of nerve fibres.

##### **Muscle Physiology**

Classification of muscles-Morphology of skeletal muscle, Mechanisms of muscle contraction- Excitation, Contraction coupling, Sliding filament mechanism, Changes during muscle contraction- Chemical , Thermal, Mechanical.

Types of contraction: Relationship between length and tension during contraction, Effect of load etc., Properties of skeletal muscle. [(simple muscle twitch, effect of two successive stimuli, beneficial effect, tetanus, fatigue, fasciculation and fibrillation–( to be studied in practical)], Neuro muscular junction -in detail including drugs affecting it and diseases. Cardiac muscle - basic structure & comparison with skeletal muscles. (Details to be taken along with CVS). Smooth muscles structure, innervation, properties neuro-muscular transmission, mechanism of contraction, plasticity, tonus.

#### **2. Haematology 18 Hr**

**Homeostasis :** Body fluid compartments. Blood– normal volume, composition and functions

**Plasma proteins:** Types, quantity, functions, applied aspects.

**Red blood cells :** Morphology, Count & its variations, functions, ESR and PCV Definition normal values, factors affecting, variations. Fragility of RBC. Haemoglobin – outline of normal basic structure, derivatives, functions, Haematological indices. Erythropoiesis - stages, factors regulating, life span of RBC and its destruction - Reticulo-endothelial system (mention only) Anaemias - Definition, Classification. Physiological basis of anaemias (very briefly) Iron deficiency anaemia, Pernicious anaemia, Aplastic anaemia, Haemolytic anaemia, polycythaemia, Jaundice (briefly).

**White blood corpuscles:** Morphology, life span, classification and functions of different WBC's, normal count and variations of WBC's, Agranulocytosis, leukemias (mention only) Leucopoiesis. Tissue macrophage system .

**Immunity :** Types and mechanism of immunity, role of different WBCs in immune mechanism, mention important abnormalities, e.g.: AIDS.

**Platelets :** Structure, normal count, properties and functions, Abnormalities, Thrombopoiesis. Haemostasis mechanisms.

**Coagulation of Blood** : clotting factors, intrinsic and extrinsic system of clotting, Tests for clotting, Anti-coagulants. Factors preventing intravascular clotting. Basis of Haemorrhagic disorders.

**Blood Group** : ABO system. Landsteiner's laws, method of determination. Importance, Rh blood group, Rh incompatibility, Erythroblastosis foetalis. Other blood group systems. Inheritance of blood group. Blood transfusion, indications, precautions, Complications of incompatible blood transfusion. Blood banking, preservation injuries

**Lymph and Tissue fluid** formation, Starling hypothesis, Circulation and functions, oedema.

### 3. Respiratory System

16 Hrs

**General Organisation**

**Structure and Functions of Respiratory tract.** Mechanics of respiration.

**Mechanism of Breathing** : Pressure changes in the pleural cavity and lungs. Spirometry. Lung volumes and capacities, Pressure volume relationship, compliance, work of breathing, Airway resistance, Bronchial tone (role) Surface tension of the lung and surfactant. Application of Law of Laplace in alveolar stability.

**Pulmonary Ventilation & Alveolar Ventilation:** Dead space volume and measurement. Pulmonary Circulation: Special features, Ventilation – perfusion ratio. Respiratory membrane – Diffusion of gases and factors affecting it. Transport of O<sub>2</sub> & CO<sub>2</sub>. Factors affecting the transport of O<sub>2</sub> & Control of respiration – Neural and chemical.

**Hypoxia:** Definition, classification. Effects of hypoxia. Mountain sickness. Acclimatization at high altitude, Therapeutic uses of O<sub>2</sub>.

**Disturbance in Respiratory Functions:** Periodic breathing, Apnoea and breath holding, Dyspnoea, Orthopnoea, hyperpnoea, Decompression sickness, cyanosis, asphyxia. Respiratory changes during exercise, artificial respiration (mouth-to-mouth breathing, Mechanical methods ventilators briefly.)

**Non Respiratory Functions of Lung:**

### 4. Cardiovascular System

20 Hrs

**Functional anatomy of heart and blood vessels.** Properties of cardiac muscles, conducting system of heart, original spread of cardiac impulse.

**Cardiac cycle** - Events of cardiac cycle, pressure changes in ventricle, atria, jugular vein, aorta and pulmonary artery, volume changes in ventricle, heart sounds, murmurs, cardiac catheterization (principle only), arterial pulse, Echocardiography (principle only).

**Normal ECG** - waves, segments, leads, classical changes in myocardial infarction, arrhythmias, heart block (mention only).

Cardiac output - Normal values and regulation through stroke volume and heart rate.

**Blood pressure** - systolic pressure, diastolic pressure, pulse pressure, mean arterial pressure, measurement (details in practical class), determinants, regulation of blood pressure (short term, long term), hypertension.

**Regional circulation** - coronary, cerebral, cutaneous, splanchnic.

**Shock** - definition, classification, pathophysiology, treatment (principles only).

Effect of exercise and g<sup>o</sup> forces on CVS.

**Haemodynamics:** physical principles governing blood flow in heart and blood vessels.

**Foetal Circulation** - Brief outline only.

### 5. Renal System

10 Hrs

Role in homeostasis, role as an endocrine organ. Functional anatomy, Renal circulation, special features, Renal blood flow, regulation, measurement. Glomerular filtration: Definition, measurement, calculation, normal value, Factors governing GFR, Filtration fraction. Tubular reabsorption – general mechanisms, reabsorption of sodium & glomerulotubular balance, glucose reabsorption, Tubular maximum, renal threshold & splay in glucose titration curve, water reabsorption and concentration mechanism in urine formation, Tubular secretion of K<sup>+</sup> & H<sup>+</sup> ions, Acidification of urine and its significance, buffers in urine. Urinary bladder : Innervation Cystometrogram (mention), micturition

reflex and its higher control, abnormal bladder function. Disorders of renal function. Mention normal and abnormal constituents of urine & basis of albuminuria, Diuretics, Artificial Kidney & Dialysis (Mention principle only)

#### 6. Skin and Temperature Regulation

1 Hr

**Biophysics** (to be taken along with the relevant systems): Physical principles of transport across cell membranes and across capillary wall. Bio potentials. Physical principles governing flow of blood in heart and blood vessel; Also physical principles governing flow of air in air passages.

#### 7. Gastrointestinal System:

11 Hrs

Functional Anatomy, Enteric nervous system, General principles of exocrine secretions. Composition, functions and regulation of Salivary secretion, Gastric secretion, Pancreatic secretion, Intestinal secretion, Biliary secretion. Functions of gall bladder. Gastric acid secretion and its regulation in detail, Gastric mucosal barrier, peptic ulcer- Physiological basis of genesis & management.

**Endocrine functions** of G. I. tract.

**Motor Functions** of G. I. Tract. Mastication, Deglutition, Movements of stomach, Small intestinal movements, Large intestinal movements, Defaecation reflex. Gall bladder filling and emptying, gall stones. Vomiting, Dumping syndrome, paralytic ileus.

**Absorptive Functions** of G. I. Tract. Absorption of Carbohydrates, protein, fat.

#### 8. Nervous System

34 Hrs

**Introduction. Organisation** of nervous system and functions. General morphology of Brain, Spinal cord including Lamination. Cranial nerves (practicals) and spinal nerves - origin from spinal cord.

**Synapse** Definition, classification, functional anatomy. Mechanism of Synaptic transmission, EPSP, IPSP and Ionic basis and properties of synapse.

**Reflex action.** Definition, Reflex arc and its components, Bell- Magendie Law, Properties of reflex action. Mono and Polysynaptic reflexes.

**Sensory system :** Classification of senses – conscious and unconscious sensations. Physiology of receptor –Types ,classification and properties – Two important sensory pathways. Sensory pathways for different sensations from body and face. Pain – Types, Receptor, different pathways, visceral pain in detail –Referred pain and its basis. Pain modulation in the body and abnormalities of pain sensation. Synthetic senses. Sensory cortex, thalamus.

**Motor System:** 3 levels of integration, spinal integration – spinal reflexes, Muscle spindle - Stretch Reflex and inverse stretch reflex, its higher control and role in muscle tone. Cortical integration – voluntary activity. Motor cortex. Pyramidal and extrapyramidal tracts. Effect of lesions of motor pathways and effect of lesions of spinal cord. Basal ganglia, Reticular formation, Cerebellum. Vestibular apparatus – Posture regulation. Cerebral cortex and Prefrontal lobe. Higher function- speech, learning, memory, sleep. Autonomic nervous system and its higher control. Hypothalamus, limbic system. Cerebrospinal fluid.

EEG- standard waves, pattern in sleep, clinical uses.

#### 9. Special Senses

10 Hrs

**Vision:** Functional anatomy of the human eye, intraocular tension and variations (mention). Refractory media of the eye, extra ocular muscles Visual pathway, Visual cortex, Accommodation of the eye, Refractory errors of eye and its correction. Far and near points, Retina and image formation, visual acuity, Photochemistry of vision, adaptation of receptors, Colour vision and colour blindness. Field of vision, electro-retinogram. Pupillary reflex.

**Audition: External** ear, Middle ear–Structure and functions, Inner ear-structure and function of Organ of Corti, auditory pathway, mechanism of hearing. Tests for hearing. Audiometry (briefly).

**Smell and taste :** Receptor organs and pathways. Primary taste sensations, after taste-

ionic basis.

## 10. Endocrinology

18 Hrs

**Introduction-** Endocrine glands in the body. Hormones – definition, Chemical nature of hormones – mechanisms of action, actions of hormones in general, Regulation of glands in general, Radio immuno assay, para crine secretions.

**Pituitary gland:** Functional anatomy, Anterior lobe, Cell types, hormones secreted by anterior lobe. Growth hormone -physiological actions, Regulation of secretion. Physiology of growth – growth curves, factors influencing growth and development, dwarfism. (other pituitary hormones to be dealt along with target glands.) Beta Lipotropin, Intermediate lobe hormones. Effects of hypophysectomy. Clinical disorders – gigantism, acromegaly. Neurohypophysis – hormones – physiological actions – regulation of secretions- disorders.

**Thyroid:** (Anatomy and histology) Hormones, synthesis, transport, metabolism, Actions in detail, Regulation of secretions, thyroid function tests, abnormalities of thyroid function

**Adrenal cortex:** Histology ( to be mentioned) Adrenal cortical hormones, classification, biosynthesis ( to be mentioned), Glucocorticoids - Actions, regulation of secretion, Excess secretion, Cushing syndrome. Mineralocorticoids – Actions, regulation of secretion, effects of hypersecretion (primary and secondary). Adrenal androgens– Physiological significance, abnormalities of secretions, enzyme deficiency, effects of adrenalectomy, adrenal cortical insufficiency.

**Adrenal Medulla :** Hormones, Biosynthesis, metabolism, Physiological actions, Epinephrine, Norepinephrine, dopamine, uses, regulation of secretion. Abnormal rate of secretion, Pheochromocytoma.. Role of adrenal medulla and adrenal cortex in counter-acting stress.

**Pancreas-** Cell types, Hormones, Physiological actions, Regulation of secretion, hormonal control of blood glucose level. Insulin deficiency. Pathophysiology of Diabetes mellitus, oral hypoglycemic agents, Insulin excess – symptoms.

**Local Hormones:** Ectopic hormones, thymus, pineal (very briefly).

## 11. Reproductive System

10 Hrs

Introduction, development and differentiation of male and female characteristics. Role of genetic and hormonal factors. Sex chromatin. Male reproductive system - functional anatomy, spermatogenesis and regulating factors. Semen – composition and function of constituents - Hormonal functions of testes, testicular abnormalities. Female reproductive system - functional anatomy, onset of puberty, menstrual cycle-ovarian and uterine cycle and their hormonal basis. Fertilisation, implantation, foeto placental unit; Physiology of pregnancy - placenta and its functions, Tests of pregnancy (Immunological tests). Parturition and its regulation, Lactation and its regulation. Contraception - basic principles.

## Schedule of Practicals

### Haematology

110 Hrs

1. Use and care of compound microscope and microscopic examination of blood.
2. PCV, ESR
3. Haemoglobin estimation and blood indices.
4. RBC count.
5. WBC count.
6. Examination of peripheral blood smear.
7. Differential WBC count.
8. Bleeding time, clotting time, blood grouping and Rh typing.

### System Examination

1. General examination.

2. Examination of respiratory system.
3. Examination of CVS.
4. Examination of higher functions and sensory system.
5. Examination of motor system.
6. Examinations of reflexes.
7. Examination of cranial nerves 1-6 & 7-12

**Experimental Physiology – only Photo/Video Graph Discussions 30 hrs**

1. Appliances in experimental physiology laboratory including Physiograph, student's stimulator and Kymograph.
2. Pithing, nerve muscle preparation, mounting, effects of different types of stimuli.
3. Simple muscle twitch.
4. Two successive stimuli.
5. Fatigue and recovery.
6. Genesis of tetanus and starling's law of muscle.
7. Effects of variations of temperature on muscle contraction.
8. Velocity of nerve impulse.
9. Normal cardiogram of frog's heart.
10. Effects of heat and cold.
11. Stannius ligatures.
12. Demonstration of extra systole, compensatory pause.
13. Effects of vagal stimulation on heart.

**Human Physiology Practical 10 hrs**

1. Record of Blood Pressure and its variations with posture and exercise.
2. Demonstration of a) ECG b) Perimetry (optional to have demonstration of EEG, EMG, Ophthalmoscopic examination.) c) Physiograph d) Spirometry e) Stethography.

**Innovative Teaching: Seminars/Group Discussions etc.**

**List of seminars 30 hrs**

**Blood**

1. Haemostasis
2. Blood groups

**Muscle and Nerve**

3. Mechanism of muscle contraction.
4. Neuromuscular junction.

**Endocrinology**

5. Calcium homeostasis
6. Hormonal control of blood glucose

**Reproductive System**

7. Physiology of lactation, menstrual cycle, ovulation.

**Renal System**

8. Renal concentration mechanism of urine

**Central Nervous System**

9. Hypothalamus – connection, nuclei and functions
10. Skin and temperature regulation.

**Cardio Vascular System**

11. Cardio respiratory changes during exercise

**Respiratory System**

12. High altitude physiology and acclimatization
13. Pulmonary function tests

**Special senses**

14. Colour vision
15. Tests for hearing

**Topics for Tutorials/ Group Discussions****100 hrs**

1. Cell structure, transport across cell membrane
2. Action Potential
3. Erythropoiesis.
4. Immunity.
5. Body fluids – Composition and regulations of volume.
6. Cardiac cycle – phases and pressure changes.
7. Blood pressure.
8. Shock and compensatory mechanism.
9. Pressure changes and volume changes.
10. Gas exchange, Oxygen transport and CO transport.
11. Renal blood flow and autoregulation.
12. Reabsorption of glucose.
13. Movements of GIT.
14. GIT Hormones.
15. Endocrine pancreas.
16. Actions of Thyroid Hormone.
17. Properties of synapse and reflexes.
18. Pain pathway.
19. Functions of thalamus.
20. Cortico spinal tract.
21. Basal ganglia.
22. Hypothalamus.
23. Neuromuscular junction.
24. Visual pathways.
25. Errors of refraction.
26. Functions of Middle ear.
27. Tests for hearing.
28. Mechanism of hearing.

**Clinical Orientation/Vertical Integration – Videos of Cases/Procedures to be Shown to Students.**

Vertical integration for Haematology, CVS, Respiration, GIT, Nervous System, Endocrinology and Special Senses (at least 6 sessions).

**Horizontal Integration**

Related topics in Physiology, Anatomy and Biochemistry to be taken simultaneously (preferably).

**Assessment****Schedule of Internal Assessment and University Examination**

<b>1<sup>st</sup> Internal Assessment (Theory)</b>	<b>2<sup>nd</sup> Internal Assessment (Theory)</b>	<b>1<sup>st</sup> Practical Examination</b>	<b>Final Internal Examination (Theory)</b>	<b>2<sup>nd</sup> Practical Examination</b>	<b>University Examination Theory</b>	<b>University Examination Practicals</b>
1 <sup>st</sup> week of November 2018	Last week of February 2019	1 <sup>st</sup> week of March 2019	2/3 <sup>rd</sup> week of June 2019	3 <sup>rd</sup> week of June 2019	3 <sup>rd</sup> week of July 2019	Last week of July 2019

1. Study leave for final sessional examination- 1<sup>st</sup> July onwards
2. Study leave for University examination– 1<sup>st</sup> August onwards

### Distribution of Marks for Internal Assessment and University Examination:

University Examination					Internal Assessment		
Theory I	Theory II	Practical	Viva voce	Total	Theory	Practical	Total
50	50	40	20	160	20	20	40

#### Internal Assessment

Internal assessment should be based on the performance in the regular periodical sessional examinations, practical, Viva, Tutorials and seminars.

Weightage for the internal assessment shall be 20% of the total marks of each subject. There will be periodic revision sessions both for theory and practicals.

Internal Assessment examinations will be of three hours duration each. Final internal assessment examination will be of the same pattern as the University examination.

Minimum three sessionals (theory).

Minimum three sessionals (practical)

Viva-voce (at least one).

#### University Examination Pattern:

##### Theory

###### Paper I

Blood, CVS, Respiration (including environmental physiology), Renal system and skin and temperature regulation, Digestive system. (50 marks, 3 hours)

###### Paper II

Nervous System, Special Senses, Muscle and nerve, Endocrinology, Growth and development, Reproductive system. (50 marks, 3 hours)

The weightage for each topic should be proportional to the number of hours allotted.

**Practical** - Total : 40 marks

<b>Practical I</b>		<b>Marks</b>
Short Experiments:	One amphibian graph:	5
	One haematology short experiment.	5
Spotters	Two Calculations, Two observations, Three interpretations, 2 Graphs, One Clinical skill test. (total ten stations X 1)	10
<b>Practical II</b>		
Long Experiment:	One Haematology Experiment	10
	One System Examination (write full format, demonstrate as required by examiner).	10
<b>Total</b>		<b>40</b>

**Viva -voce** : 20 marks

Four examiners – Topics to be divided and all examiners to examine each student.

### **Textbooks Recommended**

1. Review of Medical Physiology: W. F. Ganong - (Lange Medical Book).
2. Text Book of Medical Physiology : Guyton & Hall - W.B Saunders (Elsevier)

### **Reference Books**

1. Text Book of Medical Physiology: N. Geetha - (Paras Publications)
2. Berne & Levy Physiology - (Mosby).
3. Textbook of Medical Physiology: G.K. Pal - (Universities Press India, Private Limited)
4. Essentials of Medical Physiology: Indu Khurana - (Elsevier)
5. Textbook of Medical Physiology: Venkatesh & Sudhakar - (HH Lippincott)



# **BIOCHEMISTRY (1MB.BI)**

## **Goal**

The broad goal of teaching undergraduate students in biochemistry is to make them understand the scientific basis of the life processes at the molecular level and to orient them towards the application of the knowledge acquired in solving clinical problems.

## **Competencies:**

1. Estimate the levels of blood urea, Creatinine, Glucose, Total protein and Albumin using colorimeter in a given sample and interpret its results.
2. Identify the biologically important substance in a given sample and interpret its results.
3. Demonstrate the normal constituents of urine.
4. Detect any abnormal constituents in a given urine sample and interpret its results.
5. Interpret specific gravity of a given urine sample using urinometer.
6. Interpret problem solving data on Jaundice, Diabetes mellitus, Myocardial Infarction , Nephrotic syndrome etc.

## **Objectives**

## **Knowledge**

At the end of the course, student shall be able to:

- Describe the molecular and functional organization of a cell and list its subcellular components.
- Delineate structure, function and inter-relationship of bio molecules and consequences of deviation from normal.
- Summarise the fundamental aspects of enzymology and clinical application wherein regulation of enzymatic activity is altered.
- Describe digestion and assimilation of nutrients and consequences of malnutrition.
- Enumerate biochemical role of vitamins and minerals.
- Integrate the various aspects of metabolism and their regulatory pathways.
- Outline the structure and function of Hb and abnormal Hb.
- Explain the biochemical basis of inherited disorders with their associated sequelae.
- Outline the molecular mechanisms of gene expression and regulation, the principles of genetic engineering with applications and modern techniques in molecular biology with application in medicine.
- Describe mechanisms involved in maintenance of body fluid and pH homeostasis.

- Familiarise with the principles of various conventional and specialized laboratory investigations and instrumentation analysis and interpretation of a given data.
- Outline the biochemical basis of environmental health hazards, biochemical basis of cancer and carcinogenesis, biochemistry of AIDS.
- Summarise the molecular concepts of defense and their application in medicine.
- Suggest experiments to support theoretical concepts and clinical diagnosis.

### **Skills.**

At the end of the course, the student shall be able to:

- Make use of conventional techniques and instruments to perform biochemical analysis relevant to clinical screening and diagnosis.
- Analyse and interpret investigative data.
- Demonstrate the skills of solving scientific and clinical problems and decision making.

### **Integration**

The knowledge acquired in biochemistry shall help the students to integrate molecular events with structure and function of the human body in health and disease.

### **Course Outcomes**

**CO1:** Knowledge about the cell and subcellular organelles, molecular functions and membrane transport, digestion and absorption of nutrients, chemistry & metabolism of biomolecules and in-born errors.

**CO2:** Knowledge about fat and water soluble vitamins, macro and trace minerals, Enzymes and Clinical enzymology, TCA cycle, ETC ,integration of metabolism, immunology, plasma proteins.

**CO3:** Knowledge of the structure and function of Hemoglobin, abnormal Hb, thalassemias, function tests- LFT, TFT, RFT, PFT, maintenance of homeostasis- acid base and fluid and electrolyte.

**CO4:** Understanding of molecular biology- replication,transcription,translation, gene expression mutation, Molecular techniques and gene therapy.

**CO5:** Understanding of biochemistry and immunology of cancer and AIDS, Study of xenobiotics, biochemistry practicals-identification of biomolecules, spotters, lab data interpretation, quantitative experiments.

## Teaching Hours

Duration of the course	- 2 semesters
No. of hours	- 240
Lectures	- 80
Practicals	- 160

Innovative session (projects, seminars, structured discussion, integrated teaching, formative evaluation and revision - Along with practicals).

- 1. Cell structure & function**, sub cellular organelle, bio membrane (transport and ion channels. Will be covered in Physiology. So to be excluded from biochemistry.) **1 hr**
- 2. Digestion and absorption of nutrients** discussed in details in physiology so to be excluded from biochemistry. **2 hrs**
  - a. Glucose Transporters
  - b. Disorders of digestion and absorption
  - c. Malnutrition – PEM
- 3. Enzymes** **10 Hrs**

Nature of enzymes, coenzymes and cofactors, classification	1 hr
Mechanism of action, specificity of enzymes, active site.	1 hr
Enzyme kinetics, factors affecting enzyme activity, Km value and significance (derivation not required)	1 hr
Enzyme inhibition – competitive, noncompetitive, allosteric, feed back, therapeutic agents like antimetabolites as examples	2 hrs
Enzyme regulation in biological systems – allosteric regulation.	1 hr
Covalent modification, zymogen activation, induction and repression (mention only)	1 hr
Isoenzymes and their significance with suitable examples	1 hr
Clinical enzymology – Diagnostic importance of enzymes (LDH, CPK, AST, ALT, ACP, GGT, GPD, 5'Ntase, Cholinesterase, Amylase, Lipase)	2 hrs
- 4. Chemistry and metabolism of Proteins** **18 Hrs**
  - (i) Chemistry**
    - a. Classification based on structure, ionic properties of amino acids, isoelectric pH, buffering action of amino acids and proteins 1 hr
    - b. Structural organization of proteins – primary, secondary, tertiary and quarternary forces involved in maintaining . Examples – Insulin, collagen. 2 hrs
    - c. Protein denaturation, coagulation, isoelectric precipitation using salt solutions, classification of proteins (colour reactions to be covered with practicals) 1 hr
    - d. Electrophoresis and chromatography – brief mention on separation techniques (details of techniques and application in practical demonstration) 1 hr

## (ii) Metabolism

a. Body amino acid pool, dynamic state of body proteins, inter - organ transport of amino acids, nitrogen balance, glucogenic and ketogenic amino acids.	1 hr
b. Transamination (reaction only), decarboxylation, oxidative deamination, trans deamination, formation of ammonia. Disposal of Ammonia, Urea cycle, Hyper -ammonemias	2 hrs
c. Metabolism of glycine, compounds synthesized, creatine and creatinine, Heme and glutathione, hyper -glycinemias	2 hrs
d. Metabolism of sulphur containing aminoacids, (methionine and cysteine), trans sulphuration, transmethylation reactions, formation of taurine, PAP, excretion of sulphur, homocystinuria, cystinuria and cystinosis.	2 hrs
e. Phenyl-alanine and tyrosine – metabolism, PKU and alkaptonuria, synthesis of thyroid hormones , synthesis and catabolism of catecholamines, albinism, tyrosinemia	2 hrs
f. Tryptophan – formation of NAD (important steps only), serotonin and 5 HIAA xanthurenic acid, melatonin, formation of indican, Hartnup's disease. Branched chain amino acids- MSUD (pathway not required)	2 hrs
g. Glutamic acid, glutamine, GABA, aspartic acid, asparagine, serine (metabolic role and compounds synthesized using these amino acids), polyamines.	1 hr
<b>5. Chemistry and metabolism of Carbohydrates</b>	<b>17 hrs</b>

### (i) Chemistry

a. Classification – monosaccharides- glucose, fructose, galactose and mannose. Reactions, (reducing property, oxidation, reduction), isomers, anomers and epimers. Derivatives like amino sugars and deoxy sugars. Glycosidic bond.	2 hrs
b. Disaccharides- lactose, sucrose, maltose. Polysaccharides-starch, glycogen, dextrans, glycosaminoglycans (basic structural features and functions only) , blood group antigens.	2 hrs

### (ii) Metabolism

a. EMP Pathway: Reactions, regulation in brief, energetics, Rapaport leuberger cycle, fate of pyruvate in aerobic and anaerobic conditions, PDH reaction.	3 hrs
b. Gluconeogenesis-key enzymes, regulation and significance. Cori's cycle	1 hr
c. Glycogen synthesis and degradation, regulation (brief), inborn errors associated	2hrs
d. HMP shunt pathway-NADPH generation, trans- ketolase reaction, G6PD deficiency, metabolic importance (non oxidative phase need not be elaborated)	2hrs
e. Metabolism of galactose, fructose, polyol and uronic acid pathways – inborn errors	1 hr

<b>6. Vitamins</b>	<b>8 hrs</b>
a. Classification, chemical nature (detailed structure not required), coenzyme forms, biochemical role, sources, requirements, deficiency and toxicity of the following vitamins (briefly only) A, D, E, K and free radicals	4 hrs
b. Biochemical role, co-enzyme function, sources, requirement and deficiency of thiamine, riboflavin, niacin, biotin, pyridoxine, pantothenic acid, folic acid, one carbon groups, B-12 and ascorbic acid	4 hrs
<b>7. Minerals</b>	<b>5 hrs</b>
a. Sources, requirement, absorption, biochemical role, deficiency and toxicity of the following minerals - calcium, sodium, potassium, sulphur, chloride and phosphorus – role of PTH, 1,25 DHCC.	4 hrs
b. Iron, copper and anemia	1 hr
<b>8. Haemoglobin</b>	<b>4 hrs</b>
a. Synthesis and degradation	3 hrs
b. Haemoglobinopathies, thalassemias and porphyrias (brief mention only as examples in each case).	1 hr
<b>9. Liver function Tests:</b>	<b>3 hrs</b>
Including formation of bilirubin, hyper bilirubinemias and differential diagnosis of jaundice (S. bilirubin, enzymes, A/G ratio, BSP test, urine test)	
<b>10. Specialized Laboratory investigations</b>	<b>1 hr</b>
RIA, ELISA, principles of colorimetry	
<b>11. Radioactivity</b>	<b>1 hr</b>
Applications-Diagnostic, research and therapeutic. Radiation hazards	
<b>12. Chemistry and metabolism of Lipids</b>	<b>13 hrs</b>
<b>(i) Chemistry of Lipids</b>	
a. Definition, classification with example, saturated and unsaturated fatty acids, triacyl glycerol, phospholipids. Structure and function of biomembrane.	2 hrs
<b>(ii) Metabolism of Lipids</b>	
a. Beta oxidation of fatty acids, role of carnitine, regulation and energetics	
b. Synthesis of fatty acids, fatty acid synthase complex, regulation, elongation and desaturation	2hrs
c. Formation and utilization of ketone bodies, ketoacidosis in diabetes and starvation	1 hr
d. Metabolism of adipose tissue, hormone sensitive lipase, action of hormones (insulin, glucagon, epinephrine & cortisol) liver- adipose tissue axis, fatty liver, lipotropic factors	1 hr
e. Cholesterol – structure, synthesis (Important steps only), regulation, metabolic fate, bile acids and Steroid hormones-formation from cholesterol.	2 hrs

f. Transport of plasma lipids, lipoprotein metabolism, apoproteins, functions, lipid profile and dys-lipidemias, atherosclerosis, biochemical basis of management of hyper-lipidemias – diet, PUFA, dietary fibre and hypo-lipidemic drugs. Lipid storage diseases.	2 hrs
g. Eicosanoids – prostaglandins , thromboxanes and leukotrienes.	1 hr
h. Phospholipids and sphingolipids - Inborn errors.	1 hr
<b>13. TCA Cycle</b>	<b>4 hrs</b>
a. Reactions, regulation and energetics	1 hr
b. Interrelation of carbohydrate, lipid, and amino acid metabolism. Anaplerotic reactions, amphibolic role of TCA cycle and metabolic adaptations during fed state and starvation.	1 hr
c. Electron transport chain - components and sites of ATP synthesis , inhibitors and uncouplers of ATP synthase complex and mechanism of oxidative phosphorylation (Briefly)	2hrs
<b>14. Maintenance of homeostasis</b>	<b>6 hrs</b>
a. Acid base regulation, acid and bases, pH ,buffers, Henderson-Hasselbach’s equation, (derivation not necessary) buffer capacity	1 hr
b. Acid and Bases in the body , plasma buffers, respiratory and renal regulation of pH	2 hrs
c. Acidosis and alkalosis, major causes and compensatory mechanism, anion gap, assessment of acid base status.	2 hrs
d. Fluid and electrolyte balance – distribution of body water and disorders (Hormonal regulation covered in Physiology)	1 hr
<b>15. Nucleic Acids ( Chemistry and metabolism)</b>	<b>17 hrs</b>
a. Structure of purines , pyrimidines, nucleosides and nucleotides	1 hr
b. Purine – Nucleotide synthesis and catabolism (Synthetic pathway need not be considered in detail with names of intermediates. Only the source of different atoms and sequence of addition). salvage pathway and regulation , hyper-uricemia and gout, Lesch Nyhan syndrome.	2 hrs
c. Pyrimidine – nucleotide synthesis, regulation, orotic aciduria, formation of deoxynucleotide, thymidylate synthase reaction , folic acid antagonist., nucleotide analogues as chemotherapeutic agents	1 hr
d. Nucleic acid – structure of DNA, different types of DNA, mitochondrial DNA, base pairing rule, difference between DNA and RNA, mention different types of RNA.	2 hrs
e. DNA replication , DNA polymerase, DNA repair	1 hr
f. Genetic code, transfer RNA, mRNA , rRNA.	1 hr
g. Transcription, ribosome, RNA polymerase, post transcriptional modifications, splicing, inhibitors, reverse transcriptase, ribozyme, antisense therapy	2 hrs
h. Translation (steps), post translation modifications, inhibitors	2 hrs
i. Regulation of gene expression, induction, repression, derepression	1 hr
j. Recombinant DNA technology , restriction endonucleases, Blotting techniques (southern, northern and western) RFLP, DNA finger printing, polymerase chain-reaction and applications, application of molecular biology in clinical situations, gene therapy.	3 hrs

k. Biochemical basis of inherited disorders: mutations, pathogenesis of inborn errors in general, types of mutations with examples in each case, mode of inheritance.	1hr
<b>16. Biochemistry of Cancer</b>	<b>2 hrs</b>
Mutagens, carcinogens and its role in carcinogenesis, viruses in carcinogenesis, tumour markers and oncogenes.	
<b>Vertical Integration Classes:</b>	<b>10 hrs</b>
a. Malnutrition and PEM (Pediatric department)	1hr
b. Diabetes mellitus (Internal Medicine)	1hr
c. Jaundice (Internal Medicine)	1hr
d. Clinical enzymology (Internal Medicine)	1hr
e. Inborn errors of carbohydrates and protein metabolism (Pediatric)	1hr
f. Calcium and phosphorus metabolism-derangement (Orthopaedics)	1 hr
g. Atherosclerosis – Ischemic heart diseases (Cardiology)	1 hr
h. Acid base balance in clinical settings (Internal Medicine)	1 hr
i. Etiology and management of cancers (Oncology)	1 hr
j. AIDS (Internal medicine)	1 hr
<b>Seminar/ Tutorials</b>	<b>27 hrs</b>
a. Cell structure, function and abnormalities	1 hr
b. Biomembrane structure and transport mechanism	1 hr
c. GIT enzymes, digestion and absorption of carbohydrates, lipids and proteins	2hrs
d. Disorders of digestion and absorption	1 hr
e. Clinical enzymology, isoenzymes	2h
f. Fat soluble vitamins	1hr
g. Thiamine, riboflavin, niacin, biotin, pyridoxine, panthothenic acid	3hrs
h. Folic acid, Vitamin B 12, Ascorbic acid	1 hr
i. Minerals: Macro elements	1 hr
j. Micro elements	1 hr
k. Glycolysis, gluconeogenesis, keyenzymes and regulation	2hrs
l. Regulation of glycogen metabolism	1 hr
m. Diabetes mellitus, glycosurias, GTT , glycated Hb	1 hr
n. Formation and disposal of ammonia	1 hr
o. Inborn errors of aminoacid metabolism	2 hrs
p. Formation and fate of bilirubin & jaundice	1 hr
q. Steroid hormones	1 hr
r. Cholesterol - metabolism and disorders	1 hr
s. ATP synthesis	1 hr
t. Renal function tests	1 hr

u. Mutation 1 hr

### Project work

Iron deficiency in women and children of Elamakkara 1 week

Vitamin & mineral deficiency in children 1 week

### Horizontal Integration

a. Haemoglobin (Physiology) 4 hrs

b. Liver Function Tests (Anatomy and Physiology ) 4 hrs

c. Synthesis of thyroid hormones (Anatomy and Physiology) 5 hrs

### Schedule of Practicals (80 hrs )

1. Reactions of Carbohydrates: Glucose 1 session 2 hrs
2. Reactions of Carbohydrates: Fructose 1 session 2 hrs
3. Reactions of Carbohydrates: Lactose 1 session 2 hrs
4. Reactions of Carbohydrates: Sucrose 1 session 2 hrs
5. Identification of unknown Carbohydrate 2 sessions 4 hrs
6. Reactions of Proteins: Colour reactions 1 session 2 hrs
7. Reactions of Proteins: Precipitation reactions 1 session 2 hrs
8. Reactions of Albumin 1 session 2 hrs
9. Reactions of urea and uric acid (Specific urease test for urea. Benedict's uric acid test and Schiff's test for uric acid.) 1 session 2 hrs
10. Identification of biologically important compounds in given solution 2 sessions 4 hrs
11. Normal urine : organic constituents 1 sessions 2 hrs
12. Normal Urine: inorganic Constituents 1 session 2 hrs
13. Abnormal urine: Report 4 hrs
14. Introduction to clinical chemistry, collection of samples, anticoagulants and preservatives , principles of colorimetry 2 hrs
15. Estimation of glucose in blood 1 session 2 hrs
16. Estimation of urea in serum, calculation of clearance from given values of U, V and P 2 hrs
17. Estimation of creatinine in serum. 1 session 2 hrs
18. Estimation of total protein and albumin in serum– A/G ratio 1 session 2 hrs
19. From given values of HDL and TAG, lipid profile data interpretation 1 session 2 hrs
20. Spotters (demonstration): simple instruments, graphs, tests etc. 2 sessions 4 hrs
21. Charts 2 sessions 4 hrs
  - a. Problem solving exercises: short history of different conditions are given and students will be asked to suggest investigations to arrive at a diagnosis.
  - b. Laboratory data interpretation- liver diseases, renal diseases, acid-base disturbances, diabetes mellitus, lipid disorders
22. Revision: Identification of unknown substance. 4 sessions 8 hrs



## Assessment

### Schedule of Internal Assessment and University Examinations

First internal assessment (Theory)	Second Internal assessment (Theory)	1st Practical Examination	Final Internal examination (Theory)	2nd Practical Examination	University examination (Theory)	University examination (Practical)
1st week of November 2018	Last week of February 2019	3rd week of March 2019	1/3rd week of June 2019	Last week of June 2019	3rd week of July 2019	Last week of July 2019

1. Study leave for final examination -1st June onwards
2. Study leave for University examination-4th July onwards

### Distribution of Marks for Internal Assessment and University Examination

University Examination				Internal Assessment			
Theory I	Theory II	Practicals	Viva Voce	Total	Theory	Practicals	Total
50	50	40	20	160	20	20	40

### University Examination– Division of topics

#### Theory paper I (50 Marks)

1. Cell structure and functions, biomembrane
2. Digestion and absorption of nutrients
3. Enzymes
4. Chemistry and metabolism of carbohydrates and proteins
5. Vitamins and minerals
6. Hemoglobin
7. Liver Function Tests and Special Laboratory investigations (RIA, ELISA ,Colorimetry)
8. Radioactivity

#### Theory Paper II (50 Marks)

1. Chemistry and Metabolism of lipids
2. TCA cycle, electron transport chain, integration of metabolism
3. Maintenance of homeostasis- acid base balance, fluid and electrolyte balance
4. Nucleic Acids -structure and function, biosynthesis of purines and pyrimidines
5. Molecular genetics including techniques
6. Biochemistry of HIV ,cancer and cell cycle
7. Pancreatic and renal function tests
8. Xenobiotics and biotransformation

### Practical Examination (40 marks)

#### Practicals I

- a. **Quantitative experiment:** Estimation of blood urea, creatinine, glucose, total protein and albumin (skills and interpretation) 10 marks
- b. **Interpretation of data/problem solving exercise** (data on jaundice, Diabetes mellitus, myocardial infarction, nephrotic syndrome etc. ) 10 marks

## Practicals II

**a. Qualitative experiment:** Identification of biologically important substance, demonstration of normal constituents in urine, detection of abnormal constituents etc. (skills and interpretation) 10 marks

**b. Spotters** 10 marks

**Theory/ Viva Voce** (4 examiners) Topics to be divided and all examiners to examine each student. (Maximum marks 20)

## Textbooks Recommended

### Prescribed Books

1. Text book of Biochemistry for Medical students - Dr. D.M. Vasudevan, Dr. S. Sree-kumari (J.P Brothers).
2. Text book of Biochemistry – Dr. U .Sathyanarayana
3. Harper’s Biochemistry-Murray, Rodwell

### Reference Books

1. Biochemistry with Clinical Correlation - Devlin.
2. Biochemistry - Stryer
3. Principles of Biochemistry - Lehninger
4. Biochemistry – A case oriented approach - Montgomery

# COMMUNITY MEDICINE (3MB.CM)

## Preamble

The first curriculum of Community Medicine (CM) of Amrita School of Medicine (ASM) under Amrita Vishwa Vidyapeetham (AVV) was prepared in 2002 in line with the guidelines of Medical Council of India (MCI) regulations and recommendation (1997). It has been revised in the year 2017 based on the latest updates in the field of Community Medicine.

## 1. Vision

The Department of Community Medicine at Amrita School of Medicine, shall be recognized nationally and internationally for its:

- 1.1. Innovative, rural based, Primary Health Care oriented, value based medical education to train the medical students as “Five Star Doctors” as envisaged by the World Health Organization, who are competent to work as
  - *Care providers*
  - *Decision makers*
  - *Communicators*
  - *Community leaders and*
  - *Managers*
- 1.2. Provision of Cost effective Health Care delivery strategies characterized by equity, inter sectoral co-ordination, community participation and appropriate technology.
- 1.3. Innovative curriculum enriched with the principles of human values, love and empathy encompassing the spiritual dimensions of health and delivered with state of the art Information Technology through Searching, Sharing, Observation, Participation and Action.

## 2. Mission

The mission of the Department of Community Medicine is :

- 2.1. To provide value based, rural oriented medical education to produce doctors who have the knowledge, attitude, and skills to provide Primary Health Care as per the National Health Policy.
- 2.2. To demonstrate that positive health can be achieved only through total development and community participation.
- 2.3. To demonstrate that spiritual dimension of health is also important while developing health care delivery strategies.
- 2.4. To provide need based refresher training on Continuous Professional Development (CPD) to all categories of health care providers.
- 2.5. To undertake research on health and develop low cost logistics for delivery of Primary Health Care
- 2.6. To bring the benefits of the advancements in technology to the people in the villages.

## 3. Competencies

The Indian Medical Graduate will acquire the knowledge, skills and attitude necessary to attain the following competencies.

- To deliver evidence based, need oriented Primary Health Care in the context of the prevailing socio-cultural settings.
- To identify community health problems, prioritize them and chalk out solutions with local resources and community participation.
- To communicate effectively and appropriately with people at large and patients

and their family in particular.

- To collect, compile, analyze and interpret health related data for disease surveillance using epidemiological and biostatistical principles.
- To give health education using appropriate tools and educational methods with special reference to national health issues.
- To implement, monitor and evaluate national health programmes.
- To undertake multi-disciplinary programmes to achieve healthy environment for sustainable development.

#### **4. Departmental Objectives**

##### **4.1. General Objectives**

To train medical students with knowledge, attitude and skills required to function as basic doctors with empathy, compassion and love and who can effectively function as care providers, decision makers, communicators, community leaders and managers in the rural and urban settings

##### **4.2. Specific Objectives**

At the end of the course, the student shall acquire:

###### **4.2.1. Knowledge**

- To Identify the multi-factorial determinants and dimensions of health and disease, dynamics of community behavior and human society
- To understand the structure and process of the health care delivery system in India in general and Kerala in particular.
- To identify the health needs of the community in general and small vulnerable groups in particular
- To understand the science of applied Epidemiology and Research tools for health promotion initiatives.
- To apply principles of Biostatistics to study the phenomenon of health and disease, and to draw conclusions and to formulate policies

###### **4.2.2 Attitude**

- To provide health care in an environment of love and compassion.
- To provide evidence based and need oriented health care.
- To see the 'man in disease' against 'disease in man'.
- To perceive health as part of total development.
- To work with community hand in hand with the various sectors.
- To work in rural, tribal and urban slum areas where the services are most needed.
- To give more emphasis on prevention thereby averting the need for expensive curative care.
- To disseminate the message that positive health can be achieved through life style modifications.
- To allocate resources efficiently and cost effectively and allocate resources on the basis of contribution to health promotion.

- To imbibe the concept of essential drugs and rational drug prescription.

#### **4.2.3. Skills**

The skills shall include, but not limited to:

- Basic clinical skills including essential nursing skills.
- First aid.
- Communication skills including group interaction skills.
- History taking skills • Listening skills
- Memorizing skills • Documentation skills • Use of essential drugs
- Use of Biostatistics and Epidemiological methods to study health and diseases.
- Application of appropriate technology in preventive and promotive services.
- Use of electronic media in primary health care.
- Research skills including protocol writing, project preparation, documentation and literature search, writing a scientific paper for publication etc.
- Low cost nutrition skills and diet planning.

#### **Course Outcomes**

**CO1:** Knowledge, attitude and skills required to function as basic doctors with empathy, compassion and love.

**CO2:** Ability to effectively function as care providers, decision makers, communicators, community leaders and managers in the rural and urban settings

**CO3:** Competency to deliver evidence based, need oriented Primary Health Care in the context of the prevailing socio-cultural settings.

**CO4:** Competency to identify community health problems, prioritize them and chalk out solutions with local resources and community participation.

**CO5:** Competency to communicate effectively and appropriately with people at large and patients and their family in particular.

**CO6:** Competency to collect, compile, analyze and interpret health related data for disease surveillance using epidemiological and biostatistical principles.

**CO7:** Competency to give health education using appropriate tools and educational methods with special reference to national health issues.

**CO8:** Competency to implement, monitor and evaluate national health programmes.

**CO9:** Competency to undertake multi-disciplinary programmes to achieve healthy environment for sustainable development.

### Curriculum Map

Semester	Nature of Academic Activity	Course Strength (in Contact Hours)			Frequency of the Activity	
		Interactive Lectures*	Community Exercises**	Total	Day	Time
<b>S1</b>	Interactive Lectures/Family/Community Exposure	30	30	60	Saturday (First 4 months)	8AM - 1PM
<b>S3</b>	Interactive Team Teaching	24		24	Tuesday	1 - 2 PM
<b>S4</b>	Interactive Team Teaching	24		24	Thursday	1 - 2 PM
<b>S5</b>	Interactive Team Teaching	16		16	Thursday	1 - 2 PM
<b>S6</b>	Interactive Team Teaching	24		24	Monday	1 - 2 PM
<b>S7</b>	Integrated Team Teaching	32		32	Wednesday	1 - 2 PM
<b>R1</b> 4 weeks in <b>S4</b>	Innovative community problem solving exercises & skills training		92	92	Daily	8AM - 12PM
<b>R2</b> 4 weeks in <b>S6</b>	Project work in Research Methodology and group exercise in BCC		92	92	Daily	8AM - 12PM
<b>R3</b> 4 weeks in <b>S7</b>	Community action programmes & Clinico social case study		92	92	Daily	8AM - 12PM
<b>Total</b>		<b>150</b>	<b>306</b>	<b>456</b>		

**S1, S2 ....- Semester ONE, Semester TWO**

**R1, R2....- FIRST clinical rotation, SECOND clinical rotation... etc.**

\* Interactive learning which includes, but not limited to group teaching by faculty and students tutors.

\*\* Training in the department includes, but not limited to, family visits, seminars, symposia, group interactions in the community as well as in the class rooms, debates, brain storming sessions, skills learning, problem based learning, clinico-social case studies, epidemiological investigations, health delivery system and management disease surveillance, health mapping, participation in national health programmes, disaster management, health screening, school health, research projects, presentations/ discussions, updating, must know rapid revision, formative assessments, documentation, BCC group exercises etc.

## 5. Profile of the Syllabus of Community Medicine:

SlNo:	Topics	Strength in Contact Hour		
		Interactive Learning*	Community based problem solving exercises**	Total
1.	Concept of health and disease and community medicine	4	5	9
2.	Basic epidemiology and screening	5	10	15
3.	Bio statistics	7	15	22
4.	Demography and National Population Policy	7	6	13
5.	Environment and Health including Medical Entomology	6	24	30
6.	Health Care Waste Management	2	2	4
7.	Disaster Management	3	4	7
8.	Communicable diseases and Non-Communicable diseases	18	15	33
9.	National health programmes	10	15	25
10.	Emerging and Re-emerging diseases	2	10	12
11.	Occupational Health	3	4	7
12.	Communication for health education	4	22	26
13.	RCH and MCH including fertility regulation	6	14	20
14.	Genetics including Human Genome Project	2	2	4
15.	Nutrition in Health & Disease	4	12	16
16.	Health planning, management & health economics including Panjayati Raj & National policies.	8	14	22
17.	Health care of the community including Millennium development goals, Public health standards & Health care delivery system- public private sectors	12	16	28
18.	International Health	2	4	6
19.	Mental Health	2	4	6
20.	Geriatric Health care	2	4	6
21.	Health Legislations	2	2	4
22.	Implementation of Health programs in the state level	2	2	4
23.	Alternate Medicine - Role in National Health	1	1	2
24.	Community dentistry , Community Nursing and Community Pharmacy	1	1	2

22.	Medicine and Social Sciences including Medico-Social and ethical issues in Healthcare	2	5	7	*
23.	Social security, Role of NGOs, CBOs and Social Welfare organizations	2	8	10	
24.	Gender issues and women empowerment	3	4	7	
25.	Essential medicines & counterfeit medicines	1	3	4	
26.	Research Methodology and Project Work	2	20	22	
27.	Community Diagnosis and Management	4	40	44	
28.	Basic Clinical Skills and First Aid	5	20	25	
29.	Spiritual dimension of Health - Stress Management and Personality Development	2	2	4	
30.	Guest lectures, Integrated teaching, 'Must know' revision, Updates in Community Medicine.	18	-	18	
	<b>Total Strength</b>	<b>154</b>	<b>310</b>	<b>464</b>	

Interactive learning which includes, but not limited to group teaching by faculty and students tutors.

\*\* Training in the department includes, but not limited to, family visits, seminars, symposia, group interactions in the community as well as in the class rooms, debates, brain storming sessions, skills learning, problem based learning, clinico-social case studies, epidemiological investigations, health delivery system and management disease surveillance, health mapping, participation in national health programmes, disaster management, health screening, school health, research projects, presentations/ discussions, updating, must know rapid revision, formative assessments, documentation, BCC group exercises etc.

## 6. Academic Programmes

- 6.1. Special Care is taken to ensure that all academic sessions are conducted in a **stress free, student- friendly** environment.
- 6.2. All academic sessions (in-house as well as in the community), will be interactive, anchored to the learning objectives at the MUST KNOW level To facilitate this, learning objectives for each academic session is prepared (and maintained updated).
- 6.3. Periodic course evaluation and teaching evaluation are part of the academic programme Input from the students is respected and appropriate changes made.
- 6.4. Didactic lectures are minimized though not eliminated. Interactive **team teaching** and learning through **student tutors**, are the main methods of teaching/learning
- 6.5. For all in-house academic activities, **white board** (which is the choice of the students) and OHP are often used. Computer and LCD is reserved for pictures, films/video-clippings, computer assisted learning (CAL), net based education etc.
- 6.6. Special care is taken to develop **skills** and **competencies** to solve problems in the community set up instead of overloading the students with theoretical knowledge. This includes exercises on applications of research methodology, applications of IT in medical education.
- 6.7. **Integrated teaching** (vertical and horizontal) with guests from appropriate department (in-house as well as extramural) are arranged as and when required.
- 6.8. Daily **documentation** of academic activities in the practical record is mandatory.
- 6.9. All **strategies**/modalities and gadgets available in the departments are used to facilitate learning in the class room as well as in the community. This includes, but not limited to



health news, health bits and health flash displayed in the wall bulletin, wall book, IEC materials in the museum, indigenously made skills training/health education film, flip charts flash cards etc.

- 6.10 For **health education** and **counseling** in the community, the students are encouraged to make their own health education materials. This is one of the important academic exercises on BCC strategies

## 7. Lectures

The curriculum map is prepared in such a way that lectures are minimized to less than 1/3rd of the total course strength. The traditional didactic lectures are replaced by interactive sessions through *group teaching* and *student tutor*. Primary focus shall be to facilitate the learning process that will help to develop the required skills and competencies needed to deliver Primary Health Care.

## 8. Integrated Teaching

Horizontal as well as vertical integrated teaching are conducted with in-house sister departments and extramural organizations (Government and Non Government) which are involved in the delivery of primary health care, implementation of National Health Programmes and/or running social welfare institutions.

## 9. Guest Lectures

Guest lectures are arranged by inviting guest faculties from sister departments of other Medical Colleges and/or other institutions as and when required. This will facilitate sharing of academic as well as strategic experiences.

## 10. Practicals

The curriculum are primarily oriented to the concept of community laboratory (as against the traditional hospital laboratory). As such, the training shall be residential. The practicals are designed to develop the skills and competencies required to deliver Primary Health Care to the rural as well as urban families. These skills shall include, but not restricted to, basic clinical skills, communication skills, management skills, problem solving skills, decision-making skills, health care documentation skills, Community health programmes (organization, implementation and evaluation) skills with special reference to National Health Programme, leadership skills, appropriate use of essential drugs skills, community based research skills etc.

## 11. Record of Academic Exercises

All academic exercises (in-house as well as extramural) are documented in the Comprehensive Record of Academic Exercises on a daily basis. The records are valued concurrently after each exercise by the faculty concerned. The aggregate score gained by the student, shall be computed out of 10, which shall be directly added to the internal assessment for practicals. (See computation of internal assessment)

## 12. Highlights of the semester wise academic programmes.

### 12. 1. SEMESTER 1 (S1)

**Total time allotted** : 60 Hrs

**Frequency** : Saturdays - 8 AM – 1 PM x 12 Saturdays

#### **Methods of teaching / learning**

Interactive Team Teaching

Learning by observation Learning by participation Learning by action

Learning by Group interaction

#### **Key areas covered**

Communication skills

Introduction to group activity

To be a good doctor  
 Value based education  
 Health problems of India  
 History of Medicine with special reference to Community Medicine  
 Introduction to Community Medicine  
 Concept of health  
 Spiritual dimension of health  
 Introduction to environment  
 Introduction to nutrition  
 Introduction to sociology  
 Health care delivery system in India  
 National Health Policy  
 National population policy  
 Concept of research on health Various BCC (IEC) Strategies  
 Visit to hospital environment  
 Visit to community and families  
 Release of stress  
 Solving a community health problem  
 OPEN FORUM: course evaluation - feed back from the students:

**Community based.** Total Contact hours (S4 & S6) **184 hours**

(Actions and/or participatory and/or observational learning and hands on exercises (at the rate of 4 hours per day (i.e. 8–12) for 4 weeks each during S4 & S6).

## 12. 2. **THIRD TO SIXTH Semesters (S3 to S6) Methods of Teaching/Learning**

**Class room based.** Total Contact hours (S3-S6) **88 hours**

(Interactive group teaching / learning in the class room and/or small groups at the rate of one hour per week).

The traditional didactic lectures are minimized. **Team teaching** and **Student Tutor** concept is introduced. The students are encouraged to utilize the different types of **learning resource materials** like poster presentations, health news, wallpaper, health bits, wall book, album of action, museum and the department library.

There are two **sessional exams** officially scheduled by the Principal during this period of S3- S5. In addition, end of semester assessments shall also be conducted by the department using appropriate tools covering smaller portions. All assessments shall be designed to measure the problem solving skills of the students.

**Course evaluation** is done at the end of each semester. Appropriate changes are introduced based on the input received from the students.

### **Clinical rotations during S4 & S6**

The students are posted in Community Medicine in groups of 15-20 for 4 weeks each during 4th & 6th semesters. Every day, the programme starts with innovative learning like reading **health news** followed by discussion. (this includes but not limited to articles on health and related topics appearing in the news papers, journals, internet etc.). Topic discussions on eminent personalities in the field of public health is also carried out. The daily activities/learning objectives achieved, are documented in the record on the same day. The major academic assignments during the clinical rotations of S4 and S6 are

- **R1 – Four weeks during 4th semester** (92 contact hours)

This is residential training. The students shall stay in the rural and/or urban field train-

ing centers. The main academic activities shall include but not limited to

1. Family studies – Community diagnosis and diet survey - Presentation
2. Nutrition - Basic concepts
3. Sociology – Basic concepts
4. Biostatistics - Basic concepts
5. Demography – basic concepts
6. Basic Clinical Skills Training
7. Entomology including field assignments
8. Visits to public health related institutions (Water treatment plant, sewage treatment plant, biomedical waste management plant)
9. Hands on exercises in the Nutrition Skills Lab
10. Community interaction, identification and solving community health problem
11. BCC (IEC) strategies – individual & group assignments
  - **R2 – Four weeks during 6th semester** (92 contact hours)
    1. Family studies – follow up – Community action programme
    2. Biostatistics – hands on exercises
    3. Search for Research Initiatives - Hands on exercise on Research Methodology with groups of 2 to 3 students undertaking a research study.
    4. Health indices – hands on exercises on collection and calculation
    5. Participation in health related activities in the community
    6. BCC / IEC Strategies

### 12. 3. SEVENTH Semester

#### **Method of Learning/Teaching:**

**Classroom based -32 hours** at the rate of 2 hours per week.

Integrated teaching with in-house as well as extramural departments related to public health, guest faculty from other Medical Colleges, rapid revision, problem based learning and related exercises, information update, presentation of research projects, recap assessments, model examination, question paper discussion, the learners choice etc.

#### **Community based action oriented programmes (R3)**

**92 hours**

The students are posted for 4 weeks during 7th semester every day 8-12

#### **Highlights of R3 clinical rotation**

- Epidemiological exercises
- Biostatistics and vital statistics.
- Clinico – social case studies
- Visit to Public Health Institutions implementing National Health Programmes
- Review of museum specimens, wall book, academic album, poster presentations etc.
- Objectively structured physical examination exercises.
- Review of current health issues and policies.

### 13. ASSESSMENT SYSTEM

#### **13.1. Concurrent Assessment**

13.1.1. The formal concurrent assessment of a student (in-house as well as community) shall start on the first day and ends with the last day in the department. All types of assessment tools shall be used for this. It shall be documented in the Register of Academic Performance of students maintained in the Department.

13.1.2. The Department shall conduct minimum one concurrent end of semester assessment at the end of each semester. All these assessments are directed to measure the problem solving skills of the students and can include but not limited to formal written/skill

assessment (OSPE)/viva voce and /or any other tool developed by the department from time to time. The marks scored by the students in each assessment, is documented in the Register of Academic Performance of the students. All these marks shall be considered while computing the final internal assessment marks for theory and practical, which shall be forwarded to the University.

### **13.2. Formative assessment**

#### **13.2.1. Written**

13.2.1.1. There will be **4 formal internal assessments** centrally scheduled by the Principal.

13.2.1.2. The 4th and the final assessment scheduled by the principal is a **model assessment** of the University examination pattern.

**The students are given the chance to peruse their answer books after discussing the question papers and expected answers in the class. This gives a chance for the students for self assessment and improvement.**

#### **13.2.2. Practical Assessment**

13.2.2.1. There shall be minimum one practical assessment at the end of every clinical rotation (i.e., R1, R2 & R3) utilizing different assessment tool.

13.2.2.2. In addition, there will be a formal practical assessment of the university pattern conducted along with the model assessment at the end of 7th semester.

#### **13.2.2. Viva voce**

There will be a viva voce conducted along with the model assessment. Each student shall be assessed separately by each examiner. Viva voce shall be structured as far as possible.

## **14. INTERNAL ASSESSMENT**

### **14.1. Strength of internal assessment**

The strength of internal assessment is 40 marks, divided equally into

<b>Written</b>		<b>20</b>
	and	
<b>Practical</b>		<b>20</b>

### **14.2. Computation of Internal Assessment – Written**

Marks scored for various written internal assessments: **20**

**TOTAL:** **20**

**Marks scored for various written internal assessments is calculated as follows:**

Best two of three internal assessments

***AND***

Marks of model assessment under 13.2.1.2. are computed to **15** to which the marks (max **5**) awarded for viva voce under 13.2.2, shall be added to make the total 20 marks. This shall be presented to the University as the **Internal Assessment for Theory.**

### **14.3. Internal Assessment for Practicals:**

Day-to-day community health activities/exercises done and documented in the Record (which starts in the beginning of the first semester and ends at the end of seventh semester) as mentioned under 13.1.1.	10 marks
Marks of end of rotation assessments ( R1, R2 R3) and model examination is computed to	10 marks
<b>Total Practical Marks</b>	<b>20 marks</b>

The practical assessments shall include, but not limited to, Biostatistical exercise, epidemiological exercises, clinico-social/family case discussion, OSPE, identifications of specimens of public health importance. To this, *state-of-the-art* assessment tools to measure the skills/competencies are also applied. (see 16.5 for details).

## 15. ATTENDANCE

The attendance statement of the students shall be sent to the Principal at the end of each semester. In addition, the final attendance report (in percentage for theory and practical) is sent to the office of the Principal at the end of 7th semester, for necessary processing as per the policy of AVV.

## 16. UNIVERSITY EXAMINATION

### 16.1. Number of written papers

There shall be two papers of three hours duration, each paper carrying 60 marks.

### 16.2. Distribution of topics for Theory

#### PAPER – I

1. Concepts of Health & Disease and Community Medicine.
2. Basic Epidemiology & Screening.
3. Biostatistics.
4. Mental Health.
5. Environment & Health including Medical Entomology.
6. Health care waste management.
7. Disaster management.
8. Communicable & Non communicable diseases and their National Health Programmes.
9. Emerging and Re-emerging diseases

#### PAPER–II

1. Demography.
2. RCH & MCH including fertility regulation.
3. Genetics including Human Genome Project.
4. Nutrition in Health & Disease.
5. Health Planning, Management & health Economics including Panchayati Raj & National policies.
6. Health care of the community including Millennium Development Goals, Sustainable development goals, Public health standards & Health care delivery system - public & private sectors.
7. International health.
8. Occupational health.
9. Geriatric Health care.
10. Health legislations.
11. Medicine and Social sciences.
12. Communication for Health Education.

### 16.3. Valuation of answer books

Valuation of answer books shall be as per the existing policy, rules and regulations of AVV.

### 16.4. Viva Voce

Each student shall be individually assessed by each of the four examiners. The evaluation shall be structured and shall primarily focus on the problem-solving competency of the candidate. (as against the traditional knowledge based assessment). Identification and discussion on specimens, models, charts, photographs, video clippings etc. are also included under viva voce.

The viva voce shall be conducted in an informal, student friendly environment. The marks awarded by each examiner shall be pooled and finally computed to 10.

### 16.5. Practical

There shall be six practical assessments bearing a total of 30 marks the distribution of which is shown below:

Practical I	Clinico-social case/family health discussion	10marks
Practical II	Spotters	3 marks
Practical III	OSPE	3 marks
Practical IV	Epidemiological exercises	5 marks
Practical V	Statistical Exercise	5 marks
Practical VI	Project discussion	4 marks

Each practical shall be conducted separately.

### 16.6. Rounding off Marks

Rounding off marks shall be done to the final total only. For this purpose, decimals of 0.5 and above shall be rounded off to the next higher digit and decimals of less than 0.5 shall be rounded off to the next lower digit.

### Schedule of Internal Assessment and University Examinations

I Internal Assessment	II Internal Assessment	III Internal Assessment	Final Internal Assessment	University Examination
Last week of January 2020	Last week of July 2020	Last week of July 2021	First week of December 2021	First week of January 2022

### Reference Books

1. Park's Textbook of Preventive and Social Medicine
2. Textbook of Community Medicine- Sunder Lal
3. Introduction to Biostatistics & Research Methods- Sunder Das

# **MEDICAL INFORMATICS & TELE MEDICINE (3MI.TM)**

## **Elective**

### **Goals**

The digital revolution has dramatically changed society, and India is at the forefront of this movement. For a variety of reasons, despite the enormous volumes of data generated in health care and the sometimes life-and-death nature of the field, healthcare systems and providers have been slow to adopt information technology as an adjunct to help them manage data to the best advantage. The broad goal of incorporating medical informatics and tele medicine in the undergraduate curriculum is to create in young physicians a solid understanding of how these important elements of information technology can help them in clinical practice and in maintaining their skills and knowledge while keeping in mind the principles of Evidence-based Medicine.

### **Objectives**

#### **Knowledge**

At the end of the course, the student shall be able to:

- Understand basic computing functions.
- Appreciate the methodology for literature retrieval and analysis.
- Enhance skills in clinical practice through exposure to effective clinical simulation.
- Describe how informatics can help in public health.
- Obtain an exposure to practical aspects of Tele medicine.
- Describe the utilization, benefits and challenges of an Electronic Medical Record (EMR)

#### **Skills**

At the end of the course, the student shall be able to:

- Perform basic computer related tasks such as Internet, e mail and use of MS office applications.
- Retrieve literature using the Internet.
- Critically appraise literature using principles of Evidence-based Medicine.
- Demonstrate proficiency at basic clinical procedures like urinary bladder catheterization and ophthalmoscopy, as well as fundamental skills like clinical cardiac examination using simulation technology.
- Utilize an EMR system for retrieval of relevant clinical information

#### **Integration**

This course shall integrate with the skills learned by students in community medicine, general medicine and general surgery. It will also show students how elements of IT like Tele medicine and EMR can help in integrating the process of healthcare information capture and delivery of services.

#### **Course Outcomes**

CO1: Understanding of how information technology can help them in clinical practice.

CO2: Knowledge of the methodology for literature retrieval and analysis.

CO3: Skills in clinical practice through exposure to effective clinical simulation.

CO4: Knowledge of practical aspects of tele medicine.

CO5: Familiarity with Electronic Medical Record.

## Teaching Hours

### Third Semester- Saturdays 3-4 P.M. Schedule of Lectures

Lectures/Innovative Sessions / Practicals	Total
<b>6</b>	<b>6</b>

#### Topic

#### Hours

##### **Medical informatics**

**1hrs**

Introduction to Health Informatics  
Medical databases  
Information filtering and information retrieval  
Dataware housing, data mining for public health care  
Remote sensing and geographical information system  
Standards in Hospital information system.

##### **Electronic Medical records**

**2hrs**

Introduction to EMR  
Structure of a Hospital Information System (HIS)  
Advantages and disadvantages of EMR systems  
Decision support systems and Artificial Intelligence (AI)  
Principles of good medical documentation and communication skills.

##### **Medical Simulation**

**1hrs**

Overview  
Case studies

##### **Tele Medicine**

**2hrs**

Clinical application of Tele Medicine  
Choosing the right technology  
Ethical and legal aspects of telemedicine  
Future trends of telemedicine  
Scope, benefits, limitations of telemedicine development

#### **Textbooks Recommended**

- 1) Introducing telemedicine by B.D Gupta
- 2) Computers in Medicine by R D Lele
- 3) Essentials of Telemedicine and Tele care by A C Norris
- 4) Clinical Research Methodology and Evidence-based Medicine: The basics by Ajit N Babu



# **SIMULATION BASED MEDICAL EDUCATION (3MI.SB)**

## **Elective**

### **Objectives**

Acquisition of clinical skills is an essential part of clinical medicine and plays quite an important role in the Medical education. Acquisition of skills has three stages. The first is learning by imitation. Second level is practice under guidance and the third is to practice independently and acquire proficiency. Traditional medical education is facing many challenges. There are few opportunities for the students to practice their clinical skills and their dexterities are generally at a low level. Medical simulation based education is a new teaching modality and helps to improve medics' clinical skills to a large degree. Simulation is the modern technique to replace or amplify real experiences with guided experiences on mannequins. Medical simulation based education has many significant advantages. It is mainly dedicated to enhancing hands-on medical education performance assessment, evaluation, improving clinical and communication skills, assuring patient safety and quality of care.

Medical Council of India has suggested Clinical Skill labs mandatory for all Medical colleges in India.

### **Course Outcomes**

CO1: Understanding the method of examination of Cardiovascular and Respiratory system. Skills like aspiration of pleural effusion, pneumothorax, pericardiocentesis etc.

CO2: Skill of palpation, incisions, suturing, intravenous and intramuscular injections, catheterization of male and female, examination of breasts, PR examination, and practice of minor surgical procedures.

CO3: Palpation identifying presentations and positions of the foetus, conduct of all types of deliveries, episiotomy, foetal heart monitoring, CPR of mother as well as the neonate, pervaginal and bimanual examination.

CO4: ATLS, Intubation and Lumbar Puncture. Emergency Stroke Management.

CO4: ATLS, Intubation and Lumbar Puncture. Emergency Stroke Management.

CO5: ENT and Ophthalmology Examination.

CO6: BCLS and ACLS (with defibrillation)

### **Materials and Methods**

Mannequins are artificial human body parts made up of silicon rubber and PVC, mimicking accurate anatomical structures. These mannequins can be fitted with electronic devices to produce normal /abnormal heart, lung and abdominal sounds. Palpation of abdomen to appreciate normal/abnormal liver, spleen, intestines, male and female pelvic organs and different positions of foetus. CPR mannequins are used in basic and advanced life support skills training. Various clinical conditions and scenarios can be programmed on these simulaids. It can be used to evaluate the performance of skills, especially for the Post Graduate students of Emergency medicine.

Simulaids for utilized for basic and advanced surgical skills , various non invasive procedures as well as different surgical operations. Students can engage in repetitive practice with increasing levels of difficulty. Students can repeatedly practice skills to acquire proficiency.

The simulaids with programmed clinical conditions to conduct undergraduate and post-graduate practical examinations instead of live patients.

The following Simulation Stations with mannequins can be used for the following teaching/learning programmes:

**I. General Medicine:** Examination of Cardiovascular and Respiratory system with provision for detecting pneumothorax etc. With the help of Simulaids aspiration of pleural effusion, pneumothorax, pericardiocentesis etc. can be practiced.

**II. Surgery:** Simulaids can be used for acquiring basic surgical skills such as palpation of normal viscera, making incisions and putting sutures, practicing intravenous and intramuscular injections, catheterization of male and female and examination of breasts. PR examination, examination of prostate and practice of minor surgical procedures.

**III. Obstetrics & Gynecology:** Palpation of abdomen for identifying various presentations and positions of the foetus inside the uterus can be practiced with the help of mannequins. Simulaids also help in practicing the conduct of all types of deliveries including normal delivery, breach and other abnormal presentations and obstructed labour. Episiotomy can be practiced in the mannequins. Foetal heart can be monitored with provision for CPR of mother as well as the neonate. Simulaids also help in learning all pathological conditions of the uterus and fallopian tubes by pervaginal and bimanual examination.

**IV. Paediatrics:** With the help of baby mannequins intravenous and intramuscular injections can be practiced. Neonatal baby care can also be practiced with the help of simulaids.

**V. Orthopedic procedures:** joint examinations, intra articular injections, arthroscopy.

**VI Truma mannequins.** These mannequins are used for administration of first aid and performing different types of bandaging. ATLS can be practiced.

**VII. ENT :** Various ENT examinations can be practiced with simulaids. Different conditions of the tympanum can be visualised through the autoscope.

**VIII. Ophthalmology Fundus examination:**

**VIII- Emergency Medicine /Anaesthesia :** Intubation and Lumbar puncture.

**IX. Intensive Care Unit set up:** With Adult CPR mannequins for cardiopulmonary resuscitation with monitors , provision for creating artificially various cardiac conditions. For BCLS and ACLS training (with defibrillation facilities.)

**X. Emergency Stroke management training system**

**Basic training in Skill Lab:**

**Training Schedule:**

**III semester-** Every Friday, between 9 am to 12 noon during General Medicine, General Surgery and Obstetrics and Gynaecology postings.\*

**VI semester -** Two weeks continuous posting during the General surgery posting.

**Advanced Training**

During House Surgency

\* The Head of Departments of Medicine, Surgery and Obstetrics & Gynaecology can chalk out a scheme for giving training using simulaids. Each department will get approximately 8 hours during the posting in the III Semester. Evaluation can be done along with the 1<sup>st</sup> theory and practical examination conducted at the end of 3<sup>rd</sup> semester. Intensive training can be given during house surgency.

## **VALUE BASED EDUCATION (3MI.VB)**

### **Elective**

#### **Objectives**

Education is not to become special, but to become humble, so that you can keep the doors of your heart always open, letting knowledge flow into you instantly. The Institution always strives to instill the correct values in the student in addition to world class training.

#### **Course Outcomes**

**CO1:** The attitude to be a good human being, with the curiosity to continue lifelong learning.

**CO2:** The conviction to do service to humanity - to put the interests of the individual patient as the foremost priority.

**CO3:** Acquisition of the “skills for life” in addition to the skills to live.

**CO4:** Acquisition of positive lifelong values.

**CO5:** The “practical applications” of the right values.

## PHASE II

### Semester III, IV and V

The students who pass the Phase I Subjects are permitted to enter the Phase II; which extends to semesters III, IV and V. The subjects taught in this Phase are Pathology, Microbiology, Pharmacology and Forensic Medicine, Community Medicine which extends up to semester VII is also dealt within phase II. These subjects are generally called Para clinical subjects.

During this phase, the students get exposure to clinical subjects like General Medicine, General Surgery, Obstetrics & Gynaecology, Paediatrics, Psychiatry, Radiology, Dermatology, Pulmonology, Orthopaedics, Ophthalmology, Oto rhino laryngology, Anaesthesiology and Dentistry. Every forenoon, the first hour is devoted for clinical lectures. The remaining hours are devoted for clinical teaching. The student will be posted to various clinical units, outpatient departments, emergency departments, operation theatres, clinical laboratories.

Subject	Lecture Hrs	Practical/ Clinical	Innovative Sessions	Total
<b>Pharmacology</b>	106	128	86	<b>320</b>
<b>Pathology</b>	100	100	104	<b>304</b>
<b>Microbiology</b>	80	80	80	<b>240</b>
<b>Forensic Medicine</b>	34	20	50	<b>104</b>
<b>Community Medicine</b>	64		192	<b>256</b>

There will be three internal assessment examinations for the Phase II subjects. The final internal examination will be conducted during the 1st week of fifth month of semester V. The 2nd Professional University examination will be held in the first week of sixth month of semester V.

#### Schedule of Examination.

Subject	Last week of January 2020	Last week of July 2020	First week of December 2020	First week of January 2021
<b>Pharmacology</b>				
<b>Pathology</b>	do	do	do	do
<b>Microbiology</b>	do	do	do	do
<b>Forensic Medicine</b>	do	do	do	do

#### Distribution of Marks for the Internal Assessment and University Examinations

Subject	University Examination					Internal Assessment		
<b>Pharmacology</b>	40	40	25	15	120	15	15	30
<b>Pathology</b>	40	40	25	15	120	15	15	30
<b>Microbiology</b>	40	40	25	15	120	15	15	30
<b>Forensic Medicine</b>	40	-	30	10	80	10	10	20

Each Theory question paper will have A&B sections carrying equal marks.

The questions will be short answer / short structured type.

Practical Examination will be objective with structured evaluation.

## **PATHOLOGY (2MB.PA)**

### **1. Goal:**

The goal of teaching pathology is to provide undergraduate students comprehensive knowledge of the causes and mechanisms of disease, in order to enable them to achieve complete understanding of the natural history and clinical manifestations of the disease.

### **2. Competencies:**

The Indian Medical Graduate will acquire the knowledge, skills and attitude necessary to attain the following competencies to.

- Understand the various processes and their mechanisms which govern general pathology.
- Apply their knowledge of mechanisms to disorders arising in the major organ systems.
- Understand the epidemiology, gross and microscopic features, as well as the presentation, the natural history and complications when untreated.
- Understand the basic pathology in blood disorders, identify and interpret the tests.
- Apply knowledge of disease mechanisms and processes to the unique patient at hand in the clinicopathological correlations.
- Identify, perform and interpret the different diagnostic tests in clinical pathology.
- Understand the basics of transfusion medicine to enable him/her to perform basic tests, order appropriate blood products and recognize laboratory support in adverse reactions.
- Know how to perform autopsy and correlate the various pathology in different organ systems in order to provide cause of death.
- Be aware of the newer advances in pathology and their applications in relation to important diseases
- Be able to engage in group learning, peer teaching and understand the value of working effectively in a multi disciplinary team meeting.

### **3. Educational Objectives:**

#### **a. Knowledge:**

At the end of one and half years, the student shall be able to:

- Describe the structure and ultrastructure of a sick cell, the mechanisms of the cell degradation, cell death and repair. And be able to correlate structural and functional alterations in the sick cell.
- Explain the pathophysiological processes which governs the maintenance of homeostasis, mechanism of their disturbances and the morphological and clinical manifestation associated with it.
- Describe the mechanisms and patterns of tissue response to injury to appreciate the pathophysiology of disease processes and their clinical manifestations.
- Correlate the gross and microscopic alterations of different organ systems in common diseases to the extent needed to understand disease processes and their clinical significance.
- Develop an understanding of neoplastic change in the body in order to appreciate need for early diagnosis and further management of neoplasia.
- Understand mechanisms of common haematological disorders and develop a logical approach in their diagnosis and management.

#### **b. Skills:**

At the end of one and half years, the student shall be able to:

1. Describe the rationale and principles of technical procedures of diagnostic laboratory tests.
2. Interpret diagnostic laboratory tests and correlate with clinical and morphological features of diseases.

3. Perform simple bedside tests on blood, urine and other biological fluid samples.
4. Draw a rational scheme of investigations aimed at diagnosing and managing common disorders.
5. Recognize morbid anatomical and histopathological changes for the diagnosis of common disorder.

**c. Attitude:** At the end of one and half years the student develops an ability to integrate the causes, mechanisms of disease, biobehavioural and clinical sciences to analyse and solve problems related to the diagnosis, treatment and prevention of diseases.

#### 4. Teaching hours:

Total duration of teaching of Pathology is 300 hours in 3 Semesters of III, IV and V put together.

#### Distribution of Teaching Hours:

- A. Theory (Didactic lectures, Symposiums) 140 hrs.
- B. Practicals -100 hrs.
- C. Clinical Pathology -40hrs
- D. Revisions - 20hrs.

#### 5. Syllabus:

The Broad area of study shall be:

- I. General Pathology
- II. Systemic Pathology
- III. Haematology &
- IV Clinical Pathology

#### Course Outcomes

CO1: Comprehensive knowledge of the causes and mechanisms of disease.

CO2: Understanding of the various processes and their mechanisms which govern general pathology and the ability to apply the knowledge to disorders arising in the major organ systems.

CO3: Knowledge of the epidemiology, gross and microscopic features, as well as the presentation, the natural history and complications of diseases when untreated.

CO4: Knowledge of the basic pathology in blood disorders, identify and interpret the tests.

CO5: Application of the knowledge of disease mechanisms and processes to the unique patient at hand in the clinicopathological correlations.

CO6: Competency to identify, perform and interpret the different diagnostic tests in clinical pathology.

CO7: Knowledge of the basics of transfusion medicine to enable him/her to perform basic tests, order appropriate blood products and recognize laboratory support in adverse reactions.

CO8: Knowledge of how to perform autopsy and correlate the various pathology in different organ systems in order to provide cause of death.

CO9: Awareness of the newer advances in pathology and their applications in relation to important diseases

## I GENERAL PATHOLOGY :

### 1. Cell Injury:

**Must know:** Causes and mechanisms of cell injury.  
Responses to cell injury-Adaptations,  
Reversible, Intracellular accumulations.  
Irreversible: Necrosis Apoptosis; Gangrene;  
Free radical injury & ischemia-Reperfusion injury and antioxidants  
Pathological calcification.

**Desirable to know:** Subcellular changes in reversible injury, Autophagy  
Necroptosis & Pyroptosis  
Telomeres and cellular aging

### 2. Inflammation & Repair:

**Must know:** Define and describe causes, features, vascular and cellular events,  
morphological types, Chemical mediators & fate of acute inflammation  
Definition, causes and features of Chronic inflammation;  
Granulomatous inflammation. & Granulation tissue;  
Regeneration and Repair; Wound healing by primary and secondary intention;  
Fracture healing; Factors promoting and delaying the process and complications  
Systemic effects of Inflammation.

**Desirable to know:** Neutrophil Extracellular Traps; Defects in leukocyte function

### 3. Hemodynamic Disorders:

**Must know:** Edema –Pathogenesis and types ;Exudate and Transudate.  
Hyperemia & Congestion; CVC Lung, liver and spleen  
Thrombosis –etiopathogenesis, morphology effects and fate of thrombosis  
Embolism & infarction :Definition, types of embolism & infarction;  
morphological changes and clinical significance  
Shock: Define, classify, understand pathogenesis, stages & morphological changes in shock

### 4. Genetic disorders:

**Must know:** Normal karyotype, classification of genetic disorders, inheritance pattern of non-Mendelian disorders; Down's syndrome, Klinefelter's syndrome, Turner's syndrome; Marfan's; Gaucher, Nieman Pick, Methods of disease diagnosis including FISH, PCR

**Desirable to know:** Glycogen storage disorders; Other Lysosomal storage disorders, Single gene disorders; genomic imprinting; Microarray.

### 5. Immunopathology:

**Must know:** Hypersensitivity reactions; Autoimmune diseases-SLE; Amyloidosis: AIDS-Pathogenesis, investigations, infections & malignancy associated.

**Desirable to know:** Immunodeficiency syndromes. Transplant rejection; GVHD.

### 6. Neoplasia:

**Must know:** Definition, Nomenclature and classification; differentiate benign from malignant Neoplasms; Hallmarks of cancer; Precancerous conditions; Carcinogenesis-etiological agents & steps involved in chemical carcinogenesis;  
by radiation & microbial agents

Metastasis, grading and staging  
Molecular basis of cancer –Oncogenes, Proto-oncogenes, Tumour suppressor genes  
Anti-apoptotic genes; Oncoproteins; Paraneoplastic syndromes;  
Lab diagnosis of tumours.

**Desirable to know:** Carcinogenesis by hereditary & occupational causes.  
Genomic instability; Epigenetics; Tumour immune surveillance and cancer  
Knudson's theory

#### 7. Infectious diseases:

**Must know:** TB, Leprosy, Typhoid fever, Syphilis. Histoplasmosis, Actinomycosis, Fungal diseases – Aspergillosis, Candidiasis, Mucormycosis & opportunistic infections, Malaria, Filariasis, Amoebiasis, Rhinosporidiosis, Herpes, Measles, CMV, EBV.

#### 8. Environmental and Nutritional diseases:

**Must know:** Radiation injury, air & food pollution, PEM, Vitamin & Zinc deficiency disorders,

**Desirable to know:** Obesity

#### 9. Diseases of Infancy & Childhood:

**Must know:** Cystic fibrosis, Hyaline membrane disease; fetal hydrops; Malignant tumours- Neuroblastoma, Nephroblastoma, Retinoblastoma.

**Desirable to know:** Congenital anomalies; Prematurity

### II. Hematopathology:

**Must know:** **RBC:** Hematopoiesis, Anemia and its classification, iron deficiency anemia; Megaloblastic anemia, Hemolytic anemia-classification, workup, Thalassemia, Hereditary spherocytosis, SCA, AIHA: Aplastic anemia.  
**WBC:** Leukocytosis, Leukopenia, Leukemoid reaction, Acute and chronic leukemias; Multiple myeloma, Myeloproliferative disorders: Polycythemia & myelofibrosis  
Hemostatic disorders: Platelet deficiency, ITP  
Coagulation disorders: Hemophilia, DIC

**Desirable to know:** MDS, G6PD deficiency, PNH, TTP/HUS, MAHA, Hairy cell leukemia.

### III Systemic Pathology:

#### 11. CVS:

**Must know:** Atherosclerosis; Hypertension; vasculitis, aneurysms, vascular tumours  
Ischaemic heart disease; Rheumatic heart disease: Infective endocarditis, Differential diagnosis of cardiac vegetations; Heart failure.

**Desirable to know:** Congenital heart disease; Cardiomyopathies; Cardiac tumours; Pericardial disease;

#### 12. RS:

**Must know:** Inflammatory diseases of Bronchi-chronic bronchitis and bronchiectasis, Pneumonias; Lung Abscess; pulmonary tuberculosis.  
Obstructive lung disorders –Emphysema; Asthma.  
Restrictive lung disease: Idiopathic pulmonary fibrosis;  
Hypersensitivity pneumonitis.  
ARDS  
Occupational lung disorders-silicosis; asbestosis CWP.



Tumours of lung and pleura.

Nasopharyngeal carcinoma and laryngeal tumours.

**Desirable to know:** Interstitial lung disease

### 13. Renal and Urinary Tract Pathology:

**Must know:** Structure of glomeruli, renal function tests & urine analysis,

Glomerulonephritis –Primary proliferative and non proliferative, Secondary (SLE, Amyloidosis, Diabetes)

Nephrotic syndrome and the nephritic syndromes

Pyelonephritis, reflux nephropathy, Nephrolithiasis & obstructive nephropathy

Cysts of the kidney; Renal failure; Acute tubular injury;

Tumours of Kidney and Pelvis

**Desirable to know:** Hypertensive renal disease; Thrombotic microangiopathies, drugs and toxins causing renal injury.

### 14. GIT:

**Must know:** Precancerous lesions and carcinoma of Oral cavity; Salivary gland tumours.

GERD ; Ca oesophagus.

Gastritis, Peptic Ulcer, Carcinoma stomach,

Ulcers of Intestines- Typhoid, tubercular, amoebic ulcers and bacillary dysentery.

Ulcerative colitis and Crohn's; Appendicitis;

Intestinal polyps; malabsorption syndromes-coeliac disease, Whipples Carcinoma colon; GI stromal tumours.

**Desirable to know** Odontogenesis cysts and tumours; Hirschsprung disease; Tumours of the appendix

### 15. Liver and Gall Bladder:

**Must know:** Jaundice; Viral Hepatitis; NASH; Alcoholic liver disease; Cirrhosis.

Gall bladder: Cholecystitis, cholelithiasis and tumours

Hepatocellular carcinoma.

**Desirable to know** Wilson's disease, Hemochromatosis, Portal hypertension, Autoimmune hepatitis, primary biliary cirrhosis, primary sclerosing cholangitis Autoimmune hepatitis.

Tumours of exocrine and endocrine Pancreas.

### 16. MGS and Lower Urinary Tract:

**Must know:** . Cryptorchidism; Tuberculous epididymo orchitis, Tumours of testis

Benign prostatic hyperplasia; Carcinoma Prostate and urinary bladder;

Carcinoma Penis

**Desirable to know** Congenital anomalies of MGS; Malakoplakia; Prostatitis, Metaplastic lesions of bladder.

1

### 7. FGS and Breast:

**Must know:** Carcinoma Cervix; Carcinoma Uterus; Leiomyoma; Endometriosis and adenomyosis.

Tumours of Ovary; Complete and Partial Hydatidiform mole; Choriocarcinoma,

Fibroadenoma, Phyllodes tumour, & Carcinoma breast

**Desirable to know:** Tumours of Vulva and Vagina; Pagets disease of Vulva; Endometrial polyps & hyperplasia; PCOD; PID

#### 18. Endocrine system:

**Must know:** Diffuse & multinodular goiter; Hashimoto's thyroiditis; Grave's disease; carcinoma of thyroid  
Diabetes mellitus  
Parathyroid hyperplasia and tumours  
Pheochromocytoma ; Cushings syndrome

**Desirable to know** Addison's disease; MEN syndromes; Pituitary adenomas; Prolactinoma

#### 19. Bones Joints and Soft Tissue Pathology:

**Must know:** Osteomyelitis-acute chronic, tuberculous,  
Rickets/osteomalacia; Osteoporosis; Paget's disease, Rheumatoid arthritis,  
Osteoarthritis & Gout  
Bone tumours - Osteosarcoma, Osteoclastoma, Ewing's sarcoma; Plasmacytoma  
Soft tissue tumours -Lipoma, Neurofibroma, Schwannoma hemangioma

**Desirable to know:** Fibrous dysplasia; Aneurysmal bone cyst; Osteochondroma; Chondrosarcoma ; Synovial sarcoma;

#### 20. Lymphoreticular System:

**Must know:** Common causes of lymphadenopathy and Splenomegaly  
Hodgkin's lymphoma-classification, morphology and staging  
Non Hodgkins lymphoma: classification ,Lymphoblastic, Burkitt's, DLBCL, Follicular  
Mycosis fungoides, Sezary syndrome

**Desirable to know:** Anaplastic large cell lymphoma; Hypersplenism, Thymomas

#### 21. CNS:

**Must know:** Inflammatory disorders: various types of Meningitis,brain abscess, Tuberculoma  
WHO classification of brain tumours; Gliomas, Meningioma  
Cerebrovascular disease: atherosclerosis, thrombosis, embolism, aneurysm, hypoxia, infarction, hemorrhage; Alzheimer's disease

**Desirable to know:** Degenerative brain disease

#### 22. Dermatopathology:

**Must know:** Psoriasis, Lichen planus , Skin tumours: SCC, BCC, Nevus, Malignant melanoma

**Desirable to know:** Bullous diseases, Eczema

#### IV. Clinical Pathology:

**Must know:** . Different methods of Hb estimation; ESR, PCV  
Urine analysis- Physical, Chemical ,Microscopic examination of Urine  
LP & CSF analysis; Bone marrow; Liver biopsy  
FNAC & Exfoliative cytology  
Blood groups and their relevance, Components used in practice;  
Autologous transfusion; Transfusion reactions; Coombs test; Erythroblastosis fetalis  
Tissue processing techniques; Instruments; Charts

Automatic Tissue Processing Machines  
Frozen Section - Preparation , uses , Staining techniques

**Desirable to know IHC, IF, IPT**

### **PRACTICAL:**

Practical classes will have slide/specimen discussion along with clinicopathological correlation (CPC) discussions at the end of each chapter. The list of histopathology slides and specimens shown to them are given below.

#### **Histopathology slides:**

1. Fatty liver 2. Monckebergs sclerosis 3. Hyaline change 4. Coagulative necrosis 5. Fat necrosis 6. Acute appendicitis 7. Osteomyelitis 8. TB intestine 9. TB lymphnode 10. FB granuloma 11. Tuberculoid leprosy 12. CVC lung 13. CVC spleen 14. Amyloid kidney 15. Lipoma 16. Squamous cell papilloma 17. Fibroadenoma breast 18. Capillary hemangioma 19. Cavernous hemangioma 20. Serous cystadenoma 21. Benign cystic teratoma 22. Leiomyoma 23. Actinomycosis 24. Rhinosporidiosis 25. Atheroma 26. Pneumonia 27. Pleomorphic adenoma 28. Signet ring cell carcinoma stomach 29. Adenocarcinoma colon 30. Cirrhosis liver 31. Chronic pyelonephritis 32. Nephroblastoma 33. Renal cell carcinoma 34. Transitional cell carcinoma 35. Seminoma 36. Colloid goitre 37. Hashimoto's thyroiditis 38. Papillary carcinoma thyroid 39. Hodgkin's disease 40. Secondaries lymphnode, 41. Squamous cell carcinoma 42. Basal cell carcinoma 43. Malignant melanoma 44. Osteosarcoma 45. Osteoclastoma 46. Meningioma 47. Schwannoma

#### **Gross specimens:**

1. Stones. 2. Staghorn calculi. 3. Acute Appendicitis. 4. Acute cholecystitis. 5. TB lymphnode. 6. Gangrene intestine 7. Gangrene foot 8. CVC spleen 9. Infarct spleen 10. Hydatid cyst 11. Lipoma 12. Ca. Larynx 13. Cavity lung 14. Carcinoma lung 15. FAP colon 16. Amoebic ulcer colon 17. Carcinoma colon 18. Cirrhosis liver 19. Polycystic kidney 20. Renal cell carcinoma 21. Carcinoma bladder 22. Malignant melanoma 23. Ca penis 24. Serous pap. cyst adenoma, ovary 25. Teratoma ovary 26. Leiomyoma uterus. 27. Carcinoma cervix 28. Carcinoma uterus 29. Fibroadenoma breast 30. Ca breast 31. MNG-thyroid. 32. Osteosarcoma 33. Osteoclastoma.

#### **Haematology Slides:**

1. Neutrophil 2. Eosinophil 3. Iron deficiency anemia 4. CML 5. AML 6. Normoblast 7. Sick cell 8. LE cell 9. Plasma cell 10. Malarial parasite 11. Megakaryocyte 12. Spherocyte 13. Elliptocyte. 14. Target 15. Acanthocyte 16. Burr cell

#### **Charts:**

1. Iron deficiency anemia 2. Megaloblastic anemia 3. Haemolytic anemia 4. Thalassemia 5. Sick cell anemia 6. Acute leukemia 7. AML-M4 8. CML 9. Obstructive jaundice 10. Haemolytic jaundice 11. Hemophilia 12. CSF- bacterial meningitis 13. CSF -viral meningitis 14. CSF -TB meningitis 15. Acute glomerulonephritis 16. Nephrotic syndrome 17. GTT 18. Semen analysis

#### **Instruments:**

1. LP needle 2. BM needle 3. Liver biopsy (trucut) needle 4. Albuminometer 5. L block 6. Block holder 7. Cassette 8. Ayre's spatula 9. Paraffin block 10. FNAC model 11. ESR tube 12. RBC pipette 13. WBC pipette 14. Counting chamber 15. PCV tube 16. HB pipette 17. Urinometer  
18. Automatic Tissue Processor

#### **AUTOPSY:**

To study and describe two autopsy reports.

### DETAILS OF PRACTICALS (100 hrs)

General Pathology, Haematology, Clinical Pathology and Systemic Pathology. The practical classes include.

1. Gross specimens
2. Microscopic slides for identification
3. Identification of instruments with their uses
4. Discussion on charts
5. Peripheral smear- staining and reporting of the given smear
6. Hb estimation and blood group examination
7. Total WBC count and PCV estimation
8. Routine urine examination including Microscopic examination
9. ESR estimation from the given sample of blood

The student has to write clinical pathology, histopathology, Post Mortem findings of 2 cases in record. Clinical Pathology Posting for 15 days will be set apart, where the students will be posted to the different labs.

#### Schedule of Internal and University Examination:

1 <sup>st</sup> Internal Assessment	2nd Internal Assessment	Final Internal Assessment	University Examination
Last week of January 2020	Last week of July 2020	First Week of December 2020	First week of January 2021

#### Distribution of Marks for Internal Assessment:

Theory	Practical	Total
15	15	30

#### Distribution of Marks for University Examination:

Theory Paper I	Theory Paper II	Practical	Viva voce	Total
40	40	25	15	120

### University Examination

#### Theory:

Division of topics:

Paper I- General Pathology, Hematology and Clinical Pathology

Paper II-Systemic Pathology

Each paper will have 2 sections- Section-A & Section –B (see model question papers on pages 177 & 178)

**Practicals:**

1. Spotters at 20 stations which include histopathology & haematology slides, instruments, charts, gross specimens, urine and haematology tests.
2. Peripheral smear preparation and staining
3. Peripheral smear reporting
4. Blood grouping
5. WBC count/Hb estimation

**Evaluation of Practical:**

Spot- ters (20) 20x2	Peripheral Smear Prepara- tion & Staining	Report- ing of Periph- eral Smear	Blood Group ing	Hb/ WBC Estima- tion	Urine Analy- sis	Record	Total Score	Total Marks
40	10	10	10	10	10	10	100	25

**Viva voce:** All examiners will individually assess each candidate. It is conducted at 4 stations covering all the topics in Hematology, Clinical Pathology, General Pathology and Systemic Pathology.

**Textbooks Recommended**

1. Pathological basis of disease. - Robbins and Cotran
2. General and systemic Pathology – JCE Underwood
3. Clinical Haematology in medical practice – De Gruchy- Livingston
4. Hematology - Dr. Tejinder Singh
5. Textbook of pathology by Dr. Harsh Mohan
6. Preparatory manual of Pathology for undergraduate students by Dr. Ramdas Naik
7. Text book of Hematology and clinical Pathology by Dr. Ramdas Naik

# MICROBIOLOGY (2MB.MI)

## Goal

The broad goal of teaching undergraduate students in Microbiology is to provide an understanding of the natural history of infectious disease in order to deal with etiology, pathogenesis, laboratory diagnosis, treatment and control of infections in the community.

## Competencies:

The Indian Medical Graduate will acquire the knowledge, skills and attitude necessary to attain the following competencies.

- To describe the morphology of bacteria.
- To demonstrate the various methods of sterilisation practiced in the microbiology laboratory.
- To interpret the various antigen antibody reactions.
- To identify various hypersensitivity reactions.
- To diagnose Mycobacterium tuberculosis infection using laboratory techniques.
- To diagnose the syphilis using laboratory techniques.
- To diagnose MRSA infection using laboratory techniques.
- To diagnose Hepatitis B using laboratory techniques.
- To diagnose HIV using laboratory techniques.
- To diagnose intestinal parasitic infections using wet mount of stool.

## Objectives

The objective of teaching medical microbiology is to enable the student to understand the natural history of infectious diseases in order to deal with the etiopathogenesis, laboratory diagnosis and control of infections in the community and the hospital set up as well..

## Knowledge:

At the end of the course, the student shall be able to:

- State the infective micro-organisms of the human body and describe the host parasite relationship;
- List pathogenic micro-organisms (bacteria, viruses, parasites, fungi) and describe the pathogenesis of the diseases produced by them.
- State or indicate the modes of transmission of pathogenic and opportunistic organisms and their sources, including insect vectors responsible for transmission of infection;
- Describe the mechanisms of immunity to infections;
- Acquire knowledge on suitable antimicrobial agents for treatment of infections and scope of immunotherapy and different vaccines available for prevention of communicable diseases;
- Apply methods of disinfection and sterilization to control and prevent hospital and community acquired infections;
- Recommend laboratory investigations regarding bacteriological examination of food, wa-

ter, milk and air.

**Skills:**

At the end of the course, the student shall be able to:

- Plan and interpret laboratory investigations for the diagnosis of infectious diseases and to correlate the clinical manifestations with the etiological agent.
- Identify the common infectious agents with the help of laboratory procedures and use antimicrobial sensitivity test to select suitable antimicrobial agents;
- Perform commonly employed bed-side tests for detection of infectious agents such as blood film for malaria, filarial, gram staining and Acid Fast Bacilli (AFB) staining and stool sample for ova cyst etc.;
- Use the correct method for collection, storage and transport of clinical material for microbiological investigations.

**Attitude:**

The student shall understand infectious diseases of national and regional importance in relation to the clinical, therapeutic and preventive aspects.

**Course Outcomes:**

CO1: Knowledge of the natural history of infectious disease in order to deal with etiology, pathogenesis, laboratory diagnosis, treatment and control of infections in the community.

CO2: Competency to demonstrate the various methods of sterilisation practiced in the microbiology laboratory.

CO3: Competency to interpret the various antigen antibody reactions.

CO4: Competency to identify various hypersensitivity reactions.

CO5: Competency to diagnose Mycobacterium tuberculosis infection using laboratory techniques.

CO6: Competency to diagnose the syphilis using laboratory techniques.

CO7: Competency to diagnose MRSA infection using laboratory techniques.

CO8: Competency to diagnose Hepatitis B using laboratory techniques.

CO9: Competency to diagnose HIV using laboratory techniques.

CO10: Competency to diagnose intestinal parasitic infections using wet mount of stool.

## Teaching Hours

Lecture	Practical	Innovative Sessions	Total
80	80	80	240

## Schedule of Lectures

Topic	Hours
<b>General microbiology (12 hours)</b>	
1 Introduction to Microbiology	1
2 Morphology & physiology of bacteria	2
3 Culture media, identification of bacteria	1
4 Sterilization & disinfection	2
5 Bacterial genetics and drug resistance	3
6 Molecular methods in lab diagnosis	1
7 Antibacterial agents & antibiotic sensitivity tests	1
8 Infection	1
 <b>Immunology (17 hours)</b>	
1 Introduction , classification of immunity cells involved in immunity	1
2 Antigen	1
3 Antibody	1
4 Antigen- Antibody reactions	2
5 Structure and functions of Immune system	2
6 Immune response	2
7 Complement in health & disease	1
8 H L A antigens in health & disease	1
9 Autoimmunity	1
10 Tumour & transplantation immunity	1
11 Immunodeficiency diseases	1
12 Immuno hematology	1
 <b>Systematic Bacteriology (30 hours)</b>	
1 Staphylococci	1
2 Streptococci	1
3 Pneumococci	1
4 Neisseria	1
5 Coryne bacterium	1
6 Mycobacteria	1
7 Bacillus	1



8	Clostridia	2
9	Nocardia and Actinomycetes	1
10	Nonsporing anaerobes	1
11	Enterobacteriaceae	3
12	Hemophilus & Bordetella	1
13	Brucella	1
14	Yersinia , Pasteurella & Francisella	1
15	Pseudomonas	1
16	Vibrio and campylo bacter	2
17	Listeria and Legionella	1
18	Spirochaetes	3
19	<b>Leptospira</b>	<b>1</b>
20	Mycoplasma	1
21	Rickettsiae	1
22	Chlamydiae	1
23	Miscellaneous	1
<b>Virology (20 hours)</b>		
1	General characteristics of viruses & cultivation	1
2	Virus host interactions,Replication of virus,Interferons	1
3	Diagnosis of viral infections , Bacteriophage	1
4	Poxviruses Adenoviruses & Herpesviruses	2
5	Picorna Viruses	1
6	Myxoviruses	3
7	Arboviruses	2
8	Hepatitis viruses	3
9	Slow Viruses	1
10	Miscellaneous Viruses	1
11	Human Immunodeficiency Virus	2
12	Rhabdoviruses	1
13	Retroviruses & Oncogenic Viruses	1
14	<b>Henipavirus</b>	<b>1</b>
<b>Mycology (5 hours)</b>		
1	Introduction classification &Lab. Diagnosis	1
2	Superficial fungal infections	1
3	Sub cutaneous fungal infections	1
4	Deep mycotic infections	1
5	Opportunistic fungi	1
<b>Parasitology -19</b>		
1	Introduction to parasitology	1
2	Entamoeba	1
3	Free living amoebae	1
4	Flagellates – Intestinal and Genital	1
5	Hemoflagellates - Leishmania	1
6	Hemoflagellates -Trypanosoma	1
7	Plasmodium & Babesia	2

8	Toxoplasma & Balantidium coli	1
9	Intestinal coccidian parasites & Microsporidia	1
10	Cestodes	2
11	Trematodes	2
12	Intestinal Nematodes I – Trichuris, Enterobius, Strongyloides	1
13	Intestinal Nematodes II – Ascaris and Trichinella	1
14	Intestinal Nematodes II – Hookworm and Larva Migrans	1
15	Tissue nematodes - Filarial Nematodes I	1
16	Filarial Nematodes II and Dracunculus	1

### **Applied Microbiology (4 hours)**

1	Infection control practices	1
2	Healthcare associated infections	1
3	Bacteriological analysis of food, water, milk & air	1
4	Disposal of Hospital waste	1
5	Selection of Antimicrobials based on culture and sensitivity	1

### **Integrated learning (4 hours)**

1	<b>Horizontal integration (3<sup>rd</sup> semester)</b> Topic: Hypersensitivity reactions Departments involved: Microbiology, Pathology and Pharmacology	2
2	<b>Vertical integration(4<sup>th</sup> semester)</b> Topic: Tuberculosis Departments involved: Anatomy, Microbiology, Pathology, Pharmacology, Medicine, Surgery (30 minutes for Microbiology and Pathology, 15 minutes for other	2

### **Schedule of Practicals**

1	Microscopy	1
2	Staining methods	1
3	Simple staining	1
4	Gram staining	4
5	Culture media and culture methods	1
6	Identification of bacteria	1
7	Sterilization & Disinfection	1
8	Ziehl-Neelsen staining	4
9	Lacto phenol cotton blue mount for fungi-demonstration	1
10	Parasitology – demonstration of ova/cyst in stool	1
11	Hanging drop preparation demonstration	1
12	Spotters- Structured exercises - Covering all sections	5
13	Antibiotic sensitivity test	1
14	Antigen Antibody reactions	1

**Applied Microbiology/ Clinical Microbiology  
(Demonstration cum practical) 56hrs**

1	Collection & despatch of specimens	1
2	Oropharyngeal infection	2
3	Wound infections	2
4	Respiratory tract infections	1
5	Meningitis-Pyogenic/fungal	1
6	Gastrointestinal infections	2
7	Urinary tract infections	1
8	Urethritis	1
9	Aseptic meningitis & encephalitis	2
10	Blood culture techniques	1
11	Equipments/ Instruments (Lab visit)	1
12	Interpretation of lab results	1
13	Pyrexia of Unknown Origin	1
14	Zoonotic infections	1
15	Sexually transmitted diseases	1
16	Tuberculosis	1
17	Vector borne diseases	2
18	Blood borne infections	2
19	Bone and joint infections	1
20	Infections of eye and ear	1
21	Congenital infections	1
22	Immuno prophylaxis& immunotherapy	1
	Revision -Seminar/Formative evaluation/Practical tests	30

**Assessment**

**Schedule of Internal and University Examinations**

First Internal assessment	Second Internal assessment	Final Internal assessment	University Examination
Last week of January 2020	Last week of July 2020	First week of December 2020	First week of January 2021

**Distribution of Marks for Internal Assessment and University Examination**

University Examination					Internal Examination		
Theory I	Theory II	Practical	Viva voce	Total	Theory	Practical	Total
40	40	25	15	120	15	15	30

**Internal Assessment**

Internal assessment consists of internal assessment examinations and continuous evaluation during the course. Continuous evaluation during the course includes practical record book maintenance, performance in theory and practical tests, evaluation of student assignment etc. Three theory internal assessment exams & one practical internal assessment exam will be conducted. Practical internal assessment exam will be conducted after the third theory internal assessment as part of the third internal assessment.

The first & the second theory internal assessment examinations will be conducted in the afternoons of the last week of semesters III and IV as examination week and the third internal assessment (theory & practical) just before the University Examination.

The duration of the first and second internal assessment examinations will be of two hours each and the question paper pattern will be same as university examination. The third theory internal assessment examination will have 2 papers and will be conducted in the actual pattern of the University Examination. Of the consolidated theory internal assessment marks, 50% may be based on the last internal assessment examination and the rest 50% based on the first & the second internal assessment examinations and continuous evaluation during the course. Weightage for the continuous evaluation during the course should be 20% of the total marks in the subject.

### **University examination:**

#### **Theory:**

There will be two papers – Paper I and Paper II Examination is to be conducted on two days. Duration of each Paper will be of two hours. Each Paper carries a total of 40 marks.

**Paper I** includes General Bacteriology, Systematic Bacteriology and Immunology.

**Paper II** includes Virology, Parasitology, Mycology, & Clinical Microbiology.

Each Paper will have two sections – Section A & B.

**Section A** includes:

Draw and label (2 questions- 1 mark each), Short Notes (4 questions-2 marks each), Short Essay (2 questions -5 marks each).

**Section B** includes:

Structured Essay (1 question - 10 marks), Short Notes (5 question - 2 marks each)

#### **Practical:**

Practical examination will be conducted in the laboratory. The objective of this examination is to assess the proficiency in the conduct of experiment, interpretation of data and logical conclusion. Structured evaluation will be done, 25 marks are to be allotted for practical examination. The exercises will be in the following pattern:

I. Two staining techniques. Gram staining and Ziel Neelsen staining of clinical material. (5+5=10 marks)

(For each exercise above: Skill – 2 marks, Diagram – 1 mark, Interpretation – 2 marks)

II. Clinical Case –A case scenario with 4 to 5 relevant exhibits(culture plates/ photographs/charts/serological test) are placed along with a series of questions. (5marks)

e.g.- A 30-year-old man presented with fever, arthralgia and jaundice. He gave a history of blood transfusion 6 months ago. On examination, there was tender hepatomegaly.

What is your diagnosis?

Describe the structure of the causative organism

Describe the serological markers of this disease  
What are the prophylactic measures to be taken?

III. 10 spotters-Structured exercises (Covering all topics as far as possible)  
(10 x1= 10 marks)

e.g.- Gram stained smear of organisms, grown anaerobically on BA.  
Aerobic plate has no growth

What is the organism likely to be?

Mention one or more infections it can cause? What is the drug of choice?

#### **Viva voce**

Four examiners will individually examine and assess each candidate. Marks will be divided among the examiners.

### **Textbooks Recommended**

#### **Prescribed Books (Latest Edition):**

1. Textbook of Microbiology – R.Ananthanarayanan & C.K. Jayaram Panicker
2. Essentials of Medical Microbiology- Apurba Sankar Sastry/Sandhya Bhat K
3. Textbook of Medical Parasitology – by C.K.Jayaram Panicker
4. Essentials of Medical Parasitology - Apurba Sankar Sastry/Sandhya Bhat K
5. Medical Microbiology - Jawetz, Melnick & Adelberg's

#### **Reference Books**

1. Basic Immunology : Functions and Disorders of the Immune System By Abdul K Abbas/ Andrew Lichtman/ Shiv Pillai
2. Textbook of Immunology by Roitt
3. Medical Microbiology & Immunology by Warren Levinson / Ernest Jawetz
4. Textbook of Parasitology by Chatterjee K.D
5. Medical Parasitology by RL Ichhpujani / Rajesh Bhatia
6. Koneman's Color Atlas and Textbook of Diagnostic Microbiology (Color Atlas & Textbook of Diagnostic Microbiology) Elmer. W. Koneman
7. Text Book of Medical Mycology by Jagadish Chander
8. Fields Virology(Knipe,Fields Virology)-2 Volume Set [Hardcover] by David M. Knipe/ Peter Howley
9. Mackie & McCartney – Practical Medical Microbiology by Collee/Fraser/Marmion/Simmons
10. Bailey & Scott's Diagnostic Microbiology by Forbes/ Sahm/Weissfeld

## PHARMACOLOGY (2MB.PH)

### Goal:

To guide a medical graduate to study the various aspects of the pharmacology of drugs so as to gain competence in the safe and rational use of drugs for the promotive, curative and rehabilitative purposes.

### Competencies:

The Indian Medical Graduate will acquire the knowledge, skills and attitude necessary to attain the following competencies.

1. To use essential medicines in the daily practice of the medical graduate.
2. To select drugs for common disease conditions based on objective criteria, individualise the selected drug for a particular patient and write a correct prescription.
3. To respond effectively to pharmaceutical promotion and the ability to use various independent sources of medicine information in the process of prescribing and providing treatment.
4. To use drugs, especially antimicrobials rationally.
5. To analyse prescribing in primary health facilities using WHO prescribing indicators and be able to use the same for self-analysis and improvement of own prescribing behaviour.
6. To communicate drug and non-drug information about common diseases with a simulated patient.
7. Report adverse drug reactions to the pharmacovigilance centre.
8. Diagnose and manage overdose.

### The Broad Objectives

- To understand the concept of “Rational Therapy”
- To practice “Rational Use of Drugs” based on the knowledge gained from the study of pharmacology of drugs.
- To develop good prescribing habits and communication skills.
- To understand the essence of “Essential Drug Concept” and be competent to make/modify the essential drug list of the institution.
- To uphold the principles of “Medical Ethics” in patient care, drug development and research.

### Objectives in Detail:

At the end of the course the student shall be able to:

#### Related to knowledge:

- Appreciate the relevance of studying the pharmacokinetics and pharmacodynamics of drugs.
- Understand the significance of alterations of pharmacokinetics and pharmacodynamics of drugs in the special groups like the paediatric, the geriatric, the pregnant and the lactating, the drug addict and the ethnic variant.
- Derive at the possible and probable indications, contra indications, interactions, and adverse effects of drugs based on the pharmacology of individual drug or groups of drugs.
- Understand the importance of eliciting drug history as a routine practice.
- Familiarize with the process of rational prescribing and rational treatment for the individual and the social group
- Recognise the common signs and symptoms of poisoning due to over dosage of medicines, natural substances and chemicals and chart out the line of management.
- Understand the deleterious effects of substance abuse and the principles of pre-

vention and treatment.

- Understand the importance of the concept of essential drugs and to participate in the process of updating essential drug list of the institution.
- Learn the protocol to be followed during the development and clinical trial of drugs.

**Related to skill:**

- Cultivate good prescribing habit based on the 'WHO Guidelines to Good Prescribing'
- Develop communication skill.
- Prescribe drugs for common ailments.
- Learn to critically evaluate drug prescriptions and formulations.
- Familiarise with the nature of common formulations like powder, elixir, mixture, lotion ointment, paste etc. and learn the technique of compounding and dispensing in a small set up like a pharmacy.
- Observe/perform some of the experiments designed to study the drug effects and learn to interpret the data elicited.
- Participate in activities like adverse drug event monitoring, therapeutic serum plasma drug level monitoring etc.

**Related to attitude:**

- Learn to respect and uphold the principles of ethics in personal life, in patient care and also during development and research.

**Training Method**

- Theory classes- Emphasis is given to drugs included in the essential drug list.
- Practical exercises.
- Project work.
- Problem based learning and presentation.
- Subject seminars.
- Integrated teaching –Vertical and horizontal Integration with other departments.
- Group discussions/tutorials.
- Oral, quiz, periodical assessment.
- Continued medical education programmes.

**Course Outcomes**

CO1: Competency to use essential medicines in the daily practice of the medical graduate.

CO2: Competency to select drugs for common disease conditions based on objective criteria, individualise the selected drug for a particular patient and write a correct prescription.

CO3: Competency to respond effectively to pharmaceutical promotion and the ability to use various independent sources of medicine information in the process of prescribing and providing treatment.

CO4: Competency to use drugs, especially antimicrobials rationally.

CO5: Competency to analyse prescribing in primary health facilities using WHO prescribing indicators and be able to use the same for self-analysis and improvement of own prescribing behaviour.

CO6: Competency to communicate drug and non-drug information about common diseases with a simulated patient.

CO7: Competency to report adverse drug reactions to the pharmacovigilance centre.

CO8: Competency to diagnose and manage overdose.

Systems	Hours	Systems	Hours
General Pharmacology	12	Autonomic Nervous System	10
Autacoids and Related drugs	6	Respiratory System	3
Kidney	4	Cardiovascular Systems	10
Peripheral Nervous System	2	Central Nervous System	14
Antimicrobial Chemotherapy	12	Chemotherapy of Parasites	6
Chemotherapy of Neoplasm	4	Immunomodulators	3
Hormones & Antagonists	13	Blood & Blood formation	4
Gastrointestinal Function	3	Toxicology	2
Miscellaneous	2		

**THEORY LECTURES:****Basic Principle:**

- The common diseases of the area to be identified
- Emphasis is to be given to drugs used more often for prophylaxis and treatment.
- The prototype representing the system /class and those included in the essential drug list alone to be discussed in depth. Frequently used preparations / formulations of that group/class may be compared with the prototype..
- The pharmacology required for understanding the basis of rational use in the clinical setting alone to be discussed.
- Principles of management of common diseases and poisonings are to be included in the discussion.
- Throughout the discussion, the importance of rational use of drugs to be stressed.

**Common Format For Discussion of Theory Topics:**

Definition, grouping/classification (preferably therapeutic classification), commonly used preparations, clinically relevant aspects of pharmacokinetics, mechanism of action, pharmacological actions, adverse effects, precautions, indications, contraindications and clinically significant interactions (topics arranged as per the divisions in the University examinations).



## **Syllabus: Formatted According to the Topics Selected for Examinations**

### **PHARMACOLOGY PAPER I**

Maximum Marks – 40

### **PHARMACOLOGY PAPER II**

Maximum Marks – 40

#### **Section A (20 marks)**

Sl. No Topics

**1. General Pharmacology**

- Introduction: Definitions, Nomenclature, Essential drug concept, Rational drug use.
- Routes of drug administration.
- Pharmacokinetics; Absorption, Bioavailability, Distribution, Biotransformation and Excretion.
- Pharmacodynamics: Principles of drug action, Mechanisms of drug action, Action- effect sequence, The relationship between drug concentration and effect, Combined effect of drugs, Dosage and factors modifying drug action.
- Adverse effects of drugs

**2. Autacoids & Related Drugs**

**Antihistamines: H<sub>1</sub> Blockers**

- 5-Hydroxytryptamine & their antagonists: Preparations and clinical uses.
- Eicosanoids: Prostaglandins, Leukotrienes & Platelet- activating factors: preparations and clinical uses of major eicosanoids.
- Non opioid analgesics & non steroidal anti-inflammatory drugs.
- Principles of drug therapy of migraine.
- Drugs for gout.
- Drugs for rheumatoid arthritis

**3. Autonomic Nervous System**

- General considerations.
- Cholinergic drugs : Esters of choline, Natural alkaloids.
- Anticholinesterases

- Anticholinergic drugs: Anti muscarinic agents- Natural alkaloids, semisynthetic and synthetic compounds.
- Adrenergic drugs, catecholamines and non catecholamines.
- Adrenergic receptor blockers

**4. Respiratory System:**

- Drugs for cough
- Drugs for bronchial asthma
- Principles of management of bronchial asthma

**Section B (20 marks)**

**5. Central Nervous System & Peripheral Nervous System:**

- General anaesthetics.
- Skeletal muscle relaxants.
- Local anaesthetics.
- Alcohols: ethyl alcohol, methyl alcohol.
- Sedative- hypnotics: benzodiazepines and miscellaneous drugs.
- Opioid analgesics and antagonists.
- Drugs for anxiety disorders, affective disorders and psychoses.
- Anti seizure drugs.
- Drugs for degenerative disorders: Parkinsonism.
- CNS stimulants (psycho stimulants) and cognition enhancers
- (Nootropics) preparations and uses

**6. Cardiovascular System, Drugs Affecting Coagulation and Lipid Lowering Agents:**

- Drug therapy of heart failure.
- Drugs therapy of myocardial ischaemia.
- Drug therapy of hypertension.
- Antiarrhythmic agents: Brief discussion based on salient features of the class.
- Drugs affecting coagulation and thrombosis.
- Plasma expanders.
- Drug therapy of shock.
- Drug therapy of hyperlipidemia

**7. Renal System**

- Diuretics
- Vasopressin and other agents affecting the renal conservation of water.
- Drugs affecting rennin - angiotensin - aldosterone mechanism.

**8. Blood Forming Agents**

- Haematopoietic agents: Growth factors, iron, folic acid and vitamin B<sub>12</sub>

**Section A (20 marks)**

**Sl. No Topics**

**1. Gastrointestinal Tract**

- Drug therapy of peptic ulcer.
- Drugs affecting gastrointestinal motility: Drugs for constipation, diarrhoea, emetics and anti emetics.
- Emetics and anti emetics

**2. Hormones**

- Hypothalamus and pituitary gland: Preparations and uses.
- Thyroid and antithyroid drugs.
- Pancreatic hormones and antidiabetic drugs.
- Adrenocorticosteroids and their analogues.
- Agents modifying bone mineral homeostasis: calcium, parathyroid hormone, calcitonin, vitamin D, biphosphonates

**3. Reproductive System**

- Gonadal hormones and inhibitors.
- Fertility and antifertility agents.
- Oxytocics, abortifacients, and tocolytics.

**Section B (20 marks)**

**4. Antimicrobial Chemotherapy**

- General principles of antimicrobial action.
- Sulphonamides and trimethoprim
- B -Lactam antibiotics.
- Aminoglycosides.
- Tetracyclines & chloramphenicol.
- Macrolides, Fluoroquinolones.
- Miscellaneous: examples.
- Antifungal drugs.
- Antiviral drugs.
- Antiseptics and disinfectants- examples.
- Chemotherapy of urinary tract infection and urinary antiseptics.
- Chemotherapy of tuberculosis.
- Chemotherapy of leprosy.
- Chemotherapy of sexually transmitted disorders.

- Antimicrobial therapy in Outbreaks
- Combination therapy
- Antibiotic Prescription Audit

**5. Chemotherapy of Parasites**

- Ectoparasites: scabies, pediculosis.
- Protozoal: malaria, amoebiasis, giardiasis, trichomoniasis.
- Helminthes: round worm, hook worm, thread worm, pin worm, whip worm, filarial worms, tape worm (*Taenia solium* & *saginata*)

**6. Chemotherapy of Neoplastic Diseases**

- General principles of Management.
- Discussion based on individual groups

**7. Toxicology**

- General principles of treatment.
- Heavy metal antagonists

**8. Immunomodulators**

- Immunosuppressants.
- Immuno stimulants.
- Gene therapy.

**9. Miscellaneous**

- Anti seborrheics, acne vulgaris, sun screens, melanizing and demelanizing agents: preparation, adverse effects.

## PHARMACOLOGY PRACTICAL EXERCISES:

- History of medicine & development of pharmacology as a separate discipline.
- Innovations, discoveries and inventions.
- Nature and sources of drugs.
- Chemical nature of drugs.
- Identification of the chemical nature of drugs.
- Dosage forms.
  - a. Oral
  - b. Parenteral.
  - c. Topical.
- Method of drawing the contents from ampoules and vials.
- Routes of drug administration.
- Weights and measures.
- Calculation of dosages.
- The Prescriptions
  - Common abbreviations and symbols used in prescriptions and chart orders.
  - Rational prescribing based on “WHO Guide to Good Prescribing” and “Good Clinical Practice”
  - Prescription audit –Incompatibility, criticism and rewriting of the prescription.
- Clinical problem solving exercises.
- Effect of drugs on blood pressure, heart rate and and respiration on an anaesthetized dog (computer simulated exercise).
- Effect of drugs on rabbit’s eye.
- Effect of drugs on isolated frog heart.
- Effects of drugs on intestinal smooth muscle.
- Effects of drugs on skeletal muscle.
- Pharmacokinetic/ Pharmacodynamic charts.
- Bioavailability.
- Competitive antagonism.
- Non Competitive antagonism.
- Tachyphylaxis.
- An introduction to dispensing pharmacy.
- The powder: Oral rehydration salts (ORS).
- The Gargles & mouthwashes: Potassium permanganate solution.
- The Ointment: Whitefield’s ointment.
- Criticism of informed consent forms.
- Pharmacovigilance.
  - Problem I
  - Problem II.
- Flow charts/ Schematic diagrams.
  - Cholinergic neurotransmission and drugs modulating it.
  - Adrenergic neurotransmission and drugs modulating it.
  - Pathway of arachidonic acid release and metabolism.
  - Renin- angiotensin- Aldosterone system and drugs acting on it.
  - Renal tubular transport system and site of action of diuretics.
  - Blood coagulation cascade.
  - Mode of action of antimicrobial agents.
  - Site of action of antimalarial agents
- Fixed dose drug combinations
- Drug Interaction
- Effective doctor- patient communication.

## SCHEME OF UNIVERSITY PRACTICAL EXAMINATION

Time – 3 hours

Max marks: 25

### Practical I

Max marks - 12

Exercises	Number	Marks
Spotters	10	5
Prescription writing/Prescription audit	1	3
Problem solving exercise	1	2
Calculation of dosage/ADE Form filling/ Drug Interaction	1	2

### Practical II (Max. marks: 13 marks)

Dispensing pharmacy	1	4
Experimental Pharmacology	1	4
Graph/chart / flowchart	1	2
Communication skill	1	3

### Viva voce

Max marks - 15

1. General Pharmacology, Autacoids and Related drugs, Blood forming Agents, Gastrointestinal Tract 3 Marks
2. Autonomic Nervous System, Respiratory System, Cardiovascular System, Drugs Affecting Coagulation & Lipid Lowering Agents 4 Marks
3. Hormones, Reproductive System, Central Nervous System, & Peripheral Nervous System 4 Marks
4. Antimicrobial Chemotherapy, Chemotherapy of Parasites, Chemotherapy, Chemotherapy of Malignancy, Immunomodulators, Toxicology 4 Marks

### DISTRIBUTION OF TEACHING HOURS

Lecture	Practical	Innovative Sessions	Total
110	128	82	320

### TENTATIVE SCHEDULE OF EXAMINATIONS

First Internal Assessment	Second Internal Assessment	Final Internal Assessment	University Examination
Last week of January 2020	Last week of July 2020	First week of December 2020	First week of January 2021

## METHOD OF CALCULATION OF INTERNAL ASSESSMENT

### Theory: 15 marks

Average of different Class and Sessional Examinations and marks for Seminar/project

Attendance: 75 % & 75 to 79 % 0.5 mark

80 to 89 % 1 mark

90 to 100 % 1.5 marks

### Practical: 15 marks

Average of Sessional Examinations 12 marks

Same as Theory

## MODE OF CALCULATION OF MARKS FOR AMRITA UNIVERSITY EXAMINATION

University					Internal Assessment			Subject
Theory			Practical	Total (Th+Pr)	Theory	Practical	Total Th+oral Max:30	Total Max:150
Written	Viva voce	Min: 50%	Min: 50%	Maximum	Maximum	Maximum	Min 35%	Min Pass : 50%
40+40 =80	15	95/48	25/13	120	15	15	11/30	11/30

### Textbooks Recommended (Latest Edition)

1. Essentials of Medical Pharmacology, K D Tripathi
2. Principles of Pharmacology by HL Sharma & KK Sharma
3. Pharmacology and Pharmacotherapeutics, R.S. Satoskar and S. D Bhandarkar
4. Pharmacology for Medical Graduates (3<sup>rd</sup> Edition) by Tara v Shanbhag, Smita Shenoy

### Reference Books (Latest Edition)

1. Goodman and Gilman's The Pharmacological Basis of Therapeutics, Laurence L Brunton
2. Modern Pharmacology with Clinical Application, Charles R Craig
3. Basic and Clinical Pharmacology, Bertram G Katzung
4. Clinical Pharmacology, P. N. Bennet, M.J.Brown.

## **FORENSIC MEDICINE & TOXICOLOGY (2MB.FM)**

### **Goal**

The broad goal of teaching undergraduate students in Forensic Medicine & Toxicology is to produce a physician who is well informed about medicolegal responsibilities in the practice of medicine. S/he should be capable of making observations and inferring conclusions by logical deductions to set enquiries on the right track in criminal matters and connected medicolegal problems. S/he must acquire knowledge of law in relation to medical practice, medical negligence and respect for codes of medical ethics.

### **Competencies**

The Indian Medical Graduate will get the knowledge and skills necessary to attain the following competencies.

#### **Core Competencies:**

- Conduct a medico-legal autopsy of an adult, prepare an autopsy report and give evidence in a court of law.
- Conduct a medico-legal autopsy of an infant, prepare an autopsy report and give evidence in a court of law.
- Identify the cases where medico-legal autopsy is to be performed by an expert and advise the law enforcement agencies in this regard.
- Collect, preserve and dispatch material objects and samples from the dead body as a part of autopsy examination.
- Identify the cases where police intimation is required and medico legal reports are to be prepared and handle such situations with necessary communication skills.
- Examine an injured individual, prepare a report and give evidence in a court of law.
- Examine an individual alleged to be intoxicated, prepare a report and give evidence in a court of law.
- Examine the victim in an alleged sexual assault case, prepare a report and give evidence in a court of law.
- Examine the accused in an alleged sexual assault case, prepare a report and give evidence in a court of law.
- Examine an individual for estimation of age, prepare a report and give evidence in a court of law.
- Identify and manage cases of child abuse.
- Identify the scenarios where material objects are to be collected, preserved and dispatched from a living person.
- Identify and manage common scenarios of acute and chronic poisoning and envenomation.
- Manage the medico-legal aspects of acute and chronic poisoning and envenomation.
- Practice the profession in accordance with principles of bioethics.
- Appropriately manage all patient-physician interactions which require consent with necessary communication skills and attitude.
- Possess the attitude to handle professional secrets in an ethical and legally compatible manner.
- Mould the practice so as to minimize and resolve legal conflicts arising in the doctor patient relationship.

#### **Non-Core Competencies:**

- Examine a set of bones, prepare a report and give evidence in a court of law.
- Identify and manage the medico-legal aspects of a scenario where a mentally ill individual is the accused in a crime.
- Do common bedside toxicological tests.
- Assess the behaviour of other physicians in their professional capacity with respect to ethical, medico-legal and social implications.

## Objectives

### Knowledge

At the end of the course, the student shall be able to:

- Identify the basic medicolegal aspects of hospital and general practice.
- Define the medicolegal responsibilities of a hospital or general practice.
- Appreciate the physician's responsibilities in criminal matters, and respect for the codes of medical ethics.
- Diagnose and manage common acute and chronic poisoning and identify medicolegal aspects.
- Describe the medicolegal aspects and findings of postmortem examination in case of death due to common unnatural conditions and poisonings.
- Detect occupational and environmental poisoning, prevention and epidemiology of common poisoning, and their legal aspects particularly pertaining to Workmen's Compensation Act.
- Describe the general principles of analytical toxicology.

### Skills

At the end of the course, the student shall be able to:

- Make observations and logical inferences in order to initiate enquiries in criminal matters and medicolegal problems.
- Diagnose and treat common emergencies in poisoning and chronic toxicity.
- Make observations and interpret finding at postmortem examination.
- Observe the principles of medical ethics in the practice of this profession.

## Integration

The department shall provide an integrated approach towards allied disciplines like Pathology, Radiology, Forensic Sciences, Hospital Administration, etc., to impart training regarding medicolegal responsibilities of physicians at all levels of health care. Integration with relevant disciplines will provide the scientific basis of clinical toxicology – e.g., medicine, pharmacology, etc.

## Course Outcomes

**CO1:** Competency to Conduct a medico-legal autopsy of an adult, prepare an autopsy report and give evidence in a court of law.

**CO2:** Competency to conduct a medico-legal autopsy of an infant, prepare an autopsy report and give evidence in a court of law.

**CO3:** Competency to identify the cases where medico-legal autopsy is to be performed by an expert and advice the law enforcement agencies in this regard.

**CO4:** Competency to collect, preserve and dispatch material objects and samples from the dead body as a part of autopsy examination.

**CO5:** Competency to identify the cases where police intimation is required and medico legal reports are to be prepared and handle such situations with necessary communication skills.

**CO6:** Competency to examine an injured individual, prepare a report and give evidence in a court of law.

**CO7:** Competency to examine an individual alleged to be intoxicated, prepare a report and give evidence in a court of law.

**CO8:** Competency to examine the victim in an alleged sexual assault case, prepare a report and give evidence in a court of law.

**CO9:** Competency to examine the accused in an alleged sexual assault case, prepare a report and give evidence in a court of law.

**CO10:** Competency to examine an individual for estimation of age, prepare a report and give evi-



dence in a court of law.

**CO11:** Competency to identify and manage cases of child abuse.

**CO12:** Competency to identify the scenarios where material objects are to be collected, preserved and dispatched from a living person.

**CO13:** Competency to identify the scenarios where material objects are to be collected, preserved and dispatched from a living person.

**CO14:** Competency to manage the medico-legal aspects of acute and chronic poisoning and envenomation.

**CO15:** Competency to practice the profession in accordance with principles of bioethics.

**CO16:** Competency to appropriately manage all patient-physician interactions which require consent with necessary communication skills and attitude.

**CO17:** Attitude to handle professional secrets in an ethical and legally compatible manner.

**CO18:** Ability to mould the practice so as to minimize and resolve legal conflicts arising in the doctor patient relationship.

**Teaching hours:**

\* (Project Work, Seminars, Structured discussion, Integrated teaching, Formative evaluation, Revision)

**Schedule of Lectures/Innovative Sessions:**

Lectures	Practicals	Innovative sessions*	Total
34	20	50	104

Topic	Hours
<b>Forensic Medicine</b>	<b>40 Hours</b>
<b>Introduction of Forensic Medicine</b> Definition, synonyms, historical aspects, modern Forensic Medicine, sub-division etc.	<b>1 hour</b>
<b>Courts and Legal Procedures</b> Courts and their powers, Inquest, types of evidence, Dying declaration, Types of witnesses, Recording of medical evidence, Doctor as witness	<b>4 hours</b>
<b>Ethical and Legal Aspects of Medical Practice</b> MCI and SMC - Functions, Duties and privileges, Medical Ethics, Infamous conduct, Medical negligence, Consent in medical practice, Doctor and Consumer Protection Act, Euthanasia	<b>6 hours</b>
Four Foundational principles of Bio Ethics - Beneficence , Non malfeasance , Justice , Autonomy	<b>1 hour</b>

<b>Personal Identity</b>	<b>3 hours</b>
Factors for establishing identity, Determination of age and sex in the living and dead, Medicolegal importance of age, Forensic odontology, DNA profiling	
<b>Forensic Thanatology</b>	<b>4 hours</b>
Definition of death, moment of death, types of death - somatic and molecular, Brain-stem death & organ transplantation, Suspended animation, Sudden death, sudden infant death syndrome, Postmortem changes and estimation of time since death, Crime scene investigation	
<b>Forensic Taphonomy</b>	<b>1 hour</b>
<b>Medicolegal Autopsy</b>	<b>2 hours</b>
Objectives – procedures - negative autopsy, Examination of skeletal remains, Exhumation	
<b>Asphyxial Deaths</b>	<b>3 hours</b>
Pathophysiology, classification, cardinal features, Hanging - definition, types, mechanisms of death, postmortem appearances, medicolegal importance; Strangulation - definition, types, postmortem appearances, medicolegal importance; Suffocation - types, postmortem appearances, medicolegal importance; Drowning - definition, types, mechanisms of death, postmortem appearances, diatoms test, medicolegal importance	
<b>Forensic Traumatology</b>	<b>8 hours</b>
Classification of mechanical injuries, Blunt force injuries - abrasion, contusion, laceration, Sharp weapon injuries - incised and stab wound. Firearm injuries. Regional injuries - head, spine, thorax, abdomen and limbs. Injuries in road traffic accidents, Medicolegal aspects of injuries - hurt, grievous hurt, culpable homicide, classification of fatal injuries, etc. Injuries from physical agents - burns, electricity and lightning, Non-accidental trauma in children	
<b>Human Sexual Function</b>	<b>3 hours</b>
Medicolegal considerations of virginity, sex offences and paraphilias, pregnancy, delivery, Medical Termination of Pregnancy Act - provisions – criminal abortion, impotence, sterility, artificial insemination, sterilisation, surrogacy	
<b>Infanticide</b>	<b>2 hours</b>
<b>Blood, Semen and Hair</b>	<b>1 hour</b>
Identification of blood, semen and hair - collection and preservation, chemical tests for blood and semen, precipitin test, blood groups	
<b>Forensic Psychiatry</b>	<b>3 hours</b>
Symptoms of mental illness, classification, Mental Health Act, Restraint of insane, civil and criminal responsibilities, feigned insanity	
<b>Lie Detection And Psychological Autopsy</b>	<b>1 hour</b>
<b>Toxicology</b>	<b>25 Hours</b>
<b>General Toxicology</b>	<b>2 hours</b>
General considerations of diagnosis and management of poisoning, laws relating to drugs and poisons, classification of poisoning in general – medicolegal aspects of poisoning.	
<b>Corrosive poisons</b>	<b>2 hours</b>
Inorganic - sulphuric, nitric and hydrochloric acid Organic - phenol, oxalic acid, formic acid and acetic acid	

<b>Occupational and Environmental Toxicology</b>	<b>4 hours</b>
Non metallic irritants - phosphorus, halogens (chlorine)	
Metallic irritants - arsenic, lead, mercury, copper and iron	
Asphyxiants - CO, cyanide, H <sub>2</sub> S	
<b>Plant Poisons</b>	<b>2 hours</b>
Abrus precatorius, Datura, Oleanders, Odallum, Castor, Strychnos nux vomica, Croton tiglium, Calotropis, Semecarpus anacardium	
<b>Bites and Stings</b>	<b>3 hours</b>
Snakes - identification, diagnosis and management of snake bite, scorpion sting, bee & wasp sting	
<b>Alcohols</b>	<b>3 hours</b>
Ethyl and methyl alcohol, ethylene glycol	
<b>Pesticides</b>	<b>3 hours</b>
Organophosphates, carbamates, organochlorines, pyrethroids, zinc phosphide, aluminium phosphide, paraquat	
<b>Antipyretics and Analgesics</b>	<b>1 hour</b>
Paracetamol, Aspirin	
<b>Opium and Opiates</b>	<b>1 hour</b>
<b>Barbiturates and Benzodiazepines</b>	<b>1 hour</b>
<b>Food Poisoning</b>	<b>1 hour</b>
Microbial, chemical,	
Mushrooms - clinical presentation and management	
<b>Substance Abuse:</b>	<b>2 hours</b>
NDPS Act.	
Synthetic & semi-synthetic narcotics, Heroin	
Description and medicolegal importance relating to alcohol, tobacco, cannabis, cocaine, opiates, hypnotics, amphetamines, and hallucinogens	
<b>Integrated Teaching</b>	<b>9 Hours</b>
<b>a. With Emergency Medicine</b>	<b>2 hours</b>
Identification of mechanical injuries, wound certification, ethical aspects of consent, examination of assault victim/s and accused, sexual assault victim examination, drunkenness examination	
<b>b. With Poison Control Centre</b>	<b>6 hours</b>
Toxicology - Clinical aspects	
Medicolegal issues involved in drug therapy, drug overdose, drug hypersensitivity, mistaken prescription/administration of drugs, Drug dependence	
<b>c. With Analytical Toxicology Laboratory</b>	<b>1 hour</b>
Toxicology - basic analytical aspects.	
<b>Seminars/Symposia</b>	<b>5 Hours</b>
Euthanasia	<b>1 hour</b>
Plant poisons, chemicals and substance abuse	<b>3 hours</b>
Bites and stings	<b>1 hour</b>

<b>Group Discussions</b>	<b>21 Hours</b>
I. Ethical and legal aspects of medical practice	<b>2 hours</b>
II. Forensic thanatology	<b>3 hours</b>
III. Medicolegal autopsy	<b>3 hours</b>
1. Objectives - Procedures- Negative autopsy	
2. Examination of skeletal remains.	
3. Exhumation	
IV. Asphyxial deaths     3	<b>3 hours</b>
V. Forensic traumatology	<b>10 hours</b>
VI. Clinical and medicolegal issues - poisoning	<b>1 hour</b>
VII. Recent trends in toxicology	<b>1 hour</b>

### Schedule of Practicals

Specimens of poisons, venomous creatures, weapons, arms and ammunition, etc.	<b>6 hours</b>
Bones, X-Rays and photographs	<b>4 hours</b>
Autopsy certificate, Wound certificate	<b>4 hours</b>
Certificate of drunkenness	<b>2 hours</b>
Examination of rape victim/accused	<b>4 hours</b>
Viscera/material objects: collection, preservation/dispatch	<b>2 hours</b>
Case of poisoning - problem solving exercise	<b>4 hours</b>

## Assessment

### Schedule of Internal Assessment and University Examinations

First Internal Assessment	Second Internal Assessment	Final Internal Assessment	University Examination
Last week of January 2020	Last week of July 2020	First week of December 2020	First week of January 2021

### Distribution of marks for Internal assessments and University examinations

University Examination				Internal Assessment		
Theory	Practical	Viva voce	Total	Theory	Practical	Total
40	30	10	80	10	10	20

### Methods of Assessment & Evaluation

#### Formative Assessment:

1. Periodic objective/problem based tests.
2. Activity – Case studies/ Symposia/ Seminars / Individual and group assignments.
3. Research Activity: Short term projects.
4. Practical assessment.
5. Structured oral viva voce.

### **Summative Assessment:**

3 theory (40 marks each) and 3 practical internal examinations (30 marks each) may be held. Lowest marks secured for any internal assessment (theory) will not be considered for calculating the internal assessment average. At the end of the 5th semester, every student shall submit a record of 10 different medicolegal autopsies they have witnessed during the past 3 semesters. 10 marks allotted to the work record will be added to the marks of practical examinations and average will be taken as internal assessment.

At the end of the fifth semester of MBBS, one paper of University theory examination, one practical examination and viva voce must be conducted.

### **University Examination**

**Theory** **40 marks**

One paper including the whole subject. The marks will be divided in the following manner.

Ethics:	4 marks
Clinical Forensic Medicine:	8 marks
Forensic Pathology:	14 marks
Toxicology:	14 marks

**Practicals** **30 marks**

### **Assessment of Practical Skills**

In the practical examination, any 4 of the following exercises may be chosen by the examiners for a particular day of examination:

- Age estimation and issuance of age certificate in the supplied proforma after perusing data/x-rays.
- Issuing wound certificate in the supplied proforma after analyzing set of data &/or photographs.
- Issuing drunkenness certificate in the supplied proforma after examination of a subject/data.
- Problem solving exercise based on medicolegal autopsy report.
- Problem solving exercise of a case of poisoning.
- Medicolegal reporting on victim/ accused in sexual assault case in the supplied proforma after perusing data &/or photographs.
- Identifying the weapon; analysis of injury and drafting a statement to be given to police.
- Examination and discussion on two articles or poisons of medicolegal importance.

Each exercise is to be completed within 20 minutes, and each carries 6 marks.

**Viva voce (Structured)** **10 marks**

All examiners will independently conduct viva voce for all candidates appearing on that day.

### **Work Record**

Work record should be submitted on the day of practical examination for scrutiny by the external examiners.

## **Textbooks Recommended**

### **Prescribed Books**

- Forensic Medicine and Toxicology – PC Ignatius
- Forensic Medicine for Medicos – B Umadethan
- Textbook of Forensic Medicine and Toxicology – VV Pillay
- Modern Medical Toxicology – VV Pillay

**Reference books**

Taylor's Principles & Practice of Medical Jurisprudence - Keith Simpson  
Knight's Forensic Pathology – Bernard Knight, Saukko P  
Principles and Practice of Forensic Medicine – B Umadethan  
Comprehensive Medical Toxicology – VV Pillay

## **PHASE III**

### **Semesters VI, VII, VIII and IX**

Course of instruction of clinical subjects are continued in this Phase. After the second professional examination, students can enter the Phase III training . During the semesters VI and VII, the subjects Ophthalmology and Otorhinolaryngology are introduced. At the end of semester VII, University examinations (Third professional part I) of the subjects Community Medicine, Ophthalmology and Otorhinolaryngology (ENT) are held. Students who have passed all the subjects of the second professional examination are alone allowed to appear for the third professional part I examination. During semesters VIII and IX more attention is to given to the training in Medicine, Surgery, Obstetrics and Gynaecology (OBG) and Paediatrics. At the end of semester IX third professional (final) examination is held.

**Total hours of Lectures/Practical/Innovative sessions**

<b>Subjects</b>	<b>Lectures</b>	<b>Practical/Clinical</b>	<b>Innovative Sessions</b>	<b>Total</b>
<b>Ophthalmology</b>	76	240	64	380
<b>Otorhinolaryngology</b>	40	192	48	280
<b>Orthopaedics</b>	36	240	72	348
<b>Pulmonology</b>	8	48	16	72
<b>Dermatology &amp; STD</b>	32	144	18	194
<b>Psychiatry</b>	8	140	16	164
<b>Radiology</b>	8	48	16	72
<b>General Medicine</b>	100	624	204	928
<b>General surgery</b>	100	624	204	928
<b>Anaesthesiology</b>	8	48	16	72
<b>OBG</b>	90	576	190	856
<b>Paediatrics</b>	44	240	88	372
<b>Dentistry</b>	4	48	8	60
<b>Community Medicine</b>	56	120		176

There will be two Internal assessment examinations for Ophthalmology, Otorhinolaryngology and paediatrics. Four Internal assessment examinations are conducted for the subjects Medicine, Surgery and Obstetrics& Gynaecology. Final Internal assessment examinations and University examinations for the subjects Ophthalmology, Otorhinolaryngology and Community Medicine are held during the first week of the 5th and 6th month of semester VII respectively.

## Duration of Clinical Posting

	Weeks	MCI Requirement
General Medicine*	30	26
General Surgery**	26	26
OBG	22	24
Paediatrics	10	10
Community Medicine	12	12
Orthopaedics***	10	10
Pulmonology	2	2
Dermatology	2	6
Psychiatry	4	2
Radiology****	2	2
ENT	8	8
Ophthalmology	8	10
Dentistry	2	2
Casualty	2	2

\* This posting includes exposure to Laboratory Medicine & Infectious Diseases.

\*\* Includes exposure to dressing and Anesthesia.

\*\*\* Includes exposure to Rehabilitation and Physiotherapy.

\*\*\*\* This posting includes training in Radiodiagnosis and Radiotherapy.



# OPHTHALMOLOGY (3MB.OP)

## Goal

The broad goal of teaching students in ophthalmology is to provide such knowledge and skills to the student that shall enable him/her to practice as a clinical and as a primary eye care physician and also to function effectively as a community health leader to assist in the implementation of National programme for the prevention of blindness and rehabilitation of the visually impaired.

## Competencies

The Indian Medical Graduate will get the knowledge and skills necessary to attain the following competencies.

- Elicit a history pertinent to general health and ocular status.
- Diagnose and treat common problems affecting the eye.

## Objectives

### Knowledge

At the end of the course, the student shall have knowledge of:

- Common problems affecting the eye.
- Principles of management of major ophthalmic emergencies
- Main systemic diseases affecting the eye.
- Effects of local and systemic diseases on patient's vision and the necessary action required to minimise the sequelae of such diseases.
- Adverse drug reactions with special reference to ophthalmic manifestations.
- Magnitude of blindness in India and its main causes.
- National programme for control of blindness and its implementation at various levels.
- Eye care education for prevention of eye problems.
- Role of primary health centre in the organization of eye camps.
- Organisation of primary health care and the functioning of the ophthalmic assistant.
- Integration of the national programme for control of blindness with the other national health programmes
- Eye bank organization

### Skills

At the end of the course, the student shall be able to:

- Assist in diagnostic procedures such as 1. visual acuity testing, 2. examination of eye, 3. subjective refraction correction of presbyopia, 4. pupillary reflex, 5. confrontation perimetry, 6. Tear Film staining with fluorescein, 7. Color Vision 8. Direct ophthalmoscopy and conjunctival smear examination and cover test, corneal sensations 9. Schiottz tonometry.
- **Interpret ophthalmic signs in relation to common systemic disorders.**
  - KF Ring (Kayser Fleicher Ring)
  - Thyroid Signs
  - Scleritis
  - Episcleritis
  - Uveitis
  - Subconjunctival hemorrhage
  - Retrobulbar hemorrhage
  - Hypertensive Retinopathy
  - Diabetic Retinopathy
  - Papilledema

## Integration

Semester	VI	VII	Total
Hours	24	32	56

The undergraduate training in ophthalmology will provide an integrated approach towards other disciplines especially Neuro sciences, Otorhinolaryngology, General Surgery and Medicine.

## Teaching schedule

### Lectures/Practicals/Innovative sessions

Semesters	IV	VI	VII	Total
Weeks	0	4	4	8

Lecture	Practical/clinical	Innovative sessions	Total
76	240	64	380

## Schedule of Lectures

Topic	Hours
<b>Basics</b>	<b>3 hours</b>
Anatomy	
Physiology including Vit. A Deficiency	
Embryology	
<b>Optics</b>	<b>3 hours</b>
Elementary optics	
Refractive error	
Accommodation, presbyopia	
<b>Conjunctiva</b>	<b>3 hours</b>
Acute conjunctivitis	
Chronic conjunctivitis (Trachoma, spring catarrh)	
Degeneration & dry eye	
Assessment	
<b>Cornea</b>	<b>3 hours</b>
Introduction	
Microbial Keratitis	
• Bacterial	
• Fungal	
• Interstitial, Acanthamoeba Keratitis	
• Viral keratitis	
Corneal degeneration, Dystrophies	
• Role of laser and other advanced methods in Corneal Surgery	

<b>Lens</b>	<b>9 hours</b>
Anatomy / Physiology Etiopathogenesis Senile cataract – stages, symptoms Management Complication Congenital cataract Assessment	
<b>Role of laser and other advanced methods in Lens Surgery</b>	
<b>Glaucoma</b>	<b>7 hours</b>
Introduction Tonometry/ gonioscopy/ perimetry Classification : POAG, PACG Secondary glaucoma Therapeutics in glaucoma Congenital glaucoma Assessment	
<b>Injuries of Eye</b>	<b>2 hours</b>
Introduction - classification/ concussion, perforation Management Chemical burns	
<b>Orbit</b>	<b>2 hours</b>
Introduction –anatomy of orbit Orbital cellulitis Exophthalmos (Thyroid)	
<b>Eyelid</b>	<b>4 hours</b>
Anatomy Inflammation Ptosis Ectropion, Entropion Assessment	
<b>Lacrimal Apparatus</b>	<b>2 hours</b>
Introduction (Anatomy)- Evaluation of watering Congenital NLD obstruction, Dacryocystitis Assessment	
<b>Sclera &amp; Episclera</b>	<b>1 hour</b>
Episcleritis, sclerites Styphaloma	
<b>Uvea</b>	<b>4 hours</b>
Introduction Anterior uveitis (symptom, signs, sequelae) Investigations & management Uveitis in special condition Tuberculosis, HIV, Toxoplasma Assessment	

<b>Retina</b>	<b>5 hours</b>
Introduction	
Diabetic retinopathy	
Vascular block & Hypertensive retinopathy	
ARMD/ RP	
RD/ Tumors	
Tumors – Retinoblastoma, malignant melanoma	
Assessment	
<b>Retinal Surgeries including advanced methods</b>	
<b>Optic Nerve</b>	<b>3 hours</b>
Introduction	
Pupillary reflexes – abnormalities	
Papilledema	
Optic neuritis	
Optic atrophy	
<b>Strabismus</b>	<b>5 hours</b>
Introduction/ EOM anatomy	
Classification	
Evaluation of squint	
Diplopia	
Treatment	
Assessment	
<b>Miscellaneous</b>	<b>9 hours</b>
Ocular emergencies	<b>2 hour</b>
Ocular manifestation of systemic diseases such as syphilis, Leprosy, TB, AIDS,	
Herpes Sarcoidosis	<b>1 hours</b>
Ocular therapeutics	<b>1 hour</b>
Eye banking	<b>1 hour</b>
Community Ophthalmology	<b>3 hour</b>
Newer techniques in Ophthalmology	<b>1 hour</b>
Ocular emergencies	
<b>Instruments</b>	<b>1 hours</b>
<b>Revision classes by each consultant.</b>	<b>10 hours</b>
<b>Common topics to be covered for all medical subjects</b>	
Communication skills including doctor-patient relationships.	
Intra- and inter- personal relationships.	
Caring for the critically sick and dying patient.	
Medical ethics.	
Basics in research methodology and statistics.	
Information retrieval.	
Use of medical library and database.	

### **Clinical Training**

#### **First 4 weeks**

History taking

#### **Examination in VI semester**

Introduction to ocular diseases

#### **Second 4 weeks**

#### **Procedures (In VII semester)**

Instruments

Operating room posting

Clinical cases

## Course Outcomes:

**CO1:** Knowledge and skills to practice as a clinical and as a primary eye care physician.

**CO2:** Ability to function effectively as a community health leader to assist in the implementation of National programme for the prevention of blindness and rehabilitation of the visually impaired.

**CO3:** Competency to elicit a history pertinent to general health and ocular status.

**CO4:** Competency to diagnose and treat common problems affecting the eye.

## Assessment

### Schedule of Internal Assessment and University Examinations

First Internal assessment	Final Internal assessment	University examination
Last week of July 2019	First week of December 2019	First week of January 2020

### Distribution of marks for Internal assessment and University examinations

University examination				Internal assessment		
Theory	Practical	Viva voce	Total	Theory	Practical	Total
40	30	10	80	10	10	20

### Internal Assessment

#### Evaluation of Initial Phase

Log books – include record of patients studied by the learner along with day-to-day activities.

MCQ examinations on topics covered in theory.

OSCEs, short case presentations and oral examinations.

Assessment of presentation of the problem-based learning focusing on communication skills.

#### Evaluation of second phase

Log books – should contain work up of at least 20 patients studied by the student during the clinical postings. Theory examination – including SAQ, MCQ.

Evaluation of the topic presented by the student.

Final practical examination – long case/ short case/ spots/instruments/ viva voce examination

### University Examination-Scheme

#### Theory

One paper - two sections - each including surgical anatomy, pathology and recent advances the questions will be objective type - short answer/short structured)

#### Practical

One long case, one short case, spots, drugs, instruments and Viva voce

#### Viva voce

### Books recommended

Parsons diseases of the eye (latest 21st edition).

Kanski latest edition (Optional for MCQ)

# **OTORHINOLARYNGOLOGY (3MB.OR)**

## **Goal**

The broad goal of teaching undergraduate students in otorhinolaryngology is that the undergraduate students have adequate knowledge and skills for optimally dealing with common disorders and emergencies and principles of rehabilitation of the hearing impaired, and be familiar with the latest equipment and modern trends in ENT.

## **Competencies**

The Indian Medical Graduate will get the knowledge and skills necessary to attain the following competencies.

- Identify differential diagnoses in the patient presenting in ENT OPD by taking a detailed history.
- Perform complete ear, nose, throat examination of the patient presenting in ENT OPD.
- Describe the pathophysiology of common ENT diseases and emergencies.
- Document and interpret the findings after a complete examination.
- Prescribe common investigative procedures, including imaging, and interpret the findings.
- Counsel the patient regarding need for various common surgeries in ENT.
- Perform procedures with assistance.
- Prescribe appropriate and rational medicines for common ENT conditions.
- Identify the cases that need referral.
- Know the management protocol for ENT emergencies.

## **Objectives**

### **Knowledge**

At the end of the course, the student shall be able to:

- Describe the basic pathophysiology of common ENT diseases and emergencies.
- Adopt the rational use of commonly used drugs, keeping in mind their adverse reactions.
- Suggest common investigative procedures and their interpretation.

### **Skills**

At the end of the course the student shall be able to:

- Learn use of head mirrors and common ENT OPD instruments.
- Detect and diagnose common ENT problems including the pre malignant, malignant and communicable disorders of the head and neck.
- Manage ENT problems at the first level of care and be able to refer whenever necessary.
- Assist, carry out minor surgical procedures like ear syringing, ear dressing and nasal packing.
- Assist in certain procedures such as tracheostomy, endoscopies and removal of foreign bodies.

## **Integration**

The undergraduate training in ENT will provide an integrated approach towards other disciplines specially neurosciences, ophthalmology and general surgery.

## **Attitude**

To demonstrate proficiency in examining and treating a patient with common ENT problems.

To demonstrate the four ethical principles in management of common ENT problems

To develop interest in ENT specialty as a career

## Teaching Schedule

### Lectures/Practicals/ Innovative Sessions

Semester	VI	VII	Total
Hours	24	48	72

### Clinical Posting

Semesters	VI	VII	Total
Weeks	4	4	8

### Teaching Hours

Lectures	Practical/Clinical	Innovative sessions	Total
40	192	48	280

## Schedule of Lectures

**Total Hours**

**40**

### Nose

1. Anatomy of nose (including endoscopic anatomy)
2. Symptomatology and clinical examination of nose
3. Epistaxis
  - a. Blood supply of nose.
  - b. Causes.
  - c. Investigations
  - d. Management
4. Rhinitis
  - a. Physiology of nose and PNS.
  - b. Allergic Rhinitis.
  - c. Vasomotor Rhinitis.
  - d. Polypi of nose and PN
5. Sinonasal polyposis
6. Nasal Septum
  - a. Anatomy of nasal septum.
  - b. Types of DNS.
  - c. Management.
  - d. Complications such as haematoma, septal abscess and perforation.
  - e. Choanal Atresia & Management
7. Sinusitis
  - a. Anatomy of lateral wall of nose
  - b. Acute and chronic sinusitis.
  - c. Investigations and management.
  - d. Complications of sinusitis.
  - e. Granulomatous lesions of nose (Rhinosporidiosis, Diphtheria, Syphilis)
8. Benign nasal masses, Granulomatous lesions, Rhinosporidiosis, JNA

9. Tumours of nose and paranasal sinuses
  - a. Benign angiofibroma - Inverted Papilloma
  - b. Malignant—Clinical features, Principles of management
10. Facio maxillary injuries
  - a. CSF Rhinorrhea
  - b. Le Forte's fractures
  - c. Tripod fractures
  - d. CSF Otorrhoea
11. Surgeries of nose and PNS
  - a. Septoplasty and SMR
  - b. FESS
  - c. Nasal bone fracture reduction
  - d. Caldwell Luc

### **Throat**

12. Anatomy and physiology of pharynx, larynx, Tracheobronchial tree, Oesophagus
13. Symptomatology and clinical examination of throat
14. Tonsils and Adenoids
  - a. Anatomy of Waldeyer's Ring
  - b. Clinical features of tonsillitis and adenoids /Quincy
  - c. Investigations and Management
15. Neck Space Infections
  - a. Anatomy of neck spaces
  - b. Ludwigs angina
  - c. Retropharyngeal abscess
  - d. Parapharyngeal abscess
16. Hoarseness
  - a. Anatomy of larynx
  - b. Physiology of phonation
  - c. Differential diagnosis of hoarseness of voice
  - d. Inflammatory lesions of larynx
  - e. Obstructive lesions of larynx
  - f. Neurological lesions of larynx
17. Stridor
  - a. Causes in children
  - b. Causes in adults
  - c. Investigations and emergency management
  - d. Tracheostomy
18. Malignancies of larynx and hypopharynx
  - a. Etiology
  - b. Clinical features
  - c. Pathology
  - d. Investigations
  - e. Principles of management
19. Malignancies of Nasopharynx, Oropharynx and oral cavity, submucous fibrosis
  - a. Etiology
  - b. Clinical features
  - c. Pathology



- d. Investigations
  - e. Principles of management
20. Dysphagia-Causes, Investigations and Management
- a. Anatomy of oropharynx and hypopharynx
  - b. Causes of dysphagia
  - c. Investigations and Management
21. Foreign bodies in aerodigestive tract
- a. Air passage –Nose, Ear
  - b. Food passage
  - c. Direct Laryngoscopy
  - d. Bronchoscopy
  - e. Oesophagoscopy
22. Tracheostomy –Indications, procedure and complications

### **Ear**

23. Anatomy of ear
- a. External
  - b. Middle
  - c. Inner
24. Physiology of ear
- a. Middle ear
  - b. Inner ear
25. Symptomatology and clinical examination of ear
26. Otitis externa and media (acute, secretory)
27. Chronic Suppurative Otitis Media (CSOM) (tubo-tympanic type)
28. Chronic Suppurative Otitis Media (CSOM) (attico-antral)
29. Complications of Otitis Media
30. Deafness
- a. Congenital—Investigations and Management
  - b. Acquired —Conductive
  - c. Secretory otitis media
  - d. Otosclerosis
  - e. SNHL
  - f. Meniere’s disease
  - g. Acoustic neuroma
  - h. Presbycusis
  - i. Ototoxicity
31. Audiometry I
- a. Basic principles of audiometry
  - b. PTA
  - c. Tympanogram
32. Audiometry II
- a. Hearing assessment in children
  - b. Hearing aids and Cochlear implant
33. Vertigo
- a. Causes
  - b. Investigations and Management

- 34. Trans-sphenoidal Approach in Neurosurgery
- 35. Keros Classification of Sphenoethmoidal Recess
- 36. Cochlear Implant
- 37. Radiology in ENT
- 38. Instruments in ENT
- 39-42. Common case presentation (Seminar or Flipped classroom)
- 43. OSCE discussion

### **Schedule of Practicals**

Four weeks each in the sixth and seventh semesters. The entire batch will be divided into groups of two/three (depending on the number of students) and posted to cubicles. One of these groups will attend the operation theatre by rotation.

- 8 to 9 am:** Clinical methods and case presentation Class
- 9 to 11:** Clinics
- 11 to 12 noon:** Case or Topic presentation (Students should maintain a record book of minimum of ten cases – 2 marks will be awarded for this record book and added to the internal assessment practical marks)

#### **Innovative teaching – Seminars / Group discussions**

- a. Sensitise students to common ENT problems in the society. Students may be assigned projects in areas like early detection of deafness, rehabilitation of the hearing impaired, noise pollution and its prevention, tobacco and its deleterious effects in the ear, nose and throat, environmental pollution and allergies etc.
- b. Use of Internet to keep track of latest innovations and as a research tool.

#### **Integrated teaching sessions - vertical and horizontal**

<b>Topic</b>	<b>Department</b>
1. Anatomy of ear nose and throat	Anatomy
2. Physiology of hearing and balance, olfaction and phonation	Physiology

#### **Course Outcomes**

- CO1: Competency to perform complete ear nose, throat examination.
- CO2: Knowledge of the pathophysiology of common ENT diseases and emergencies.
- CO3: Competency to document and interpret the findings after a complete examination.
- CO4: Competency to prescribe common investigative procedures, including imaging, and interpret the findings.
- CO5: Competency to counsel the patient regarding need for various common surgeries in ENT.
- CO6: Competency to perform procedures with assistance.
- CO7: Competency to prescribe appropriate and rational medicines for common ENT conditions.
- CO8: Competency to identify the cases that need referral.
- CO9: Knowledge of the management protocol for ENT emergencies.

<b>First Internal assessment</b>	<b>Final Internal assessment</b>	<b>University examination</b>
Last week of July 2021	First week of December 2021	First week of January 2022

University examination				Internal assessment		
<b>Theory</b> 40	<b>Practical</b> 30	<b>Viva voce</b> 10	<b>Total</b> 80	<b>Theory</b> 10	<b>Practical</b> 10	<b>Total</b> 20

### **Schedule of Internal Assessment and University Examinations**

#### **Distribution of Marks for Internal Assessment and University Examinations:**

##### **University Examination – Scheme:**

**Theory:** One paper – Each paper will have two sections A and B of 20 marks each. Each section will have - one structured long question of 8 marks, four short answer / short structured questions of 2 marks each and four questions of 1 mark each.

**Practical/Clinical:** One long case (20 min. including writing of case sheet) – 15 marks.

OSCE: 15 marks - 5 stations of 3 marks each

**Viva Voce:** X-Rays and instruments (5 marks each)

#### **Textbooks/ Reference Books Recommended**

##### **Prescribed Books:**

1. Short Text Book of ENT - K.K. Ramalingam
2. Text book of Ear, Nose, Throat, Head and Neck Surgery- Clinical and Practical- P.Hazarika
3. Ear, Nose Throat Simplified - Hathiram and Grewal
4. Logan Turners Diseases of the Ear, Nose and Throat

##### **Reference Book:**

Scott- Brown's Otolaryngology – 6 volumes

# GENERAL MEDICINE

## Goal

The broad goal of teaching under graduate students in Medicine is to have knowledge, skills and behavioural attributes to function effectively as the first contact physician.

## Competencies

The Indian Medical Graduate will acquire the knowledge and skills necessary to attain the competencies to:

- Establish doctor-patient communication.
- Take an adequate history and interpret the same.
- Analyse symptoms and form differential diagnosis based on history.
- Conduct physical examination with the necessary clinical skills.
- Form provisional/differential diagnosis based on history and physical examination.
- Chose the appropriate basic Laboratory/Radiological investigation.
- Summarize/Conclude case based on all the above.
- Communicate diagnosis/disease information to patient/bystanders.
- Evaluate/Treat/Prevent common illness.
- Impart health education.
- Non communicable disease prevention/treatment.
- Familiarity with commonly used medications and treatment of common illness.
- Documentation.
- Communication/Relationship with seniors and colleagues.
- MLC - Documentation.
- Familiarise with basic medical procedure.

## Objectives

### Knowledge:

At the end of the course, the student shall be able to:

- Diagnose common clinical disorders with special reference to infectious diseases, nutritional disorders, tropical and environmental diseases.
- Propose diagnostic and investigative procedures and ability to interpret them;
- Outline various modes of management including drug therapeutics especially dosage, side effects, toxicity, interactions, indications and contra indications.
- Provide first level management of acute emergencies promptly and efficiently and decide the timing and level of referral, if required.
- Recognise common geriatric disorders and their management.

### Skill

At the end of the course, the student shall be able to:

- Develop clinical skills (history taking, art of communication, detailed systematic clinical examination to diagnose various common medical disorders and emergencies;
- Take decision to refer a patient to secondary and / or tertiary level of health care after having instituted primary care when necessary
- Perform simple routine investigations like haemogram, stool, urine, sputum and biological fluid examinations;
- Assist the common bed side investigative procedures like pleural / peritoneal tap, lumbar puncture, bone marrow aspiration / biopsy and liver biopsy / aspiration

### Attitude

- Heal whenever possible but always provide hope, health and happiness.
- Not to make investigation and treatment more difficult than the disease itself.

- Avoid over investigation and over treatment. Do not forget that most, common disorders are self curing.
- The patient is not a mere collection of symptoms / signs / disordered function /damaged organs / disturbed emotions – He is human, fearful / hopeful / seeking relief / health / reassurance.
- To maintain human touch always integrating the traditional with the modern methods of healing.
- Maintain highest standard of ethical practice, character, modest and humble behavior.
- Maintain good relationship with professional colleagues. Avoid criticism of the measures taken by the colleagues. Medical practice is always a team work. There is no place for “EGO”.
- Treat the patient as a whole considering, social, economical and family background, and not the organ / system that are abnormal.
- CURE WHENEVER POSSIBLE, COMFORT VERY OFTEN, CONSOLATION ALWAYS.

### Integration

With community medicine and physical medicine and rehabilitation to have the knowledge, and be able to manage important current national health programmes, also be able to view the patient in his / her total physical, social and economic milieu.

Integrate with other relevant academic inputs which provide scientific basis of clinical medicine e.g.:- Anatomy, Physiology, Biochemistry, Microbiology, Pathology and Pharmacology.

### Teaching Schedule

#### Lectures/ Practical/Innovative Sessions

Semester	III	IV	V	VI	VII	VIII	IX	Total
Hours	24	24	16	48	32	96	64	304

#### Clinical Posting

Semester	III	V	VI	VIII	IX	Total
Weeks	8	2	4	8	4	26

#### Teaching Hours

Lecture	Practical/ Clinical	Innovative sessions	Total
100	624	204	928

## Schedule of Lectures

<b>Topic</b>	<b>Hours</b>
Foundation of our art	1 hour
<b>Nutrition, Exposure to Chemical and Physical Agents</b>	<b>11 hours</b>
Obesity	1 hour
Vitamin deficiency and excess	1 hour
Fluid and electrolyte balance, acidosis, alkalosis	2 hours
Common poisonings	3 hours
Snake bite, insect stings	2 hours
Disturbance of temperature	1 hour
Drowning, electrical injury, radiation hazards	1 hour
<b>Infections</b>	<b>21 hours</b>
Enteric fever	1 hour
Cholera, gastroenteritis, food poisoning	1 hour
Influenza, other respiratory viral diseases	1 hour
Rabies	1 hour
Tetanus	1 hour
Herpes simplex, zoster, chicken pox	1 hour
Amoebiasis	1 hour
Helminthic infections and filariasis	2 hours
Malaria	2 hours
Leptospirosis	1 hour
Common fungal infections	1 hour
Common exanthem	1 hour
Tuberculosis	2 hours
Leprosy	1 hour
HIV, AIDS	2 hours
Syphilis	1 hour
Dengue fever	1 hour
Chikungunya	1 hour
Toxoplasmosis	1 hour
Kala Azar	1 hour
Hydatid Disease / Cysticercosis	1 hour
Rickettsial Infections- Scrub typhus	1 hour
Brucellosis/Melioidosis	1 hour
<b>Rare infectious Diseases of the region</b>	<b>1 hour</b>
<b>Haematology</b>	<b>8 hours</b>
Red cell disorders (nutritional deficiency anemias to be emphasised)	2 hours
Bleeding disorders, Disseminated Intravascular Coagulation, Platelet Disorders	2 hours
Leukemias, leukopenia	2 hours
Lymphoma, myeloma	2 hours
<b>Respiratory System</b>	<b>15 hour</b>
Respiratory physiology, respiratory function test	1 hour
Upper and lower respiratory tract infection	1 hour
Pneumonia	2 hours
Bronchiectasis, lung abscess	1 hour
Bronchial asthma, tropical eosinophilia	2 hours
COPD, cor pulmonale	2 hours
Respiratory failure	1 hour
Non cardiogenic pulmonary oedema / ARDS	1 hour

Pleural diseases	2 hours
Occupational lung diseases	1 hour
Smoking and diseases	
Diseases of Mediastinum	
Bronchogenic Carcinoma	
<b>Cardio Vascular Disease</b>	<b>18 hours</b>
Dislipidemia, atherosclerosis	1 hour
Coronary artery disease	1 hour
Rheumatic fever and RHD	3 hours
Infective endocarditis	1 hour
Systemic hypertension, hypertensive emergencies	2 hours
Cardiac failure, acute pulmonary oedema	2 hours
Congenital heart disease	2 hours
Rhythm disturbances	1 hour
Conduction disturbances	1 hour
Pericardial diseases	1 hour
Cardio myopathy	1 hour
Peripheral vascular disease	1 hour
Pulmonary embolism-pulmonary infarction	1 hour
Myocardial Infarction	
Valvular Diseases	
ECG - Normal - Common abnormalities (VIII semester-2 classes)	
<b>Gastro Intestinal Disease</b>	<b>8 hours</b>
Acid peptic disease – GERD, gastric ulcer, duodenal ulcer	1 hour
Mal absorption syndrome	1 hour
Irritable bowel disease, colitis, inflammatory bowel disease	1 hour
Hepatitis – virus + drug induced, Cirrhosis of the Liver,	
Alcohol Abuse, Constipation	2 hours
Abdominal tuberculosis	1 hour
Pancreatic diseases	1 hour
Gall bladder disease	1 hour
<b>Neurological Diseases</b>	<b>22 hours</b>
Cerebro vascular disease (TIA, Stroke, SAH, SDH)	3 hours
Meningitis (pyogenic/Tubercular/Viral)	2 hours
Epilepsy, status epilepticus	2 hours
Peripheral neuropathy	1 hour
Demyelination, GBS	1 hour
Extra pyramidal disease	2 hours
Spinal cord disease	2 hours
Motor neuron disease, polio, myasthenia gravis	2 hours
Intra cranial space occupying lesion	1 hour
Diagnosis and management of comatose patient	2 hours
Cranial nerve disorders	2 hours
Cerebellar disorders	1 hour
Dementias	1 hour
<b>Renal Medicine</b>	<b>5 hours</b>
Acute renal failure	1 hour
Chronic renal failure	1 hour
Glomerular disease – AGN	1 hour
Nephrotic syndrome	1 hour
Urinary tract infection	1 hour

<b>Connective Tissue Disease</b>	<b>6 hours</b>
Rheumatoid disease	3 hours
Collagen vascular disease – SLE in detail	2 hours
Degenerative joint disease, cervical spondylosis	1 hour
<b>Endocrine disease</b>	<b>12 hours</b>
Diabetes mellitus	5 hours
Thyroid disease	2 hours
Pituitary disorders	1 hour
Adrenal disorders	2 hours
Gonadal disorders	1 hour
Menopausal syndrome	1 hour
<b>Geriatrics</b>	
Care of the elderly	2 hours
<b>Therapeutics</b>	<b>3 hours</b>
Cancer chemotherapy	1 hour
Blood transfusion and blood component therapy	1 hour
Anti coagulant therapy	1 hour
<b>General topics</b>	<b>4 hours</b>
Principles of palliative care, care of the dying	1 hour
Art of communication	1 hour
ABC of medical research and methodology	1 hour
Principles of medical ethics	1 hour
<b>Dermatology</b>	<b>5 hours</b>
Urticaria	1 hour
Psoriasis	1 hour
Dermatomycosis	1 hour
Scabies	1 hour
Skin in systemic disease	1 hour
Coping with Antibiotic Resistance - Rational Prescription	1 hour
Management of pain - Pain ladder	

### **Schedule of Clinical/Practical**

#### **Clinical Posting**

**8.00 - 9.00am:** Symposia/group discussions: (basic science topics in preclinical and para clinical subjects)

**9.00 - 10.30am:** Case examination by the students including case sheet writing.

**10.30 - 12.00 noon:** Clinical discussion

Separate clinical record should be kept and at least twenty cases to be included. During the 24 weeks of posting in the medical wards including casualty during the three years and a half of posting, the students should work taking clinical clerkship doing physical examination and necessary investigation, maintain a record of the work, their posting each year. This should be included as part of the documents to be presented before the examination and should be valued. During their posting in Medical side they should attend to out – patients each year and during the final year they should be posted to the casualty along with the senior assistants so as to familiarize with emergencies. Clinical teaching should include bed side, clinics, demonstrations etc., arranged by the clinical departments of common diseases found in the hospital. At the end of each posting there should be an examination conducted by the unit and these marks should be taken into account for the average examination and final assessment. Each candidate must have at least three clinical examination by the time he appears for the final sessional examination.



### Seminars/Group Discussions

Topics	Hour
Pallor, bleeding disorders	1
Enlargement of lymphnodes and hepatosplenomegaly	1
Anorexia, nausea, vomiting	1
Jaundice, hepatosplenomegaly, haematemesis, malena	1
Ascites	1
Coma	1
Dyspnoea, cough, hemoptysis, cyanosis	1
Chest Pain	1
Headache	1
Seizures and syncope, vertigo	1
Weight loss, weight gain	1
Generalised and localised oedema	1
Joint disorders	1
Mitral valve disease	1
Aortic valve disease	1
Congenital heart disease	1
Congestive cardiac failure	1
Fibro Cavitary Lesions	1
Bronchogenic carcinoma	1
Pneumonia	1
Pleural effusion	1
Pneumothorax	1
Evaluation of renal function	1
Shock, anaphylaxis	1
Hemiplegia	1
Paraplegia and quadriplegia	1
Involuntary movements	1
Cerebellar disorders	1
Second cranial nerve – visual pathways	1
3, 4, 6 cranial nerves	1
7th cranial nerve	1
9th 10th cranial Nerve / Examination / Clinical Importance	1

### Integrated Teaching Sessions - Vertical and Horizontal

Topics	Department
Genetics in clinical medicine	Anatomy, Biochemistry
Alcoholism	Psychiatry/Pharmacology/Pathology
Common gram positive/negative infections	Microbiology/Pathology
PUO	Microbiology/Pathology/Pharmacology
Sepsis syndrome	Microbiology/Pathology/Pharmacology
Pulmonary tuberculosis	Microbiology/Pathology/Pharmacology
Lung neoplasm	Pathology/Radiotherapy/Pharmacology
Coronary artery disease	Anatomy/Biochemistry/Pathology
Cardiac arrest – CPR	Anaesthesiology
Cirrhosis of liver	Physiology/Biochemistry/Pathology
Diabetic keto acidosis/hypoglycemia	Biochemistry/Physiology
Severe asthma	Biochemistry/Physiology
Oxygen therapy, assisted ventilation	Aneesthesiology
Upper GI bleed	Gastro Enterology
Hepatic encephalopathy	Biochemistry/Physiology

Renal replacement therapy  
Calcium Phosphorous metabolism,  
parathyroid disorders  
Antibiotic therapy (detailed discussion – 4 hours)

Nephrology  
Biochemistry/Physiology  
Pharmacology

### Course Outcomes

- CO1:** Learn Basic Anatomy and Physiological and biochemical changes in the body  
**CO2:** Learn about microbes causing infection in humans and drugs use to treat these  
**CO3:** Pathological changes during infection and the clinical examination of the patient with empathy and sympathy  
**CO4:** Use of invasive and non invasive investigations required for the diagnosis  
**CO5:** Streamline the thinking process, use investigations judiciously

## Assessment

### Schedule of Internal Assessment and University Examinations

1 <sup>st</sup> Internal Assessment	2 <sup>nd</sup> Internal Assessment	3 <sup>rd</sup> Internal Assessment	Final Internal Assessment	University Examination
Last week of January 2020	Last week of July 2021	Last week of July 2022	First week of December 2022	First week of January 2023

### Distribution of Marks for Internal Assessment and University Examinations

University Examination					Internal Assessment		
Theory I	Theory II	Practical	Viva Voce	Total	Theory	Practical	Total
60	60	100	20	240	30	30	60

### University Examination - Scheme

#### Theory

Each theory paper of 60 marks will be of 3 hours duration.

Every question paper will have two sections carrying equal marks.

Cancel the following items from Section A.

1. Match the following - 3 marks.
2. Diagram - 2 marks
3. Write briefly on - 5 Marks

The model questions can be as given below

Section A

1. MCQ - 10 Marks (20 Questions × ½ marks each)
2. Short notes on - 10 Marks (5 Questions × 2 marks each)
3. Problem Oriented Essay questions- 10 Marks  
(Total-30 Marks)

#### Section B - Same as Before

1. 10 Short structured question – 10 marks
2. 5 Short notes – 10 marks
3. 1 Problem oriented question – 10 marks

## **Division of Topics**

**Paper 1** – chest, dermatology, psychiatry, radiodiagnosis, basic sciences as applied medicine, genetics, immunology, rheumatology, tropical diseases, nutrition, poisoning, toxicology.

**Paper 2** – CVS, GIT, nephrology, CNS, endocrinology, heamatology.

## **Practicals**

Long case 1 (including writing of case sheet) – 60 marks

Short case 2 (system to be mentioned) – 20 x 2 – 40 marks

## **Clinical examination**

Clinical examination will be conducted in the hospital wards.

Clinical cases should include common diseases, the student is likely to come across in practice. Rare cases/obscure syndromes, long cases of neurology shall not be kept in the practical examination. Emphasis should be on candidate's capability in eliciting physical signs and their interpretation. Practical examination should be objective and should test skills and ability to interpret the results. OSCE (Objective Structured Clinical Evaluation) should be incorporated in the practical examination. VIVA includes evaluation of management approach in handling of emergencies. Candidate's skill in interpretation of common investigative data, X – Rays, Identification of specimens, ECG etc. is to be evaluated

## **Viva voce**

Patient management problems, X- Ray, ECG, medicines, instruments, investigation charts.

Four examiners – topics to be divided and all examiners to examine each student. (4 x 5 = 20 marks)

## **Textbooks Recommended**

### **Prescribed Textbooks**

1. Principles and Practice of Medicine – Davidson
2. Text Book of Medicine – Prof. Dr. K. V. Krishnadas
3. Text Book of Medicine – Kumar and Clerk
4. Clinical Examination in Medicine – Macleod
5. Clinical Examination in Medicine – Prof. K.V. Krishnadas
6. Clinical Methods - Hutchison

### **Reference Books**

1. Text Book of Medicine API
2. Text Book of Medicine Harrisons
3. Text Book of Medicine Cecil Loeb
4. Text Book of Medicine Oxford

## PSYCHIATRY AND BEHAVIOUR MEDICINE (4MB.GM)

### Goal

The broad objective is to groom the medical student into a first contact physician with an awareness about and affinity for a holistic humanistic approach and a bio-psycho-social model of clinical medicine, besides an essential working knowledge about mind and its disorders.

### Objectives

#### Knowledge:

At the end of the course the student should be able to:

- Identify the common mental illnesses.
- Aware of the management aspects of common mental illnesses.
- Be able to provide emergency and first level care in psychiatric disorders.
- Take appropriate referral decisions in psychiatric, neuropsychiatric and psychosomatic disorders.
- Provide an efficient follow-up for psychiatric patients in maintenance and prophylactic treatment.
- Develop sensitivity to the psychological factors influencing predisposition, onset, course, treatment and management of physical diseases.
- Identify psychiatric disorders like major depression, dysthymia, neurotic disorders and substance abuse disorders that present with physical symptoms and signs.

#### Skills:

At the end of the training the student should be able to:

- Develop communication skills to put the patient at ease and help in adjusting to illness and accepting treatment.
- Take a proper history and conduct a proper mental status examination and diagnose common psychiatric disorders.
- Impart first level management of psychiatric illnesses in emergencies.
- Make appropriate referral decisions in case of psychiatric disorders, neuro-psychiatric disorders and psychosomatic disorders.
- Do follow-up of psychiatric patients in maintenance and prophylactic treatment.
- Able to develop good doctor patient relationship.
- Able to develop good interpersonal relationship and clinical team work with colleagues.

#### Attitude:

- Be available and willing to communicate with a patient in distress and suffering.
- Recognise the personality, personal anxieties and feelings of the patient and be able to respect the patient as a human being.
- Enable the patient to adjust to the pain, distress and disability of the illness and accept the treatment and its outcome with fortitude and optimism.

### Integration:

- Integrate with Internal Medicine and specialities, Community Medicine and Physical Medicine to impart a holistic and longitudinal clinical approach.
- Integrate basic biological sciences with basic behaviour sciences like Psychology, Sociology, Medical Anthropology and Medical Ethics.

### Teaching Schedule

#### Lectures/Practical/Innovative Sessions

Semester	Hours	Total
VI	24	24

## Clinical Posting

Semester	V	VI	Total
Weeks	2	2	4

## Teaching Hours

Lecture	Practical/Clinical	Innovative sessions	Total
8	140	16	164

## Schedule of Lectures

Topics	Hours
Science of the mind – psychology – sociology	1 hour
Emotions and their influence in health	1 hour
Influence of society and culture in health	1 hour
Importance of study of the mind for the practice of medicine	1 hour
Symptoms and signs of mental illnesses	2 hours
Diagnosis and nosology of mental disorders	1 hour
Organic psychiatric disorders	2 hours
Psychoses	2 hours
Neuroses	1 hour
Personality disorders	1 hour
Alcohol & other substances of abuse	2 hours
Childhood psychiatric disorders	1 hour
Psychiatric disorders of old age	1 hour
Treatment - approaches & principles in psychiatry	2 hours
Psychiatry in India	1 hour
Suicide and social psychiatry	1 hour
Mind, spirituality and medicine	1 hour

Innovative sessions: are mostly meant to cover communication, doctor patient relationship, patient role and doctor role and illness behaviour. For this 12 hrs are allocated in V semester and 12 hrs in VI semester. The innovative sessions will cover aspects of behaviour medicine, which is very vital for the physician. It includes communication in clinical settings, doctor-patient relationship, inter personal relationship and teamwork, breaking bad news, handling patient's complaints. These are better imparted as integrated group learning sessions and role play. 6 Session of 2 hrs in V Semester and 6 Session of 2 hrs in VI Semester are allocated for this.

Integrated teaching:	26 Hours
With Bio Chemistry	: Neuro chemistry of the human behaviour 2 hours
With Physiology/Anatomy	: Limbic lobe functioning and human behaviour 2 hours
With Pharmacology	: Psychopharmacology-therapeutics aspects 4 hours
With Community Medicine	: Epidemiology of mental disorders National mental health programme Child and women mental health. Psycho - social rehabilitation 4 hours
With Forensic Medicine	: Mental Health Act' 87 Persons' with disability Act Crime and mental illness Outline of psychiatric criminology 3 hours
With Internal Medicine	: Organic psychiatric disorders Dementia, delirium, epileptic psychosis etc.

	Alcohol & drug abuse	
	Psychosomatic disorders general-principles	
	Sexuality and behaviour	5 hours
With Obstetrics& Gynecology	: Psychological disorders of women	2 hours
With Pediatrics	: Psychological development	
	Behaviour disorders of children	4 hours

### Course Outcomes

**CO1:** Ability to be the first contact physician for the mentally ill.

**CO2:** Awareness about and affinity for a holistic humanistic approach and a bio-psycho-social model of clinical medicine.

**CO3:** An essential working knowledge about mind and its disorders.

**CO4:** Competency to take appropriate referral decisions in psychiatric, neuropsychiatric and psychosomatic disorders.

**CO5:** Communication skills to put the patient at ease and help in adjusting illness and accepting treatment.

## Assessment

### Internal Assessment

#### Theory:

As there is no University examination in Psychiatry, the performance of the students are evaluated by the internal assessment examinations conducted by the department of Internal Medicine/Psychiatry. Short notes/short answer questions will be included in the 2 internal examinations conducted by department of Medicine. One hour theory examination will be conducted by the Psychiatry department during VI or VII Session and marks added to average marks in Medicine. (Theory)

#### Practical:

A brief clinical examination can be conducted by the department at the end of clinical posting consisting of a short case of psychiatric illness (30 minutes) and an interview /communication session (30 minutes) The marks can be added to Internal Medicine of Medicine department (practical).

### University Examination:

#### Theory:

Two short notes on psychiatry will be included in one of the theory papers in medicine.

#### Practical:

There will not be any practical/clinical examination in psychiatry

## Textbooks Recommended

- |   |                         |
|---|-------------------------|
| 1. Clinical Examination in Medicine       | - Prof. K.V.Krishna Das |
| 2. Text Book of Medicine                  | - Prof. K.V.Krishna Das |
| 3. Clinical Psychiatry for undergraduates | - A.V.Rao & K.Kuruvilla |

### Reference Books:

- |                                   |                                    |
|-----------------------------------|------------------------------------|
| 1. Psychological Medicine         | - Curran & Patridge, Morgan & King |
| 2. Oxford Text Book of Psychiatry |                                    |
| 3. Synopsis of Psychiatry         |                                    |

## **DERMATOLOGY AND SEXUALLY TRANSMITTED DISEASES (4MB.GM)**

### **Goal**

The aim of teaching the undergraduate student in Dermatology, Sexually Transmitted Diseases (STD) and Leprology is to impart such knowledge and skills that may enable him to diagnose and treat common ailments and to refer rare diseases or complications/unusual manifestations of common diseases, to the specialist.

### **Objectives**

#### **Knowledge:**

To impart knowledge and skills to the students so that at the end of the postings they can..

- Diagnose and treat common ailments of skin
- Correlate skin lesions with possible underlying systemic conditions
- Comprehend the basics of topical therapy.
- Recognize emergency situations/rare cases so as to refer to a specialist for further evaluation.
- Diagnose sexually transmitted infections and leprosy and be aware of various National Programmes in leprosy and STDs
- Have a basic comprehension regarding the nuances of cosmetic dermatology and dermatological surgery.
- Have a basic comprehension of newer equipment and procedures related to modern dermatology- like UV therapy

#### **Skills:**

The student shall be able to..

- Interview the patient, elicit relevant and correct information and describe the history in chronological order.
- Conduct clinical exam, elicit & interpret physical findings and diagnose common disorders and emergencies.
- Perform simple, routine investigative and laboratory procedures required for making the bed-side diagnosis especially the examination of scrapings for fungus, preparation of slit smears and staining for AFB for leprosy patients and for STD cases.
- Manage common diseases, recognizing the need for referral for specialized care, in case of inappropriateness of therapeutic response.

### **Teaching Schedule**

#### **Lectures**

Semester	VI	VII	Total
Hours	16	16	32

#### **Clinical Posting**

Semester	IV	VI	Total
Weeks	2	4	6

#### **Teaching Hours**

Lectures	Practicals/Clinical	Innovative sessions	Total
32	144	18	194

## Schedule of lectures

### Topic

14 hours

Basics of dermatology - including structure and functions of the skin and dermatological case taking.  
Infections - bacterial, fungal, viral, and parasitic.  
Eczemas.  
Papulosquamous diseases - including psoriasis and lichen planus.  
Hair and Nail disorders.  
Leprosy.  
Urticaria and drug reactions.  
Bullous dermatosis.  
Nevi and cutaneous malignancies.  
Connective tissue disorders and skin.  
Topical therapeutics.  
STDs and HIV.  
Cosmetic dermatology and dermatosurgery.  
Procedures like UV Therapy & Newer types of laser procedures for dermatological indications.

### Symposia, Seminars

14 hours

### Course Outcomes

**CO1:** Competency to diagnose and manage common ailments of skin

**CO2:** Competency to correlate skin lesions with possible underlying systemic conditions.

**CO3:** Knowledge of the basics of topical therapy.

**CO4:** Ability to recognize emergency situations/rare cases so as to refer to a specialist for further evaluation.

**CO5:** Competency to diagnose sexually transmitted infections and leprosy and be aware of various National Programmes in leprosy and STDs

**CO6:** Knowledge of the nuances of cosmetic dermatology and dermatological surgery.

**CO7:** Knowledge of newer equipment and procedures related to modern dermatology- like UV therapy

**CO8:** Competency to interview the patient, elicit relevant and correct information and describe the history in chronological order.

**CO9:** Competency to perform simple, routine investigative and laboratory procedures required for making the bed-side diagnosis especially the examination of scrapings for fungus, preparation of slit smears and staining for AFB for leprosy patients and for STD cases.



## **RADIO-DIAGNOSIS & IMAGING (4MB.GM)**

### **Goal**

The broad goal of teaching undergraduate medical students in the field of Radio-diagnosis should be aimed at making the students realize the basic need of various radio-diagnostic tools in medical practice. They shall be aware of the techniques required to be undertaken in different situations for the diagnosis of various ailments as well as during prognostic estimations.

### **Objectives**

#### **Knowledge**

The student shall be able to:

- Understand basics of x-ray production, its uses and hazards;
- Appreciate and diagnose changes in bones – like fractures, infections, tumours and metabolic bone diseases;
- Identify and diagnose various radiological changes in disease conditions of chest and mediastinum, skeletal system, gastro intestinal tract, hepatobiliary system and genito urinary (G.U) system.
- Learn about various imaging techniques, including isotopes Computerised Tomography (C.T), Ultrasound, Magnetic Resonance Imaging (M.R.I) and D.S.A.

#### **Skills**

At the end of the course the student shall be able to:

- Use basic protective techniques during various imaging procedures;
- Interpret common x-ray, radiodiagnostic techniques in various community situations;
- Advise appropriate diagnostic procedures in specialized circumstances to appropriate specialists.

### **Teaching Schedule\***

#### **Lecture/Practicals/Innovative Sessions**

Semester	VI	Total
Hours	24hrs	24hrs

#### **Clinical Posting**

Semester	V	Total
Weeks	2 (One week each in Radiology & Radiation Oncology)	2

#### **Teaching Hours**

Lectures	Practicals/Clinical	Innovative sessions	Total
8	48	16	72

\*Includes teaching of Radiotherapy.

### **Schedule of Lectures**

#### **Topic**

**14 hours**

1. Musculo Skeletal – Commonly performed skeletal radiography, various types of fractures/locations. infections, tumours, metabolic bone disease, joint disease (Infections ,Immunological metabolic condition)

2. Chest – Normal chest, various lung parenchymal pathologies, congenital and acquired cardiac conditions, pneumothorax, pleural effusion, mediastinal masses.
3. GI System – Upper GI examination, lesions of oesophagus, stomach and duodenum – small bowel diseases, various colonic pathologies.
4. Hepatobiliary system – Ultrasound examination, contrast studies, CT, MRI.
5. Genitourinary system – Plain film, ultrasound examination, contrast studies, IVU, MCU, urethrogram and CT and emergencies.
6. Central nervous system – Radiological manifestations of infarcts, haemorrhage, tumours and inflammations in brain and spine and emergencies.
7. Interventional Radiology – Common IR procedures and their role in clinical practice.
8. Women's Imaging - Mammography, Imaging of the foetus and pregnant imaging of gynecologic diseases and emergencies.
9. X-ray - its nature, production, hazards and basic safety protocols.

### Course Outcome

**CO1:** Understanding of the basics of x-ray production, its uses and hazards.

**CO2:** Ability to appreciate and diagnose changes in bones – like fractures, infections, tumours and metabolic bone diseases.

**CO3:** Competency to identify and diagnose various radiological changes in disease conditions of chest and mediastinum, skeletal system, gastro intestinal tract, hepatobiliary system and genito urinary (G.U) system.

**CO4:** Competency to use basic protective techniques during various imaging procedures;

**CO5:** Competency to interpret common x-ray, radiodiagnostic techniques in various community situations.

**CO6:** Competency to advise appropriate diagnostic procedures in specialized circumstances to appropriate specialists.

**CO7:** Knowledge of various imaging techniques, including isotopes Computerised Tomography (C.T), Ultrasound, Magnetic Resonance Imaging (M.R.I) and D.S.A.

# **RADIATION THERAPY AND MEDICAL ONCOLOGY (4MB.GM)**

## **Goal**

The broad goal of teaching the undergraduate medical students in the field of Radiotherapy is to make the students understand the magnitude of the ever-increasing cancer problem in the country. The students must be made aware about steps required for the prevention and possible cure of this dreaded condition.

## **Objectives**

### **Knowledge**

The student shall be able to:

- To have a basic concept of Radiobiology
- Identify symptoms and signs of various cancers and their steps of investigations and management;
- Explain the effect of radiation therapy on human beings and the basic principles involved in it,
- Know about radio-active isotopes and their physical properties;
- Be aware of the advances made in radiotherapy in cancer management and knowledge of various radio therapeutic equipment while treating a patient;
- Identify various Chemotherapeutic agents used in cancer treatment.

### **Skills**

At the completion of the training programme, the student shall be able to:

- Take a detailed clinical history of the case suspected of having a malignant disease;
- Assist various specialists in administration of anticancer drugs and in application and use of various radio therapeutic equipment, while treating a patient.

## **Course Outcomes**

**CO1:** Basic knowledge of Radiobiology

**CO2:** Competency to identify symptoms and signs of various cancers and knowledge of the steps of investigations and management.

**CO3:** Knowledge of the effect of radiation therapy on human beings and the basic principles involved.

**CO4:** Knowledge of radio-active isotopes and their physical properties.

**CO5:** Awareness about the advances made in radiotherapy in cancer management and knowledge of various radio therapeutic equipment while treating a patient.

**CO6:** Knowledge of various Chemotherapeutic agents used in cancer treatment.

**CO7:** Competency to take a detailed clinical history of the case suspected of having a malignant disease;

**CO8:** Competency to assist various specialists in administration of anticancer drugs and in application and use of various radio therapeutic equipment, while treating a patient.

## **Schedule of Lectures**

### **Topics**

**10 hours**

Cancer epidemiology and possible etiological factors, screening for cancer

Principles of cancer chemotherapy – chemotherapeutic agents,

Targeted therapy

Hormone treatment in cancer

Radiation Oncology – radioactive sources – teletherapy –brachytherapy

Methods of radiotherapy – recent advances

Diagnosis and treatment of common malignancies

Oncological emergencies

**Reference Books**

1. Liebel & Philips Text book of Radiation Oncology
2. Perez & Brady Text book of Radiation Oncology
3. Text book of Oncology – Devitta
4. Mannual of clinical oncology - Dennis. A.Casceita
5. Washington Manual of Oncology
6. Student- BMJ Journal
7. AJCC staging Manual (2012)
8. Radiobiology for the Radiologist (first seven chapters)- Eric J Hall

# **PULMONOLOGY (4MB.GM)**

## **Goal**

The aim of teaching the undergraduate in tuberculosis and chest diseases is to impart such knowledge and skills that may enable him/her to diagnose and manage common ailments affecting the chest with the special emphasis on management and prevention of tuberculosis and especially National Tuberculosis Control Programme.

## **Competencies**

### **Core-Competencies**

1. To prepare the clinical history of a patient with respiratory illness, by interacting with the patient, stressing on the points of presenting illness, past illness, personal history, occupational history etc.
2. To familiarize with the clinical examination of a patient with respiratory illness by methods of Inspection, palpation, percussion and auscultation.
3. To take history and examine a patient of pleural effusion systematically to arrive at a diagnosis and to suggest investigations and treatment.
4. To prepare history and examine a patient with pneumonic consolidation and to suggest investigations and treatment.
5. To take history and examine a patient with pneumothorax and to suggest investigation and treatment.
6. To Prepare history and examine a case of COPD and suggest investigations and management.
7. To take detailed history and to examine clinically a case of Bronchial asthma and plan investigations and treatment.
8. To prepare history and do clinical examination in a patient with Tuberculosis (pulmonary & extra pulmonary) and plan investigations and treatment with emphasis on Revised National TB control Program.

### **Non Core competencies.**

1. Reading an X ray Chest and interpretation of X-rays for various common pulmonary diseases.
2. Viewing and interpreting Pulmonary function tests. (spirometry)
3. Viewing procedures like pleural aspiration, Intercostal drainage and bronchoscopy.

## **Objectives**

### **Knowledge**

At the end of the course of tuberculosis and chest diseases, the student shall be able to:

- Demonstrate sound knowledge of chest diseases, their clinical manifestations, including emergent situations and of investigative procedures to confirm their diagnosis;
- Demonstrate comprehensive knowledge of various modes of therapy used in treatment of respiratory diseases;
- Describe the mode of action of commonly used drugs, their doses, side-effects/toxicity, indications and contra-indications and interactions;
- Describe commonly used modes of management including medical and surgical procedures available for treatment of various diseases and to offer a comprehensive plan of management inclusive of National Tuberculosis Control Programme.

### **Skills**

At the end of the course the student shall be able to;

- Interview the patient, elicit relevant and correct information and describe the history in chronological order;
- Conduct clinical examination, elicit and interpret clinical findings and diagnose common respiratory disorders and emergencies.

## Teaching Schedule

### Lecture/Practical/Innovative Session:

Semester	VI	Total
Hours	24	24

### Clinical Posting:

Semester	IV	Total
Weeks	2	2

Lectures	Practicals/Clinical	Innovative sessions	Total
8	48	16	72

### Course Outcomes

**CO1:** Competency to prepare the clinical history of a patient with respiratory illness, by interacting with the patient, stressing on the points of presenting illness, past illness, personal history, occupational history etc.

**CO2:** Familiarity with clinical examination of a patient with respiratory illness by methods of Inspection, palpation, percussion and auscultation.

**CO3:** Competency to take history, make diagnosis and suggest investigations and treatment in a patient with pleural effusion.

**CO4:** Competency to take history and examine a patient with pneumonic consolidation and to suggest investigations and treatment.

**CO5:** Competency to take history and examine a patient with pneumothorax and to suggest investigation and treatment.

**CO6:** Competency to take history and examine a case of COPD and suggest investigations and management.

**CO7:** Competency to take detailed history and to examine clinically a case of Bronchial asthma and plan investigations and treatment.

**CO8:** Competency to prepare history and do clinical examination in a patient with Tuberculosis (pulmonary & extra pulmonary) and plan investigations and treatment with emphasis on Revised National TB control Program.

### Schedule of Lectures/Innovative Sessions

Topics	Hours
Respiratory physiology, respiratory function test	1
Obstructive or sleep apnoea	1
Pneumonia	1
Bronchiectasis, lung abscess	1
Bronchial asthma, Eosinophilic Pneumonia	2
COPD, cor pulmonale	2
Respiratory failure	1

Text book of Pulmonary Medicine - Dr. D Behra	
Tuberculosis - 2nd Edition - S.K. Sharma/ Alladi Mohan	
Non cardiogenic pulmonary oedema / ARDS	1
Pleural diseases	2
Occupational lung diseases, Interstitial lung disease	1
Smoking and diseases	1
Investigative modalities in pulmonology	1
Pulmonary tuberculosis	1
Extra pulmonary tuberculosis - RNTCP	1
Pulmonary manifestation of systemic diseases	1
Pulmonary Vasculitis, Pulmonary thrombo embolism	1

### **Reference books recommended**

- Respiratory Diseases - Crofton (5th.ed.)
- Manual of Clinical Problems in Pulmonary Medicine- Bordow ( 5th.ed.)

# GENERAL SURGERY (4MB.GS)

## Goal

The broad goal of teaching undergraduate students in Surgery is to produce graduates capable of delivering efficient first contact surgical care.

## Competencies

The Indian Medical Graduate will acquire the knowledge, skills and attitude necessary to attain the following competencies to.

- Diagnose common surgical conditions both acute and chronic, in adult and children;
- Plan various laboratory tests for surgical conditions and interpret the results;
- Identify and manage patients of haemorrhagic, septicæmic and other types of shock;
- Be able to maintain patent air-way and resuscitate,
  - i. a critically injured patient;
  - ii. Patient with cardio-respiratory failure; and
  - iii. Drowning case;
- Monitor patients of head, chest, spinal and abdominal injuries, both in adult and children;
- Provide primary care for a patient of burns;
- Acquire principles of operative surgery, including pre-operative, operative and post operative care and monitoring;
- Treat open wounds including preventive measures against tetanus and gas gangrene;
- Diagnose neonatal and paediatric surgical emergencies and provide sound primary care before referring the patient to secondary/tertiary centres;
- Identify congenital anomalies and refer them for appropriate management.

## Objectives

### Knowledge

At the end of the course, the student shall be able to:

- Describe aetiology, pathophysiology, principles of diagnosis and management of common surgical problems including emergencies, in adult and children;
- Define asepsis, disinfection and sterilization and recommend judicious use of antibiotics;
- To impart theoretical knowledge on the diagnosis and management of common surgical problems in our country, both elective and emergency.
- To impart sound practical skills for the management of these problems.
- Describe common malignancies in the country and their management including prevention;
- Define indications and methods for fluid and electrolyte replacement therapy including blood transfusion;
- Enumerate different types of anaesthetic agents, their indications, mode of administration, contra indications and side effects
- To effect appropriate transformation in the attitude and behaviour of the learner, so that they can function effectively in society.

### Skills

The student shall have observed/assisted/performed the following:

- Incision and drainage of abscess
- Debridement and suturing open wound
- Venesection
- Excision of simple cyst and tumours
- Biopsy of surface malignancy
- Catheterization and nasogastric intubation
- Circumcision
- Meatotomy



- Vasectomy
- Diagnostic proctoscopy
- Hydrocele operation
- Endotracheal intubation
- Chest tube insertion

### Integration

The undergraduate teaching in surgery shall be integrated at various stages with different pre and para and other clinical departments.

## Teaching Schedule

### Lectures/Practical/Innovative Sessions

Semester	III	IV	V	VI	VII	VIII	IX	Total
Hours	24	24	16	48	32	96	64	304

### Clinical Posting \*

Semester	III	V	VI	VIII	IX	Total
Hours	8	2	4	8	4	26

\* This includes posting in anaesthesiology and Casualty

### Teaching Hours – General Surgery

Lectures	Practical/Clinical	Innovative session	Total
100	624	204	928

The curriculum is primarily intended for the departments of General Surgery, G I Surgery, Urology, Paediatric surgery, vascular surgery, Plastic surgery, cardiovascular surgery, Radio diagnosis, Anaesthesiology and Facio-Maxillary surgery.

The training programme is divided into three stages.

1. Initial stage (semester III)
2. Intermediate stage (semesters IV to VII)
3. Concluding stage (semesters VIII & IX)

### Initial Stage (Semester III)

The primary objective at this stage is to provide certain basic concepts in surgical knowledge along with clinical skills to elicit common physical findings.

### Lectures/Integrated Teaching

#### Topics

Introduction including basic concepts of doctor-patient relationship. History of surgery with emphasis on the contribution of Indian surgeons. Shock, hemorrhage and transfusion. Fluid and electrolyte disturbances. Surgical infections, AIDS and antisepsis. Surgical nutrition. Peripheral arterial disease, venous and lymphatic diseases. Concepts of organ transplantation. Tumors, cysts and basics of oncology. Wounds and wound healing.

First month – one to one and half hours per day – classes emphasizing basic clinical findings All

days for about 2 hours – ward posting and clinical discussion. Operation theatre by rotation to demonstrate basic surgical skills and common procedures – students may be asked to scrub up. Clerk ship – students posted to night duty in wards on their respective admission days of the units into which they are posted.

### **Self Learning Packages:**

#### **Problem – Based Learning**

Under the guidance of one faculty member, common problems such as clinical breast examination, abdominal pain, leg ulcers etc. would be allotted to different batches of students. The focus would be on data collection from databases. At the end of their postings, the students will be asked to make a presentation of their findings. They will also be required to submit a detailed report of their study.

Ethical Aspects of Clinical Examination - Abdominal examination , Breast examination , Per Rectal Examination

### **Evaluation Strategies:**

The initial phase will be evaluated as follows: Log books – include record of patients studied by the learner along with day-to-day activities. MCQ examination on topics covered in theory. OSCEs, short case presentations and oral examinations.

Assessment of presentation of the problem-based learning focusing on communication skills.

## **Intermediate Stage (Semesters IV to VII)**

The basic stress here is to provide concepts in trauma and emergency surgery and also certain surgical specialities such as paediatric surgery, anaesthesiology, dental and radio diagnosis.

### **Lecture/Integrated Teaching Topics**

Thyroid and other endocrine diseases Breast diseases. ATLS and trauma management Concepts of minimally invasive including laparoscopic surgery.

Introduction to Natural Orifice Transluminal Endoscopic surgery (NOTES)

### **Anaesthesiology**

Pain and management Concepts of local anaesthesia Regional anaesthesia General anaesthesia Critical care medicine.

### **Paediatric surgery**

CHPS Hirschsprung's disease Anorectal malformations Tracheo-esophageal fistula. Diaphragmatic hernia Neonatal intestinal obstructions Meckel's diverticulum Urological problems in children Tumors in children

### **Evaluation**

Log book maintained by the student. MCQ tests on the theory topics along with short answer questions. OSCEs Evaluation in each speciality/department.

## **Concluding Stage (Semester VIII & IX)**

Basic objective at this level is to train the learner to make a clinical diagnosis of the problem, discuss the differential diagnosis and plan management strategies for common surgical problems.

### **Lectures**

### **Topics**

Oral cavity, esophagus, stomach and duodenum Hepato-biliary surgery Pancreas and spleen Hernias including abdominal wall. Small and large intestines, rectum and anal canal. Day case surgery Auditing in surgery Upper urinary – kidney (congenital anomalies, infections, tumors, stones) Lower Urinary – bladder and ureter and urethra (congenital anomalies, infections, tumors, stones) Testis and scrotum and male external genitalia -male infertility

### **Neuro surgery:**

Head injuries Spinal injuries Basics of diagnosis and investigation of intracranial lesions Common tumors affecting the CNS Intracranial hemorrhage.

### **Cardiovascular and Thoracic Surgery**

Congenital heart disease Coronary artery diseases. Valvular lesions affecting the heart. Chest injuries and tumors of the chest wall.

### **Plastic surgery**

Burns -management. Skin grafting and flaps. Oncoplastic procedures Cleft lip and cleft palate

**Topic presentation by the students:** 1 hour per week; two or three students select a topic.

### **Operative surgery**

Demonstration of procedure in the operation theatre and video demonstrations.

Students are provided with Mannequins to improve Dexterity

They are given Exposure to Incisions , drainage , suturing , flap raising etc

### **Practical training**

Clinical posting in the wards on all days Clerkship on admission days.

### **Course Outcomes:**

**CO1:** Competency to diagnose common surgical conditions both acute and chronic, in adult and children.

**CO2:** Competency to plan various laboratory tests for surgical conditions and interpret the results.

**CO3:** Ability to identify and manage patients of haemorrhagic, septicemic and other types of shock.

**CO4:** Ability to maintain patent air-way and resuscitate, i. a critically injured patient; ii. Patient with cardio-respiratory failure; and iii. Drowning case.

**CO5:** Competency to monitor patients of head, chest, spinal and abdominal injuries, both in adult and children.

**CO6:** Competency to provide primary care for a patient of burns;

**CO7:** Knowledge of principles of operative surgery, including pre-operative, operative and post operative care and monitoring;

**CO9:** Competency to treat open wounds including preventive measures against tetanus and gas gangrene.

**CO10:** Competency to diagnose neonatal and paediatric surgical emergencies and provide sound primary care before referring the patient to secondary/tertiary centres.

### **Assessment**

Log books – should contain work up of at least 20- patients studied by the student during the clinical postings. Theory examination – including SAQ, Evaluation of the topic presented by the student. Final practical examination – long case, short case, OSEC and oral examination.

**Schedule of Internal Assessment and University Examinations:**

1 <sup>st</sup> Internal Assessment	2 <sup>nd</sup> Internal Assessment	3 <sup>rd</sup> Internal Assessment	Final Internal Assessment	University Examination
Last week of January 2019	Last week of July 2020	Last week of July 2021	First week of December 2021	First week of January 2022

**Distribution of Marks for Internal Assessment and University Examinations:**

University Examination				Internal Assessment			
Theory I	Theory II	Practical	Viva voce	Total	Theory	Practical	Total
60	60	100	20	240	30	30	60

**University Examination - Scheme****Theory**

Two papers– paper I -Section A -Gastrointestinal tract Section B-Orthopaedics Paper II -Sections A & B -General Surgery Except GIT Anaesthesiology, Surgical Anatomy And Recent advances. The questions will be objective type –short answer/short structure/structured essay.

**Practical**

One long case, three short cases of which two will be Orthopaedics case. Objective Structured Clinical Examination.

**Viva voce**

Four examiners-all examiners individually examine each student – topics to be divided X-rays/instruments/specimens/operative surgery/surgical pathology -histopathology slides

**Books Recommended**

1. Short Practice of Surgery – Bailey and Love
2. Sabiston Textbook of Surgery
3. Operative Surgery -Das
4. Textbook of Operative Surgery – Farquharson.
5. Clinical Surgery – Das.
6. Clinical Methods – Hamilton Bailey
7. Pye's Surgical Handicraft.

# ORTHOPAEDICS

## 4MB.OR

### Goal

The broad goal of teaching undergraduate medical students in the field of Orthopaedics is to make the students understand the basics of fractures and dislocations commonly encountered and the essential treatment needed for emergency management. The common inflammatory and neoplastic diseases occurring in the bones and joints should also be familiarized.

### Competencies

The Indian Medical Graduate will acquire the knowledge, skills and attitude necessary to attain the following competencies to.

- Detect sprains and deliver first aid measures for common fractures and sprains and manage uncomplicated fractures of clavicle, Colles's; fracture, phalanx fracture, undisplaced fractures, forearm, Jone's fracture.
- Diagnose and manage common bone infections.
- Advise aspects of rehabilitation for polio, cerebral palsy and amputation.

### Objectives

#### Knowledge

At the end of the course the student shall be able to:

- Explain the principles of recognition of bone injuries and dislocation;
- Apply suitable methods to detect and manage common infections of bones and joints;
- Identify congenital, skeletal anomalies and their referral for appropriate correction or rehabilitation;
- Recognize metabolic bone disease as seen in this country;
- Explain aetio genesis, manifestations, diagnosis of neoplasm affecting bones.

#### Skills

At the end of the course, the student shall be able to:

- Use techniques of splinting, plaster, immobilization etc.
- Identify the indications for amputations.

### Application

Be able to perform certain orthopaedic skills, provide sound advice of skeletal and related conditions at primary or secondary health care level.

### Integration

Integration with Anatomy, Surgery, Pathology, Radiology and Forensic Medicine to be done.

## Teaching Schedule

### Lectures/Practicals/Innovative Sessions

Semester	VI	VII	VIII	IX	Total
Hours	24	16	36	32	108

### Clinical Postings\*

Semester	IV	VII	IX	Total
Weeks	4	4	2	10

\* Includes Posting in Physical Medicine & Rehabilitation for 1 week

## Teaching Hours

Lecture	Practical/ clinical	Innovative session	Total
36	240	72	348

## Schedule of Lectures

Topic	Hours
<b>Traumatology</b>	<b>17</b>
1. Definition of a fracture and types of fracture and general principles of management	1
2. Complications of fracture – open fractures and pathological fracture, external fixation	1
3. Fracture clavicle, fracture neck of humerus and shoulder dislocation	1
4. Fracture humerus shaft and supra condylar fracture/condylar fracture	1
5. Elbow dislocation and forearm fracture	1
6. Monteggia fracture and gallezi fracture	1
7. Colle's fracture and fracture scaphoid	1
8. Tendon injuries and hand injuries	1
9. Fracture spine and traumatic paraplegia	1
10. Fracture pelvis and hip fracture – fracture neck of femur	1
11. Hip dislocation and fracture shaft of femur	1
12. Condylar fracture femur and tibia	1
13. Meniscus tear and fracture patella	1
14. Leg fracture	1
15. Ankle injuries – Pott's fracture	1
16. Fracture Calcaneum and fracture Talus	1
17. Growth Plate Injury	1
18. Supracondylar fracture humerus in children	1
<b>Cold Orthopaedics</b>	<b>15</b>
1. C.T.E.V. and flat Foot	1
2. C.D.H.	1
3. Torticollis, congenital pseudoarthrosis of Tibia and arthrogyrosis multiplex congenital	1
4. Osteomyelitis	1
5. Septic arthritis	1
6. Tuberculosis – spine, hip, knee, elbow, wrist and other sites	1
7. AVN Head Femur	1
8. Introduction to Ilizarov/arthroscopy/arthroplasty	2
9. Perthe's and SCFE	1
10. Rickets and osteomalacia	1
11. Rheumatoid arthritis and ankylosing spondylitis	1
12. IVDP and Kyphosis	1
13. Scoliosis and spondylolisthesis	1
14. Bone tumour, osteochondroma, simple bone cyst	1
15. ABC, enchondroma, GCT, Ewing's Tumour	1
16. Osteosarcoma, multiple myeloma, metastatic bone diseases and chondrosarcoma	2
17. Osteogenesis, imperfecta nerve injuries – radial/ulnar/median nerves Sciatic/brachial plexus, osteoarthritis of hip and knee.	2
<b>Seminars/Symposia</b>	
Symposium with clinical cases – Trauma	
1. CTEV2.	
2. C.D.H.	
3. Osteomyelitis	

4. T.B. Spine
5. T.B. Hip
6. Perthe's
7. Slipped capital femoral epiphysis
8. Back pain
9. Bone tumours (benign)
10. Bone tumours (malignant)
11. Cubitus Varus/Valgus
12. Genu Varus/Valgus

### **Schedule of Practicals/Clinical Posting**

1. Nerve injuries
2. Osteomyelitis
3. Metabolic bone disease
4. Symposium on physical medicine and rehabilitation
5. Supracondylar fractures of humerus
6. Ankylosis
7. Compartmental syndrome and VIC
8. Fat embolism syndrome
9. Traction, splints, POP
10. Orthopedics Implant and Instruments

### **Course Outcomes**

**CO1:** Competency to detect sprains and deliver first aid measures for common fractures and sprains and manage uncomplicated fractures of clavicle, Colles's; fracture, phalanx fracture, undisplaced fractures, forearm, Jone's fracture.

**CO2:** Competency to diagnose and manage common bone infections.

**CO3:** Competency to give advise aspects of rehabilitation for polio, cerebral palsy and amputation.

**CO4:** Orientation in basic principles of community based rehabilitation of people with disabilities.

### **Textbooks Recommended**

1. Graham Apley – System of Orthopaedics
2. Fractures and Joint Injuries – Watson Jones
3. Orthopaedics – Samuel F Turek
4. Merer's Orthopaedic Surgery
5. Outline of Fractures – Adam's
6. Outline of Orthopaedic Surgery
7. Clinical Surgery – Das-Chapter on Orthopaedics
8. Crawford Adam's – Operative Techniques ( Orthopaedics)

### **Reference Book**

1. Campbell's Operative Orthopaedics

## **PHYSICAL MEDICINE AND REHABILITATION (4MB.GS)**

### **Schedule of Lectures/Innovative Sessions**

1. Introduction to Physical Medicine and Rehabilitation
2. Concepts of impairment, disability, handicap and the rehabilitation team.
3. Principles of physio therapy-various physical modalities and therapeutic exercises.
4. Principles of occupational therapy its application in rehabilitation medicine.
5. Principles of prosthetics and orthotics and rehabilitation aids-their application in rehabilitation medicine.
6. Broad principles of Neurological, Orthopaedic, Musculoskeletal, Paediatric, Cardiac and Pulmonary rehabilitation.
7. Principles of Pain management.
8. Basic principles of disability evaluation for certification purposes.
9. To get exposed to the potentials of socio-vocational rehabilitation of the disabled.
10. Persons with Disability Act 1995.
11. To get oriented to basic principles of community based rehabilitation of people with disabilities.

### **Textbook Recommended**

1. Physical Medicine and Rehabilitation-Randall and Braddom



# **ANAESTHESIOLOGY (4MB.GS)**

## **Objectives**

**The student should be able to:**

- Identify the various types of surgical anaesthesia
- Identify and detect the common possible complications of anaesthesia and treat/prevent them if possible.
- Identify the basic components of critical care.
- The situations where the principles of critical care can be adapted to general management of the very sick patient even with limited resources.
- Identify the possible deleterious effects, especially long term adverse consequences, of critical care and methods of prevention, early detection and effective treatment.
- Diagnose cardiac and respiratory arrests effectively and institute treatment without delay.
- Identify the principles of prolonged life support.
- Point out those aspects of pathophysiology of pain that are of practical relevance to management of pain.
- Enumerate the major modalities of management of acute and chronic pains.
- Enumerate the components of the WHO 3 step analgesic ladder.
- Identify the barriers to effective pain management including opio phobia and fear of side effects of analgesics.
- Identify the means of overcoming the barriers.
- Define palliative care, supportive care and long term care.
- Identify the principles of symptom control.
- Identify the common social, emotional and spiritual problems of patients with life threatening diseases and their management.
- Describe the principles of management of the dying patient.

## **Schedule of Lectures**

### **Lecture/Practical/Innovative Session**

<b>Semester</b>	<b>Hours</b>	<b>Total</b>
VI	72	72

### **Teaching Hours**

<b>Lectures</b>	<b>Practicals</b>	<b>Innovative Sessions</b>	<b>Total</b>
8	48	16	72

## **Schedule of Lectures/Group Discussions**

### **Module A: Clinical Anaesthesia: 3 hours**

Lecture : Introduction to Anaesthesiology and clinical anaesthesia

Lecture : Types of anaesthesia

Lecture : Complications of anaesthesia, their prevention, early detection and management.

### **Module B: Critical care:2 hours**

Lecture: What is critical care?

Group work followed by discussion: How can the principles of critical care can be adapted to general management of the very sick patient even with limited resources? Group work followed by discussion: Possible deleterious effects, especially long term adverse consequences, of critical care and methods of prevention, early detection and effective treatment.

### **Module C: Resuscitation: 10 hours**

Lecture: Principles of resuscitation and the emergency management of a patient with sudden loss of consciousness: basic life support; management of the upper airway.

Group discussion: Basic life support continued: Breathing and circulation.

Practical work in three groups: Airway management, breathing and circulation.

Practical work in three groups: Airway management, breathing and circulation - continued Group discussion: ACLS: Drugs

Group discussion: ACLS – continued

Group work followed by discussion: Resuscitation in trauma

Lecture: Introduction to shock

Group work followed by discussion: Management of hypovolemic shock Evaluation, discussion and feedback.

### **Module D: Pain and Palliative care – 8 hours**

Lecture: Introduction to pain relief and palliative care

Lecture: Pathophysiology and assessment of pain

Role play followed by discussion: Assessment of pain (emphasizing on patient centered care

Group discussion: The WHO analgesic ladder

Group work followed by discussion: Management of chronic pain (using hypothetical case histories

Group work followed by discussion: Principles of management of symptoms of other than pain.

Role play followed by discussion: Emotional problems and psychosocial support in incurable illness

Group discussion: How can the principles of palliative care be integrated into routine medical practice?

1. Brain Death
2. Organ donation
3. End of life
4. Withdrawal of Supports
- 5.

### **New Innovative Methods**

1. Ultrasound guided vascular access
2. Ultrasound guided regional nerve block

### **Course Outcomes:**

**CO1:** Knowledge of the various types of surgical anaesthesia

**CO2:** Knowledge of the common possible complications of anaesthesia and the skill to treat/prevent them if possible.

**CO3:** Knowledge of the basic components of critical care.

**CO4:** Knowledge of the principles of prolonged life support.

**CO5:** Understanding of management of acute and chronic pains with understanding of the components of the WHO 3 step analgesic ladder.

**CO6:** Understanding of palliative care, supportive care and long term care.

**CO7:** Knowledge of the principles of management of the dying patient.

### **Assessment**

There will be a pre test and post test for each module. The post test will be followed by evaluation of each session by the students.

# **OBSTETRICS & GYNAECOLOGY**

## **(INCLUDING FAMILY WELFARE PLANNING) - 4MB.OB**

### **Goal**

The broad goal of teaching undergraduate students in Obstetrics and Gynaecology is that they shall acquire understanding of anatomy, physiology and patho physiology of the reproductive system and gain the ability to optimally manage common conditions affecting it.

### **Competencies**

The Indian Medical Graduate will acquire the knowledge, skills and attitude necessary to attain the following competencies to.

- Examine a pregnant woman; recognize high risk pregnancies and make appropriate referrals.
- Conduct a normal delivery, recognise complication and provide postnatal care.
- Resuscitate the newborn and recognise congenital anomalies.
- Advise a couple on the use of various available contraceptive devices and assist in insertion and removal of intra-uterine contraceptive devices.
- Perform pelvic examination, diagnose and manage common gynaecological problems including early detection of genital malignancies.
- Interpretation of data of investigations like biochemical, histopathological, radiological, ultrasound etc.

### **Objectives**

#### **Knowledge**

At the end of the course, the student shall be able to:

- Outline the anatomy, physiology, and pathophysiology of the reproductive system and the common conditions affecting it.
- Detect normal pregnancy, labour, puerperium and manage the problems he/she is likely to encounter therein.
- List the leading causes of maternal and perinatal morbidity and mortality.
- Understand the principles of contraception and various techniques employed, methods of medical termination of pregnancy, sterilization and their complication.
- Identify the use, abuse and side effects of drugs in pregnancy, peri-menopausal and post – menopausal periods.
- Describe the national programme of maternal and child health and family welfare and their implementation at various levels.
- Identify common gynaecological diseases and describe principles of their management..
- State the indications, techniques and complications of surgeries like caesarian section, Abdominal hysterectomy, vaginal hysterectomy and other surgeries for prolapse, laparoscopic surgeries, manual vacuum aspiration syringe for Medical Termination of Pregnancy (MTP).

#### **Skills**

At the end of the course, the student shall be able to.

- Make a vaginal cytology smear, perform a postcoital test and wet vaginal smear examination for Trichomonas vaginalis, moniliasis and gram stain for gonorrhoea.

#### **Attitude**

The students should be considerate and compassionate to the patients. They should be able to mingle with the patients freely and should be able to go deep into their problems. They should not only study the physical ailments but also the mental problems which would have been the cause for many of the physical ailments. Should develop service mentality in students.

### **Integration**

The student shall be able to integrate clinical skills with other discipline and bring about coordina-

tion of family welfare programmes for the national goal of population control.

### General Guidelines for Training

1. Attendance of a maternity hospital or the maternity wards of a general hospital including (i) antenatal care (ii) the management of the puerperium and (iii) a minimum period of 5 months in –patient training including family welfare planning.
2. Of this period of clinical instruction, not less than one month shall be spent as a resident pupil in a maternity ward of a general hospital.
3. During this period, the student shall conduct at least 10 cases of labour under adequate supervision and assist in 10 other cases.
4. A certificate showing the number of cases of labour attended by the student in the maternity hospital and/or patient homes respectively, shall be signed by a responsible medical officer in the staff of the hospital and shall state.
5. That the student has been present during the course of labour and personally conducted each case, making the necessary abdominal and other examination under the supervision of the certifying officer describe his official position.
6. That satisfactory written histories of the cases conducted including wherever possible antenatal and postnatal observations, were presented by the student and initialed by the supervising officer.

### Lectures/Practical/Innovative Sessions

Semester	VI	VII	VIII	Total
Hours	48	32	120	200

### Clinical Posting

Semesters	IV*	VI	VII	VIII	IX	Total
Weeks	8	4	4	4	4	22

\* 8 Including 2 weeks Radiology

### Teaching Hours

Lectures	Practicals/Clinicals	Innovative Sessions	Total
90	530	110	640

### Schedule of Lectures

Topic	Hours
<b>Obstetrics</b>	<b>49 hours</b>
Applied anatomy:	
Pelvis, foetus in normal pregnancy, foetal circulation.	1
Physiology of pregnancy	
Maternal changes-anatomical, physiological and endocrinological	1
Diagnosis and differential diagnosis of pregnancy, antenatal care	1
Physiology of labour	
Stage of labour, mechanism of normal labour, conduct of normal labour	1
Physiology of puerperium	
Normal puerperium, care of pureperium	1
New born	
Care	1
Lactation	1
Pathology of pregnancy	
I trimester: hyperemesis, abortion, vesicular mole, Ectopic, antepartum	

haemorrhage, preterm labour, PROM	2
Hypertensive disorders of pregnancy	3
Medical diseases	9
Heart disease, anaemia, diabetes, UTI, hepatitis, TB-chest disease, infections, HIV	
Pathology of labour	9
Dystocia malpresentations +malposition, multiple pregnancy +hydramnios, dysfunctional labour dystocia due to abnormalities of maternal soft parts, foetal causes – tumours complicating pregnancy, contracted pelvis, CPD –obstructed labour.	
III stage complications	2
PPH, retained placenta, inversion of uterus, postpartum collapse injuries to parturient canal –rupture uterus, tears	2
Puerperium	
Puerperal infections, CVT, DVT	2
Special Cases	6
Post dated pregnancy, prematurity, IUGR, IUD, foetal surveillance, elderly primi , grand multipara, Rh negative ,post CS pregnancy, gynaecological disorders complicating pregnancy Maternal and perinatal mortality.	
Operative obstetrics	3
Caesarean section, episiotomy, destructive operation, manual removal of Placenta.	
Neonatology, congenital malformations	1
Drugs in pregnancy –oxytocin, obstetric analgesia	1
Induction of labour	1
USG in obstetrics.	1

Ethical Aspects of Clinical Examination - Obstetric Examination , Per vaginal Examination ,	1
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<b>Gynaecology &amp; Reproductive Medicine</b>	<b>37</b>
Applied anatomy	1
Development-developmental anomalies	2
Physiology	2
Menstrual disorders –A UB , amenorrhoea	3
Puberty – problems of	1
Menopause – Hormone replacement therapy (HRT)	2
Disease of vulva and vagina	2
PID	2
Endometriosis	1
Infertility	2
Contraception	3
Diseases of uterus	3
Diseases of cervix	2
Diseases of ovary	2
Hormones, hormone replacement therapy	2
Radiation chemotherapy, preventive gynaecology	3
Adolescent problems	1
Endoscopy (laparoscopy , hysteroscopy, culdoscopy)	1
<b>Family Planning</b>	<b>4</b>
MTP	
Sterilization	

Contraception.

## Ethical Aspects of Medical Termination of Pregnancy (MTP)

### Schedule of Practicals

#### Details of Practicals/Clinical

Total Hours 530. Ward work - in the out patient department, operation theatre and labour room.

Every day	8 – 9 am	- Symposium & Group discussion
	9 -10.30 am	- Case demonstration
	10.30 am - 12.00 noon	- Clinical discussion

Two days per week is devoted for live operative surgery demonstration and discussion. Students have to maintain separate clinical record books and a minimum of twenty cases are to be recorded.

#### Clinical Posting in Obstetrics

Student will learn history taking, diagnosis and differential diagnosis of normal pregnancy, physical changes in pregnancy, presentation, position, lie etc., normal labour -stages and mechanism (demonstration of normal labour in the labour room), puerperium with stress on lactation, BFHI, common ailments of pregnancy like hyperemesis and UTI. Unit posting will include combined classes on Pathology of pregnancy, complications of pregnancy-APH, HTD, abnormal presentation, medical complications, PPRM, PTL, FGR, III stage complication and abnormal puerperium.

#### Clinical Posting in Gynaecology

Student will learn history taking, examination of a case, common symptoms, applied anatomy of genital organs, physiology of menstruation and ovulation, early complications of pregnancy, abortion, ectopic gestation and vesicular mole, fibroid, ovarian tumour, prolapse, endometriosis, malignancies of genital tract and abnormal uterine bleeding. Students will be exposed to operative procedures and diagnostic procedures like ultrasound and endoscopy.

#### Internment

Students will have to conduct at least 10 normal deliveries. They have to assist 10 normal and abnormal labour, apart from attending all emergencies. During this period there will be classes on palpation (Review), mechanism of labour, manikin demonstration, obstetric operations and emergencies. The students have to maintain a record of internment activities.

## CardioTocoGram(CTG) monitoring and Partogram charting

### Topics for Symposia and Seminars

#### Gynaecology

Physiology of menstruation, Abnormal vaginal discharge, Infertility, Contraception-I Contraception-II, MTP, Disorders of menstruation, Prolapse, Fibroid uterus Preinvasive & invasive lesions of cervix, Carcinoma endometrium, Ovarian tumour (benign), Malignant ovarian tumours, Adenomyosis + endometriosis, Endoscopy in gynaecology, P.I.D, Minor operations, Major operations, Hormones in gynaecology.

#### Obstetrics

Physiological changes during pregnancy diagnosis of pregnancy & differential diagnosis Antenatal Case, Physiology and stages of labour, Mechanism of labour, Puerperium hypertensive disorders of pregnancy, Heart disease & pregnancy, Diabetes and pregnancy, Fe deficiency anaemia, Rh incompatibility, Antepartum haemorrhage, Abortion, Ectopic pregnancy, Multiple pregnancy III stage complication, USS in pregnancy, Fetal monitoring, Trophoblastic disease.

## Topics for Project

### Obstetrics

Impact of caesarian section in subsequent deliveries, Epidemiology & outcome of PIH Perinatal problem – term babies (a) High risk (b) Low risk, Perinatal outcome in preterm babies, 1<sup>st</sup> Trimester complication in pregnancy, Heart disease in pregnancy, IUGR in obstetrics, Gestational & overt diabetes in pregnancy, Bleeding diathesis complicating pregnancy, Foetal monitoring in labour, Antenatal fetal surveillance, Fetal malformation diagnosis & management prostaglandin in cervical ripening-effectiveness, Maternal morbidity in hypertensive pregnancy, Fetal outcome in PIH, Incidence & outcome in ectopic gestation, Antepartum haemorrhage evaluation.

### Gynaecology

Incidence, clinical presentation & management of AUB, Evaluation of post menopausal bleeding, Etiology & management of infertility, Fibroid uterus in perimenopausal age group, Ovarian malignancy, PAP smear – effectiveness in screening epithelial neoplasia, Surgical management of fibroid uterus Endoscopy for pelvic factor in infertility, Uterine prolapse, Adolescent gynaecological problems.

### Family Planning

Contraceptive methods – obstetrics temporary & permanent, Medical termination of pregnancy-1<sup>st</sup> Trimesters, CuT as Intrauterine contraceptive, Medical method of early abortion, Techniques of 2<sup>nd</sup> trimester abortion.

### Integrated Teaching Sessions (Vertical/Horizontal)

#### Topic

#### Departments

- |   |                            |
|---|----------------------------|
| 1. Lymphatic drainage of female genital tract<br>in relation to pelvic malignancy   | Anatomy                    |
| 2. Embryology of genital tract and developmental<br>Anomalies with clinical relevance   | Anatomy                    |
| 3. Mechanism of coagulation and its impact on<br>Obstetric problems like PIH, abruptio placenta<br>Amniotic fluid embolism                    | Physiology                 |
| 4. Physiology of menstruation in relation to DUB<br>Carbohydrate metabolism in normal and gestational<br>diabetes and its impact in pregnancy | Physiology<br>Biochemistry |
| 5. Uterotonic drugs<br>Hormones in gynecology<br>Safety of drugs in pregnancy   | Pharmacology               |
| 6. Imaging techniques in obstetrics & gynaecology   | Perinatology               |
| 7. Cytopathology in genital tract malignancies  | Pathology                  |
| 8. Significant microbes in O&G  | Microbiology               |
| 9. Social obstetrics  | Community medicine         |
| 10. Medico legal aspects in O&G   | Forensic Medicine          |
| 11. Liver disorders in pregnancy<br>Other-Medical Disorders in pregnancy  | Internal Medicine          |

### Course Outcomes:

**CO1:** Competency to examine a pregnant woman; recognize high risk pregnancies and make appropriate referrals.

**CO2:** The ability to optimally manage common conditions affecting the female reproductive system.

**CO3:** Competency to conduct a normal delivery, recognise complication and provide postnatal care.



**CO4:** Competency to resuscitate the newborn and recognise congenital anomalies.

**CO5:** Competency to advise a couple on the use of various available contraceptive devices and assist in insertion and removal of intra-uterine contraceptive devices.

**CO6:** Competency to perform pelvic examination, diagnose and manage common gynaecological problems including early detection of genital malignancies.

**CO7:** Competency to interpret results of investigations like biochemical, histopathological, radiological, ultrasound etc.

## **Assessment**

### **Schedule of Internal Assessment and University Examination**

<b>1<sup>st</sup> Internal Assessment</b>	<b>2<sup>nd</sup> Internal Assessment</b>	<b>3<sup>rd</sup> Internal Assessment</b>	<b>Final Internal Assessment</b>	<b>University Examination</b>
Last week of January 2019	Last week of July 2020	Last week of July 2021	Last week of December 2021	First week of January 2022

### **Distribution of Marks for Internal Assessment and University Examinations**

University examination				Internal assessment			
Theory I	Theory II	Practical	Viva voce	Total	Theory	Practical	Total
40	40	50	30*	160	20	20	40

\*Out of 30 marks, 10 marks is allotted for the record of delivery cases

Weekly evaluation of the candidates will be done by one of the faculty on every Saturday and grading will be done as follows:

A. Excellent B. Good C. Satisfactory D. Poor.

### **Scheme of Internal Examinations:**

#### **Theory**

Four theory Examinations will be conducted during the course.

- At the end of 4<sup>th</sup> semester posting the topics will include a few preliminary chapters of obstetrics and gynaecology text. (Marks -40)
- At the end of the family planning posting in the 6<sup>th</sup> semester. (Marks -40)
- At the end of the 7<sup>th</sup> semester posting -Obstetrics exam (Marks -40)
- At the end of 8<sup>th</sup> semester - Gynaecology exam.
- Final examination, which will be in the model of university examination (Two Papers)

I. Obstetrics and social obstetrics (Marks - 40)

II. Gynaecology family welfare and demography (Marks - 40)

The average of three examinations in which the student has scored highest mark will be taken or internal assessment. (Final Internal Assessment Marks Are Compulsorily Included).

#### **Clinical/Practical**

- At the end of the 9<sup>th</sup> semester posting where one long case will be kept (Either obstetrics / gynaecology) (Marks -30)  
And Viva Voce examination (Marks -10)

Final average examination in the model of university examinations (one long case in obstetrics and

one long case in gynaecology )

(Marks 25 + 25=50)

**Viva Voce**

(X-Rays, instruments, family Planning and operative surgery)

(Marks -20)

Record of delivery cases

(Marks -10)

The average of both the clinical examination will be considered as the internal assessment.

**University Examinations:**

**Theory**

Paper I: Obstetrics including social obstetrics.

40 marks

Paper II: Gynaecology, family welfare and Demography.

40 marks

**Practicals** - One batch – duration -1 ½ hours

Clinical I : Long case: one 30 min. (Obstetrics including writing of case sheet)

25 marks

Clinical II:Long Case: one (Gynaecology including writing of case sheet)

25 marks

**Viva Voce:** X-rays, Instruments, Family planning and Operative surgery

20marks

4 examiners-Topics to be divided and all examiners to examine each student

**Record of Delivery Cases**

10 marks

**Textbooks Recommended - Prescribed Books**

1. Text book of Obstetrics by Sheela Balakrishnan.
2. Clinical Obstetrics by Mudaliar
3. Holland and Brews – Manual of Obstetrics
4. Clinical Gynaecology by A Bhasker Rao & N N Roy Chowdary.
5. Text book of Gynaecology by Wilfred Shaw
6. Antenatal Clinics by Browne
7. Principles of Gynaecology by TNA Jeffcoat.
8. Handbook on Obstetrics, Gynaecology for Viva, by Dr. Radhamony

# PAEDIATRICS AND NEONATOLOGY (4MB.PA)

## Goal

The broad goal of teaching undergraduate students in pediatrics is to acquire adequate knowledge and appropriate skills for optimally dealing with major health problems of children to ensure their optimal growth and development.

## Competencies

The Indian Medical Graduate will acquire the knowledge, skills and attitude necessary to attain the following competencies to.

- Assess the growth and sexual maturity of a child including adolescent.
- Prescribe and administer immunization.
- Manage malnutrition
- Manage anaphylaxis.
- Manage a child with disability.
- Manage meningeal irritation.
- Manage seizure in a child.
- Diagnose and manage dehydration
- Manage aspiration.
- Perform Heimlich Maneuver.
- Keep the child in a knee chest position in a case with intense cyanosis.
- Give chest compression in case of bradycardia.
- Use Ryles tube in a child with gastric distention.
- Accompany as a member of the transport team.
- Communicate with the relatives with empathy and sympathy.
- Use computers and other digital tools in patient management.
- Do scientific studies.

## Objectives

### Knowledge

At the end of the course, the student shall be able to:

- Describe the normal growth and development during fetal life, neonatal period, childhood and adolescence and outline deviations thereof.
- Describe the common pediatric disorders and emergencies in terms of epidemiology, etiopathogenesis, clinical manifestations diagnosis rational therapy and rehabilitation.
- State age related requirements of calories, nutrients, fluids, drugs etc., in health and disease.
- Describe preventive strategies for common infectious disorders, malnutrition, genetic and-metabolic disorders, poisoning ,accidents and child abuse.
- Outline national programmes relating to child health including immunization programmes.

### Skills

At the end of the course, the student shall be able to.

- Take a detailed pediatric history, conduct an appropriate physical examination of children including neonates, take anthropometric measurements, measure temperature orally and rectally, take BP measurement in all four limbs, make clinical diagnosis, conduct common bedside investigative procedures, operate a multi para monitor, use a pulse oximeter, interpret laboratory investigations' results, interpret paediatric early warning system (PEWS) chart and plan and institute therapy.
- Resuscitation of newborns at birth, use of AMBU bag, prepare ORS, perform tuberculin test, administer vaccines, perform venesection, provide nasogastric feeding. IV canulation and intra osseous administration of fluids if IV cannula fails.
- Conduct diagnostic procedures like, lumbar puncture, liver and renal biopsy, bone marrow aspiration and supra pubic aspiration, sub dural, pleural and ascitic tap.
- Distinguish between normal newborn baby from those requiring special care and institute

early care to all new born babies including preterm and low birth weight babies, provide guidance and counseling in breast feeding.

- Provide ambulatory care to all sick children, identify indications for specialized / inpatient care/timely referral of those who require hospitalization.
- Incision and drainage, dressing of burns, administration of oxygen and adrenaline injection.

### Integration

The training in pediatrics should prepare the student to deliver preventive promotive, curative and rehabilitative services for care of children both in community and rehabilitative services for care of children both in community and hospital as a part of a team in an integrated form with other disciplines, e.g.. Anatomy, Physiology, Forensic Medicine, Community Medicine, Physical Medicine and Rehabilitation.

### Teaching Schedule

#### Lectures/Innovative Sessions

Semesters	VI	VII	VIII	IX	Total
Hours	24	16	60	32	132

#### Clinical Postings/Innovative Sessions

Semesters	VI	VIII	IX	Total
Weeks	4	4	2	10

#### Teaching Hours

Lecture	Practical /Clinical	Innovative Session *	Total
44	240	88	372

\*Project work, seminars, structured discussion, integrated teaching, formative evaluation, revision

### Schedule of Lectures

#### Topic

Normal new born, gestational age assessment, problems related to premature, post -mature, and small for gestational age babies. neonatal jaundice, seizures, bleeding, respiratory distress, sepsis, birth trauma.

Approach to inborn error of metabolism, introduction to newborn ventilation, Behavioural problems in children.

Infectious diseases: poliomyelitis. measles, diphtheria, pertussis and tetanus, childhood tuberculosis, enteric fever, H.I.V. infection

Gastro intestinal tract and liver disorders: malabsorption syndromes, hepatitis, cirrhosis portal hypertension. helminthic infections, acute gastroenteritis.

Cardiovascular system: CHD, RHD, hypertension and CCF.

Respiratory system: croup, stridor, laryngo tracheo bronchitis, lower respiratory, tract infections, and child hood asthma.

Hemopoietic system: anemia and bleeding disorders.

Renal disorders: acute glomerulonephritis, nephrotic syndrome, urinary tract infection.

CNS: cerebral Palsy, febrile convulsions, seizure disorders, mental retardation, hydrocephalus, meningitis and encephalitis

Endocrine system: diabetes mellitus and hypothyroidism.

Childhood malignancies: Leukemias, lymphomas, neuroblastoma, Wilm's tumor.

Connective tissue disorders: JRA, SLE.

Common poisoning and accidents in children.

Chromosomal anomalies: Down syndrome .

National programmes: RCH, ARI, BFHI, ICDS, AFP, DOTS, Vit.A. prophylaxis.

Common surgical problems in children

Common instruments in pediatric practice.

Ethical Aspects of Clinical Examination - With Special emphasis on Pediatric Age group - Parent/Guardian consent - Situations where there is no guardian

Establishing rapport with Pediatric Age group and proper History taking Techniques

Transfusion Medicine in Neonatology

### **Topics for Seminars/Discussions**

Growth & development: factors affecting normal growth, causes of delayed development, and remedial measures.

Nutrition: normal and abnormal, failure to thrive (FTT)

Immunization: basic principles-vaccines used in UIP, indications, contraindications, newer vaccines.

Breast feeding-physiological aspects, techniques and advantages. Infant feeding –principles of weaning, common foods used, feeding problems in the first year Adolescent health problems.

Pediatric medical emergencies.

Fever of unknown origin (FUO)

Common pediatric orthopedic problems

Telemedicine conference in relation to pediatric problems. (once a week in 9th semester)

### **Course Outcomes:**

- CO1:** Competency to assess the growth and sexual maturity of a child including adolescent.  
**CO2:** Competency to prescribe and administer immunization.  
**CO3:** Competency to manage malnutrition.  
**CO4:** Competency to manage anaphylaxis  
**CO5:** Competency to manage a child with disability.  
**CO6:** Competency to manage meningeal irritation.  
**CO7:** Competency to manage seizure in a child.  
**CO8:** Competency to diagnose and manage dehydration.  
**CO9:** Competency to manage aspiration and perform Heimlich Maneuver.  
**CO10:** Competency to accompany as a member of the transport team.  
**CO11:** Competency to communicate with the relatives with empathy and sympathy.  
**CO12:** Competency to give chest compression in case of bradycardia.

## **Assessment**

### **Schedule of Internal Assessment and University Examination**

<b>1<sup>st</sup> Internal Assessment</b>	<b>2<sup>nd</sup> Internal Assessment</b>	<b>Final Internal Assessment</b>	<b>University Examination</b>
Last week of January 2021	Last week of July 2022	First week of December 2022	First week of January 2023

### **Distribution of Marks for Internal Assessment & University Examinations**

University Examination				Internal assessment		
Theory	Viva	Practical	Total	Theory	Practical	Total
40	10	30	80	10	10	20

### **Internal Assessment**

Separate muster roll is kept for lecture and practical classes. The student is assessed through out the period of training under the following headings:

1. Clinical presentation- Grade: A-75%-Excellent, B-60% -Good, C-50%-Satisfactory, D-30% -Unsatisfactory.

Concerned faculty member is responsible to record it and finally its mark will be added to internal assessment, along with each semester examination (10 marks added to clinical exam. of each semester during V & VIII) A record is kept by the Head of the department.

2. Clinical Records. Students are allotted to faculty members, and each student should write 10 cases during their posting and submit to the concerned faculty member. Cases should be written as follows:

5 <sup>th</sup> Semester	6
8 <sup>th</sup> Semester	3
9 <sup>th</sup> Semester	1

Case record should include, history, clinical findings, diagnosis, differential diagnosis, follow up and a brief discussion of the disease process. 10 marks are awarded to the case record and is counted for the FINAL SESSIONAL EXAMINATION.

Clinical Examination: Candidate is evaluated at the end of each posting.

5<sup>th</sup> and 8<sup>th</sup> Semester examination will include: Theory paper 1 Hour duration and clinical examination with a short case and OSCE type evaluation. Short case 10 marks, and OSCE 5 marks, previous presentation credit marks 10 =25 & Theory 20 marks

### **University examination**

<b>Theory-</b>	one paper - whole subject – 2 hours duration	
	20 questions carrying 2 marks each	: 40 mark
<b>Practical -</b>	1 long case	: 20 marks
	1 short case	: 5 marks
	OSCE (3 manned stations)	: 5 marks
	<b>Total</b>	: 30 mark
<b>Viva voce</b>	– based on X rays, Instruments, drugs etc.	: 10 mark

### **Recommended Textbooks**

1. IAP Text book of Paediatrics      A. Parthasarathy
2. Text book of Pediatrics            O.P. Ghai
3. Care of the New born                M. Singh

## **CLINICAL EPIDEMIOLOGY & RESEARCH METHODOLOGY (4MB.CERM) - Elective**

### Objectives of the Course

- To introduce the basic concepts in research methodology
- To enable students to interpret research findings
- To facilitate critical reading- identify good and bad research studies
- To enable them to conduct research projects
- To facilitate preparation of research proposals

### TOPICS

	<b>Topics</b>	<b>Hours</b>
1	Introduction to medical research	1
2	Study designs – observational studies, analytical studies	1
3	Fundamentals of clinical trials	1
4	Ethical principles in clinical research	1
5	Diagnostic test evaluation ( interpretation of sensitivity, specificity, positive and negative predictive values)	1
6	Basics of statistics in research Hypothesis testing, P value, power, type I and II errors, confidence interval Sampling, validity, reliability, bias, confounding Measures of disease frequency Types of variables, data entry, presenting and summarizing data Analysis : dealing with continuous and categorical variables	3
7	Group exercise : writing research proposal	2
8	Group exercise : questionnaire designing	1
9	Group Exercise : Critical reading of research articles – application in evidence based medicine	2
	<b>TOTAL</b>	<b>13</b>

### Course Outcomes:

- CO1:** Understanding of the basic concepts in research methodology.
- CO2:** Ability to interpret research findings.
- CO3:** Ability to critically read and identify good and bad research studies.
- CO4:** Ability to conduct research projects
- CO5:** Ability to prepare research proposals.

**Teaching Schedule**  
**Semester VII**

**Time :1-2 pm**

**Textbooks for Reference**



1. Clinical Epidemiology: The Essentials by Robert Fletcher and Suzanne Fletcher. Lippincott Williams and Wilkins. 4th Edition. 2005.
2. User's Guide to the Medical Literature: A manual for evidence-based clinical practice edited by Gordon Guyatt, Drummond Rennie, Maureen Mead and Deborah Cook. McGraw Hill Medical. 2008. (web based).
3. Basic Epidemiology by R Bonita, R Beaglehole, T Kjellstrom WHO 2006
4. Medical statistics – Principles and methods by KR Sundaram S N Dwivedi & V Sreenivasan: BI Publications, New Delhi 2009.
5. Statistics for epidemiology by Nicholas P Jewell, Chapman & Hill (CRC), 2004.
6. Principles of Medical Statistics by Alvan R Feinstein CRC press, 2002.

# **ANNEXATIONS**

## **TEACHING SCHEDULE**

**Total Number of Teaching Hours in Different Semesters  
(Includes Lectures, Practicals, Innovative Sessions & Clinical Postings)**

Subjects	I	II	III	IV	V	VI	VII	VIII	IX	Total
Anatomy	390	260	-	-	-	-	-	-	-	650
Physiology	264	232	-	-	-	-	-	-	-	496
Biochemistry	160	136	-	-	-	-	-	-	-	296
Pathology	-	-	96	144	64	-	-	-	-	304
Microbiology	-	-	96	96	48	-	-	-	-	240
Pharmacology	-	-	120	120	80	-	-	-	-	320
Forensic Medicine	-	-	24	48	32	-	-	-	-	104
Community Medicine	60	-	24	116	16	116	124	-	-	456
Ophthalmology	-	-	-	-	-	190	190	-	-	380
Otorhino-laryngology	-	-	-	-	-	120	160	-	-	280
General Medicine	-	-	216	24	64	144	32	288	160	928
Psychiatry	-	-	-	-	82	82	-	-	-	164
Dermatology & STD	-	-	-	48	-	112	16	-	-	194
Radiology	-	-	-	-	-	72	-	-	-	72
Pulmonology	-	-	-	-	-	72	-	-	-	72
General Surgery	-	-	216	24	64	144	32	288	160	928
Orthopaedics	-	-	-	96	-	24	112	36	80	348
Anaesthesiology	-	-	-	-	-	72	-	-	-	72
Obstetrics & Gynaecology	-	-	96	-	48	144	128	344	96	856
Paediatrics	-	-	-	-	-	120	16	156	80	372
Dentistry	--	-	-	-	-	60	-	-	-	60

**Note:**

- Lectures should not exceed one third of the total teaching hours.
- The rest of the time should be allotted to Practicals/Innovative Sessions such as problem based learning, self learning, group learning, seminars, group discussion, simulation, role play etc.

## **DISTRIBUTION OF LECTURES, PRACTICALS, INNOVATIVE SESSIONS & CLINICAL POSTINGS**

<b>Subjects</b>	<b>Lectures</b>	<b>Practical/Clinical/Innovative Sessions</b>		<b>Total</b>
Anatomy	258	392		650
Physiology	160	320		480
Biochemistry	80	160		240
		<b>Practical/Clinical</b>	<b>Innovative Sessions</b>	
Pathology	100	100	104	304
Microbiology	80	80	80	240
Pharmacology	106	128	86	320
Forensic Medicine	34	20	50	104
Community Medicine	150	306		456
Ophthalmology	76	240	64	380
Otorhinolaryngology	40	192	48	280
General Medicine	100	624	204	928
Psychiatry	8	96	16	72
Dermatology & STD	32	144	18	194
Radiology	8	48	16	72
Pulmonology	8	48	16	72
General Surgery	100	624	204	928
Orthopaedics	36	240	72	348
Anaesthesiology	8	48	16	72
Obstetrics & Gynaecology	90	576	190	856
Paediatrics	44	240	88	372
Dentistry	4	48	8	60

**PHASE I**  
**TEACHING SCHEDULE**  
**Semester I**

Day	8 am– 9 am	9am – 10am	10.15 am - 11.15am	11.15 am - 1.15 pm	1.15- 2 pm	2pm to 4 pm	
Mon	Physiolo Theory	Biochem Theory	Anat Demo	Anat Dissection	LUNCH BREAK	PRACTICALS 4 Batches – A,B,C,D	Physio Seminar
Tue	Anat Theory	Physio Theory	Anat Theory	Anat Dissection			D-Biochem, CA- Physio, B-Anat
Wed	Physio Theory	Biochem Theory	Anat Theory	Anat Dissection			DB-Physio, C-Anat, A-Biochem
Thu	Biochem Theory	Physio Theory	Anat Theory	Anat Dissection			D-Anat, AC- Physio,B-Biochem
Fri	Anat Theory		Physio Theory	Anat Tutori- al/Demo			A.Anat, BD-Physio, C-Biochem
Sat	Community Medicine					2 – 3 PM	3 – 4 PM
						Anat, Physio, Biochem Integration	Yoga/Cultural Education

**Semester II**

Day	8 am– 9 am	9am – 10am	10.15 am - 11.15am	11.15 am - 1.15 pm		2pm to 4 pm	
Mon	Physio Theory	Biochem Theory	Anat Demo	Anat Dissection	LUNCH BREAK	Physio Seminar	
Tue	Anat Theory	Physio Theory	Anat Theory	Anat Dissection		PRACTICALS 4 Batches – A,B,C,D	A – Anat BD – Physio C – Biochem
Wed	Anat Theory	Physio Theory	Anat Theory	Anat Dissection			C – Anat DB – Physio A – Biochem
Thu	Physio Theory	Anat Theory	Biochem Theory	Anat Dissection			D - Anat AC - Physio B - Biochem
Fri	Biochem Theory	Value Based Education	Anat Theory	Anat Tutorial / Demo			A – Anat BD – Physio C – Biochem
Sat	Physio Theory	Biochem Theory	Physio Theory	11.15 - 12.15 pm	12.15- 1.15 pm	2 – 4 PM	
						Anat Physio Biochem Integration	

Month of August 2018 will be vacation for the students who pass the I Professional Examination in the 1<sup>st</sup> chance. II Phase of Training will commence from 1<sup>st</sup> September 2019. Failed candidates will have to undergo additional course in the failed subjects. A supplementary examination will be conducted within six months in the failed subjects.

**PHASE II  
Semester III**

Day	8-9 am	9-12 noon	12-1 pm	1 – 2 pm	2 pm – 3 pm	3 pm – 4 pm	
Mon	<b>Clinical Lectures</b>	<b>Clinical Posting</b>	<b>Lunch Break</b>	FMT Theory	Patho Theory	Micro Theory	
Tue				Com Med Theory	Micro Theory	Pharmac Theory	
Wed				1 pm – 2.30 pm Practicals	2.30 – 4 pm Practicals		
				Patho – A Batch Micro – B Batch Pharma – C Batch	Patho – B Batch, Micro – C, Pharmac – A		
Thu				1 – 2 PM	2 PM – 3.30 PM Practicals		
				Pharmacology Theory	Patho – C Batch Micro – A Batch Pharma – B Batch		
Fri				<b>Simulation lab</b>	1 – 2 pm	2 pm – 3 pm	3 pm – 4 pm
					Patho Theory	Pharmac Theory	Test
Sat		Medicine Theory	Surgery Theory	Medical Informatics/ Telemedicine Lectures			

**Semester IV**

Day	8-9 am	9-12 noon	12-1 pm	1 – 2.30 pm	2.30 – 4 pm	
Mon	<b>Clinical Lectures</b>	<b>Clinical Posting</b>	<b>LUNCH BREAK</b>	Patho – A, Micro B, Pharmac - C	Patho – B, Micro - C, Pharmac - A	
Tue				1 pm to 2 pm	2 pm to 3.30 pm	
Wed				Pharmac Theory	Patho -C, Micro -A, Pharmac - B	
				1 pm – 2 pm	2 pm – 3 pm	3 -4 PM
Thu				Patho Theory	Micro Theory	Pharmac Theory
Fri				Com Med Theory	FMT Practical	Micro Theory
				FMT Theory	Medicine Theory	Patho Theory
Sat	Yoga / Cultural Programme	Pharmac Theory	Surgery Theory	Yoga/ Cultural Programme		

**Semester V**

Day	8 -9am	9 - 12 noon	12-1 pm	1 – 2.30 pm	2.30 – 4 pm	
Mon	Clinical Lectures	Clinical Posting	LUNCH BREAK	Patho – A, Micro B, Pharmac - C	Patho – B, Micro - C, Pharmac - A	
Tue				1 pm to 2 pm	2 pm to 3.30 pm	
Wed				Pharmac Theory	Patho – C, Micro – A, Pharmac - B	
				1 pm – 2 pm	2 pm – 3 pm	3 PM – 4 PM
Thu				Patho Theory	Micro Theory	Pharmac Theory
Fri				Com Med Theory	FMT Practical	Micro Theory
Sat				FMT Theory	Medicine Theory	Patho Theory
	Yoga / Cultural Programme		Pharmac Theory	Surgery Theory	Yoga/ Cultural Programme	

**PHASE III**

**Semester VI**

Day	8-9 am	9 -12 noon	12 -1 pm	1 -2 pm	2 -3pm	3 pm – 4 pm
Mon	Clinical Lectures	Clinical Posting	LUNCH BREAK	Com Med Theory	Ophthal Theory	OBG Theory
Tue				ENT Theory	Pediatrics Theory	Pulmonology Theory
Wed				Ophthal Theory	Psychiatry Theory	Ortho Theory
Thu				OBG Theory	Medicine Theory	Surgery Theory
Fri				Medicine Theory	Surgery Theory	Radiology Theory
Sat				Dermat Theory	Dental Theory	Yoga/Cultural Education

### Semester VII

Day	8 -9 am	9 -12 noon	12 - 1pm	1 pm– 2 pm	2 pm – 3pm	3 pm – 4 pm
Mon	<b>Clinical Lectures</b>	<b>Clinical Posting</b>	<b>LUNCH BREAK</b>	Ophthal Theory	ENT Theory	OBG Theory
Tue				Epidemiology/Research Methodology	Medicine Theory	Pediatrics Theory
Wed				Community Medicine Theory		
Thu				Ophthal Theory	OBG Theory	Dermat Theory
Fri				Medicine Theory	Surgery Theory	Ortho Theory
Sat				Surgery Theory	Medicine Theory	Anaesthesiology Theory

### Semester VIII

Day	8 am – 9 am	9 am – 2.30 pm
Mon	<b>Clinical Lectures</b>	<b>Clinical Posting</b>
Tue		
Wed		
Thu		
Fri		
Sat		

Failed candidates in the final MBBS Examination will have to undergo additional course in the failed subjects. A supplementary examination will be conducted with six months.



## Distribution of Marks for Internal Assessment and University Examinations

Subjects	University Examination					Internal Assessment		
	Theory I	Theory II	Practical	Viva voce	Total	Theory	Practical	Total
Anatomy	50	50	40	20	160	20	20	40
Physiology	50	50	40	20	160	20	20	40
Biochemistry	50	50	40	20	160	20	20	40
Pathology	40	40	25	15	120	15	15	30
Microbiology	40	40	25	15	120	15	15	30
Pharmacology	40	40	25	15	120	15	15	30
Forensic Medicine	40	-	30	10	80	10	10	20
Community Medicine	60	60	30	10	160	20	20	40
Ophthalmology	40	-	30	10	80	10	10	20
Otorhinolaryngology	40	-	30	10	80	10	10	20
General Medicine	60	60	100	20	240	30	30	60
General Surgery	60	60	100	20	240	30	30	60
Obstetrics & Gynaecology	40	40	50	30*	160	20	20	40
Paediatrics including Neonatology	40	-	30	10	80	10	10	20

\*Out of 30 marks, 10 marks is allotted for the record of delivery cases.

Each theory question paper will have A & B sections carrying equal marks.

The questions will be short answer/short structured type.

Practical examination will be objective with structured evaluation.

# **MODEL QUESTION PAPERS**



**FIRST PROFESSIONAL MBBS DEGREE EXAMINATION**  
**ANATOMY Paper I**  
 (INSTRUCTION- Draw neat labeled diagrams wherever necessary)

**Time: 3 hrs**  
**Date:**

**Maximum Marks 50**

**SECTION A (25 Marks)**

- I. A 14 year old girl was brought to the hospital with complaints of fever, vomiting and acute pain around umbilicus. On examination, the surgeon found that she was having maximum tenderness at the Mc. Burney's point. From the history and examination he came to the diagnosis of acute appendicitis. Based on your anatomical knowledge, answer the following questions. (1+2+4+1+2=10 marks)
- Give the surface marking of Mc. Burneys point.
  - Why is the pain in acute appendicitis felt around the umbilicus?
  - What are the various positions of appendix?
  - What is the developmental source of appendix?
  - Briefly describe its microscopic structure.
- II. Write briefly on:
- Interior of anal canal-parts, features and development. (1+3+1= 5 marks)
  - Development and developmental anomalies of pancreas. (3+2=5 marks)
  - Rectus sheath – formation and contents (3+2=5 marks)

**SECTION B (25 Marks)**

- III. A 55 year old policeman with chronic dull ache in both legs consulted a surgeon. On examination the surgeon noticed dilated and tortuous vein on the medial side of his legs. Based on your anatomical knowledge answer the following questions. (10 marks)
- Name the vein involved in the above case. (½ mark)
  - Mention the formation, course and termination of this vein. (3 marks)
  - Name the cutaneous nerve accompanying this vein. (½ mark)
  - Explain the anatomical basis of dilatation and tortuosity of the vein. (4 marks)
  - Mention two applied aspects of the vein involved. (2 marks)
- IV. Write briefly on
- Formation and fate of intra-embryonic mesoderm. (2+3=5 marks)
- V. Write short notes on the following
- Cartilaginous joints. (3 marks)
  - Microscopic structure of thin skin. (3 marks)
  - White pulp of the spleen. (2 marks)
- VI. Draw a neat labelled diagram of the cutaneous innervation of the dorsum of foot. (2 marks)



**FIRST PROFESSIONAL MBBS DEGREE EXAMINATION  
ANATOMY Paper II**

(INSTRUCTION- Draw neat labeled diagrams wherever necessary)

**Time: 3 hrs**

**Maximum Marks 50**

**Date:**

**SECTION A (25 Marks)**

- I. A four year old child swallowed a shirt button. Since the child began to suffocate, she was rushed to the hospital, where on examination of the x-ray, impaction of foreign body in the larynx was confirmed. Based on your anatomical knowledge, answer the following questions. (10 marks)
- Which is the narrowest part of laryngeal cavity? (½ mark)
  - Give the attachments and contents of vocal folds. (2 marks)
  - Name the parts of the cavity of the larynx. (1½ marks)
  - Which muscle is called the safety muscle of the larynx and why? (2 marks)
  - State the nerve supply of the larynx. (2 marks)
  - Comment on cricothyroid muscle. (2 marks)
- II. Write briefly on:
- Briefly describe the development of face. Add a note on cleft lip. (4+1=5 marks)
  - Describe the functional areas of frontal lobe of the cerebrum under the following headings:
    - Location and function. (3 marks)
    - Effect of lesion. (2 marks)
    - Right coronary artery- origin, course and distribution. (1+1+3=5 marks)

**SECTION A (25 Marks)**

- III. A young girl accidentally sustained a deep cut on the palmar aspect of her hand, which started to bleed severely. At the hospital, the physician observed a laceration in front of her left wrist on the medial side. She had sensory loss over the palmar aspect of her medial one and half fingers, but normal sensation at the back of these fingers. She was unable to grip a piece of paper between her left index and middle fingers. All her long flexor tendons were intact. Using your knowledge of anatomy, answer the following questions. (10 marks)
- Name the nerve and artery involved. (1 mark)
  - What is the origin, course and termination of the nerve affected? (1+3+1 mark)
  - Why was the sensation on the dorsal aspect of her medial one and half fingers intact? (2 marks)
  - Why was she unable to grip the piece of paper between the index and little fingers? (2 marks)
- IV. Write short notes on: (2 x 3 = 6 marks)
- Microscopic structure of thyroid gland.
  - Changes in the circulation at birth
- V. Give the anatomical basis for. (2 x 1 = 2 marks)
- Loss of light reflex in lesions of oculomotor nerve.
  - The upper part of the face is not affected in the supranuclear lesions of facial nerve.
- VI. Write short answers on: (2 x 2 = 4 marks)
- Down's syndrome.
  - Differences in the microscopic structure of a bronchus and a bronchiole.
- VII. Draw a neat labelled diagram of the cross section passing through the upper part of pons. (3 marks)



**FIRST PROFESSIONAL MBBS DEGREE EXAMINATION**

**Time 3 hours**

**Max marks –50**

**HUMAN PHYSIOLOGY Paper I**

ANSWER SECTION A & B IN SEPARATE ANSWER SHEETS  
Draw neatly labeled diagrams wherever necessary

**SECTION A (25 Marks)**

- I. Name the neural centres that regulate respiration. With the help of suitable diagrams, explain their action in regulating rate & rhythm of respiration. (2+2+6=10 marks)
- II. Enumerate the five determinants of blood pressure. Write briefly on the role of each in maintaining normal BP. (5 marks)
- III. Give physiological basis & significance, if any, for the following:
- Increased venous return results in increased cardiac output.
  - Filling of urinary bladder does not normally cause incontinence.
  - Haematocrit value of venous blood is different from that of arterial blood.
  - Gastric mucosa is not affected by gastric acid & enzymes normally.
  - Vitamin B<sub>12</sub> is given as injection in pernicious anaemia.

(2 x 5 = 10 Marks)

**SECTION B (25 Marks)**

- IV. a. Draw a neatly labeled diagram of juxta medullary nephron, showing sites of water reabsorption. Explain the mechanism at each site. (2+3 =5 marks)
- b. What are the important tests to be done before a blood transfusion? Explain the complications of mismatched transfusion. (2+3 =5 marks)
- V. Write short notes on:
- Second phase of deglutition.
  - Hormonal regulation of pancreatic juice secretion
  - Conducting tissues of the heart.
  - Buffers in renal tubular fluid.
  - Digestion & absorption of fat in GIT.

(3 x 5 = 15 Marks)



**FIRST PROFESSIONAL MBBS DEGREE EXAMINATION**

**Time 3 hours**

**Max marks -50**

**HUMAN PHYSIOLOGY Paper II**

ANSWER SECTION A & B IN SEPARATE ANSWER SHEETS  
Draw neatly labeled diagrams wherever necessary

**SECTION A (25 Marks)**

I. Explain with the help of a neatly labeled diagram, the dorsal column pathway. What are the sensations carried by this pathway?  
(4+4+2=10 marks)

II. Name the clinical conditions caused by hyper secretion of growth hormone. Discuss the classical features and their physiological basis.  
(1+4= 5 marks)

III. Give physiological basis & significance, if any, for the following:

- a. Tetany occurs in hypoparathyroidism.
- b. Incidence of red green color blindness is more in males.
- c. Undescended testes is usually associated with sterility.
- d. Neostigmine is used in treatment of myasthenia gravis.
- e. CNS neurons cannot regenerate

(2 x 5 = 10 Marks)

**SECTION B (25 Marks)**

IV. a. Describe the mechanism of hearing.  
(5 marks)

- b. Explain the cyclical changes occurring in the ovary during a normal menstrual cycle. What is the hormonal basis for these changes?  
(3+2 =5 marks)

V. Write short notes on:

- a. Accommodation for near vision.
- b. Refractory period.
- c. Basal ganglia dysfunction.
- d. REM sleep.
- e. Metabolic actions of thyroxine.

(3 x 5 = 15 Marks)

Hall Ticket No:

Code No:



**FIRST PROFESSIONAL MBBS DEGREE EXAMINATION**

**Time 3 hours**

**Max marks –50**

**BIOCHEMISTRY  
PAPER I**

**Instructions:** Draw labeled diagrams wherever necessary. Add clinical notes wherever necessary. Do not write anything on the question paper other than your Hall Ticket number on the top left corner.

**SECTION A (25 Marks)**

I. Classify vitamins. Name the fat soluble vitamins. Write the sources, recommended daily allowance, functions and deficiency manifestations of Vitamin A.

(1.5 + 1 + 1 + 1.5 + 5 + 5 = 15 marks)

II. Give reasons:

- Fluoride is added to blood sample for measuring blood sugar.
- Congenital cataract occurs in infants with galactosemia.
- Mental retardation occurs in patients with phenylketonuria.
- Iron deficiency produces anemia.
- Diabetic patients have polyuria and polydypsia.

(2 marks each = 10 marks)

**SECTION B (25 Marks)**

III. What is the normal serum bilirubin level? Define jaundice. How to classify jaundice? What are the biochemical tests used to distinguish between the different types of jaundice?

(1 + 1 + 2 + 6 = 10 marks)

IV. Write short notes on:

- Clinically important transaminases.
- Three diagnostic applications of radioisotopes.
- Sandwich ELISA
- Biochemical basis of diabetic ketoacidosis
- Alkaptonuria

(3 marks each = 15 marks)

Hall Ticket No:

Code No:



**FIRST PROFESSIONAL MBBS DEGREE EXAMINATION**

**Time 3 hours**

**Max marks –50**

**BIOCHEMISTRY  
PAPER II**

**Instructions:** Draw labeled diagrams wherever necessary. Add clinical notes wherever

necessary. Do not write anything on the question paper other than your Hall Ticket number on the top left hand corner.

**SECTION A (25 Marks)**

- I. Explain beta oxidation of palmitic acid, giving energetics (10 + 25= 15 marks)
- II. Give reasons:
- a. Patients with gout get severe joint pains in the early hours of the morning.
  - b. Anion gap is increased in patients with metabolic acidosis.
  - c. Carnitine deficiency leads to muscle fatigue.
  - d. GFR measurement using inulin is more accurate than urea clearance.
  - e. Hypercholesterolemia leads to myocardial infarction.
- (2 marks each = 10 marks)

**SECTION B (25 Marks)**

- III. Describe the process of translation. Add a note on post translational modifications. Name any two inhibitors of translation. (5 + 3 + 2 = 10 marks)

- III. Write short notes on:
- a. Metabolic acidosis
  - b. Urea clearance
  - c. Tumor markers
  - d. DNA fingerprinting
  - e. Dietary fiber
- (3 marks each = 15 marks)





**SECOND PROFESSIONAL MBBS DEGREE EXAMINATION**

**Time : 2 hours**

**Maximum: 40 Marks**

**PATHOLOGY-Paper I  
General Pathology, Hematology & Clinical Pathology.**

Answer all questions  
Draw diagrams wherever necessary

**Section A  
General Pathology**

**1. Structured Essay**

**(1+3+2+2=8marks)**

1. a) Define necrosis.
1. b) What are the features that differentiate it from apoptosis?.
1. c) Write in brief about free radical injury with examples.
1. d) Describe coagulative necrosis

**Write short notes on:**

**(3x4=12 Marks)**

2. Granuloma
3. Marfan syndrome
4. Type III hypersensitivity reaction with examples
5. Metastatic cascade with illustration

**Section B  
Hematology and Clinical Pathology**

**Structured Essay**

**(1+2+2+1+2=8marks)**

6. A 5 yr old boy has become increasingly lethargic for the past 2 months. He also gives H/O fever on and off. O/E . He is febrile, ecchymosis seen on the skin of his legs. Lab investigations showed. Hb 9gm/dl, Total WBC count 4,55,100 cells/ cu mm and platelet count 1,01,000 cells/ cu mm. A bone marrow aspirate and biopsy done show a 100% cellular marrow with replacement by immature cells.
  6. a. What is the most likely diagnosis?
  6. b. Describe the abnormal cells in the marrow and special stains that can be employed to diagnose
  6. c. Enumerate the FAB classification of this disease
  6. d. Give 2 extra nodal sites of involvement of this lesion
  6. e. What is Immunophenotyping (flow cytometry)

**Write short notes on:**

**(4x3=12 Marks)**

7. Blood components in clinical practice
8. Idiopathic Thrombocytopenic Purpura
9. Peripheral smear, bone marrow and biochemical findings in a case of megaloblastic anemia
10. Microscopic examination of urine



**SECOND PROFESSIONAL MBBS DEGREE EXAMINATION**

Time : 2 hours

Maximum: 40 Marks

**PATHOLOGY-Paper II  
Systemic Pathology**

Answer all questions  
Draw diagrams wherever necessary

**Section A**

**(Cardiovascular, Respiratory, Gastrointestinal, Hepatobiliary & Central nervous system)**

**1. Structured Essay****(1+2+2+2+1=8 marks)**

A 27 year old male has intermittent cramping abdominal pain and diarrhea with blood and mucous for several weeks. These symptoms subsided in a few days. The abdominal pain recurred after 6 months along with perianal pain and formation of a perirectal fistula. Colonoscopic examination reveals many areas of mucosal edema and ulceration and some areas that appear normal.

- 1.a)** What is your diagnosis
- 1.b)** Describe the gross morphology of this lesion
- 1.c)** What is the microscopy
- 1.d)** What are the complications
- 1.e).** Enumerate any two extra intestinal manifestations of this disease

**Write short notes on****(3 x 4=12marks)**

- 2.** Lobar pneumonia
- 3.** Morphological features of acute viral hepatitis
- 4.** Cardiac lesions of Acute rheumatic fever
- 5.** Schwannoma

**Section B**

**(Renal, Reproductive, Endocrines, Musculoskeletal and Reticuloendothelial system)**

**6. Structured Essay****(1+1+6=8 marks)**

A 7 yr old boy presented with complaints of fever, reduced urine output & dark brown (cola coloured) urine. He gives h/o impetigo lesions on the leg 2 weeks back. O/E BP : 140/90 mm.Hg. No edema, no organomegaly.

Investigations showed. Urine - Alb+, no sugar, no ketone.  
Urine Microscopy - RBC ++ RBC cast ++. No bacteria, no pus cells.  
24 hr urine protein 1gm/ day.  
Blood urea : 60mg/dl. Serum complement: low.

- 6.a)** What is the patient suffering from and why
- 6.b).** What is the pathogenesis of these lesions
- 6.c)** What are the light microscopy, Immunofluorescence and electron microscopic findings

**Write short notes on****(3x4=12marks)**

- 7.** Etiological factors, gross morphology and histology of osteosarcoma
- 8.** Hashimoto's thyroiditis
- 9.** Fibroadenoma breast
- 10.** Seminoma testis



**SECOND PROFESSIONAL MBBS DEGREE EXAMINATION**

**Time 2 hours**

**Maximum Marks - 40**

**MICROBIOLOGY Paper I**

**Instructions:**

Answer all questions.

Answer Section A & Section B in separate answer books.

Draw labeled diagrams wherever necessary.

**SECTION A (20 Marks)**

**I. Draw and label**

- a. Autoclave
- b. IGM

(2 x 1 = 2 Marks)

**II. Write short notes on:**

- a. Bacterial growth curve
- b. Transport media.
- c. Cold sterilization.
- d. Sequestered antigen

(4 x 2 = 8 Marks)

**III. Short essay**

1. Type IV hypersensitivity.
2. Laboratory diagnosis of Cholera.

(2 x 5 = 10 Marks)

**SECTION B (20 Marks)**

**IV. Read the following paragraph and answer the questions.**

A 55 year old man presented with a history of cough , left sided chest pain and rigors. He has productive purulent cough. On examination he has fever, tachycardia and tachypnoea. Auscultation of respiratory system indicated probable consolidation.

1. What is the clinical diagnosis and how may this be confirmed?
2. What are the organism which can cause this illness?
3. What are the risk factors?
4. Describe the laboratory diagnosis.
5. What is the treatment of choice?

(2+2+2+3+1=10 marks)

**V. Write short notes on:**

1. *Listeria monocytogenes*.
2. Graft versus host reaction.
3. MRSA.
4. Bacterial Conjugation.
5. Satellitism.

(5 X 2 = 10 Marks)



**SECOND PROFESSIONAL MBBS DEGREE EXAMINATION**

**Time 2 hours**

**Maximum Marks - 40**

**MICROBIOLOGY Paper II**

**Instructions:**

Answer all questions  
Answer Section A & Section B in separate answer books.  
Draw labeled diagrams wherever necessary.

**SECTION A (20 Marks)**

**I. Draw and label**

1. Influenza virus
2. Cryptococcus neoformans (India ink stain)

(2x1=2 Marks)

**II. Write short notes on:**

1. Viral inclusion body.
2. Rhinosporidiosis.
3. Laboratory diagnosis of Malaria.
4. Procedure of collection of blood for culture.

(4x2=8 Marks)

**III. Short Essay:**

1. Hydatid disease.
2. Hepatitis A

(2 x 5=10 Marks)

**SECTION B (20 Marks)**

**IV Read the following paragraph and answer the questions.**

A 35 year old truck driver was brought to Medicine OPD with complaints of loss of weight, recurrent fever and diarrhoea not responding to drugs. He gave past history of several contacts with sex workers. On examination he is emaciated, has lymphadenopathy and markedly low CD 4 cell count.

1. What is your tentative diagnosis?
2. Describe the morphology of virus causing infection.
3. Describe the laboratory tests to be done.
4. Write in brief about pathogenesis of the disease.
5. What are the opportunistic bacterial infections encountered in this disease

(1+2+3+2+2=10 marks)

**V. Write short notes on:**

1. Dengue fever.
2. Microfilariae.
3. Pulmonary Aspergillosis.
4. Dermatophytes.
5. LD Body

(5 X 2 = 10 Marks)



**SECOND PROFESSIONAL MBBS DEGREE EXAMINATION**

**PHARMACOLOGY- Paper - I**

**Section A**

**Time 2 Hours**

**Maximum marks - 40**

- I a) Classify beta blockers with examples.  
 b) Write the uses, adverse effects and contraindications of Beta blockers.  
 (2+3=5 marks)
- II Name one drug in the following clinical conditions, giving the pharmacological basis of their use.  
 a) Cancer pain  
 b) Migraine  
 c) Organophosphorus poisoning  
 d) Idiopathic Parkinsonism  
 (4 x 1.5 = 6 marks)
- III Write short notes on:  
 a) Merits and demerits of Halothane  
 b) Uses and adverse effects of H1 blockers  
 c) Low molecular weight Heparin  
 (3 x 3 = 9 marks)

**Section B**

- IV Reji, 30 years, while working on his computer suddenly went blank, fell down and became unconscious. He regained consciousness in next 5 minutes, but was confused. After consultation with a neurologist, he was diagnosed to have absence seizure.  
 a) Name two drugs useful in this patient  
 b) Write the mechanism of action, uses and adverse effects of one drug.  
 c) Mention Two drugs used in Status epilepticus.  
 (1 + 3 + 1 = 5 marks)
- V Short answers:  
 a) Two first line drugs with mechanism of action in glaucoma.  
 b) Two uses and important adverse effects of Succinylcholine.  
 c) Various uses and merits of Diazepam  
 (3 x 2 = 6 marks)
- VI Short notes on:  
 a) Furosemide  
 b) Statins  
 c) Nitrates.  
 (3 x 3 = 9 marks)



**SECOND PROFESSIONAL MBBS DEGREE EXAMINATION**

**PHARMACOLOGY- PAPER - II**

**Time 2 Hours**

**Maximum marks - 40**

**Section A**

- I a) Enumerate the various Antimicrobial agents, based on mechanism of action.  
 b) Describe the uses and adverse effects of Levofloxacin.  
 c) Mention one example of synergistic antimicrobial drug combination. (2 + 3 + 1 = 6 marks)
- II Short answers:  
 a) Radical cure in plasmodium vivax malaria.  
 b) Methyl ergometrine is not used for induction of labour. Give reason.  
 c) Mechanism and Adverse effects of oral contraceptives pills.  
 d) Uses and adverse effects of Rifampicin. (4 x 1.5 = 6 marks)
- III Write short notes on:  
 a) Dimercarpol (B.A.L)  
 b) Albendazole  
 c) Human insulin (3 x 3 = 9 marks)

**Section B**

- IV Rejina 34years, married, presented with the complaints of itching on external genitalia, with profuse and frothy vaginal discharge. The case was diagnosed as Trichomonas vaginitis.  
 a) Mention the treatment schedule in this case.  
 b) What advice do you give to this patient.  
 c) Write the mechanism of action, uses and adverse effects of the drug, used in this patient. (1 + 1 + 3 = 5 marks)
- V Write one specific use with mechanism of action and Two important adverse effects of the following:  
 a) Methotrexate  
 b) Propyl thiouracil  
 c) Chloroquine (3 x 2 = 6 marks)
- VI Short notes on:  
 a) Uses and contraindications of Prednisolone  
 b) Omeprazole  
 c) Cyclosporin (3 x 3 = 9 marks)



**SECOND PROFESSIONAL MBBS DEGREE EXAMINATION  
FORENSIC MEDICINE**

Time: 2 hrs

Max marks: 40

**Section A (20 marks)**

**Essay:****(2 + 2 + 2 = 6 marks)**

1. The dead body of a 25 year old female was brought for autopsy examination. She was found hanging from a ceiling fan, in a room bolted from the inside. The ligature mark was oblique, was rising from left to right and was placed above the thyroid cartilage. On neck dissection, the subcutaneous tissues showed infiltration of blood. The hyoid bone showed an abduction type fracture with infiltration. A vertical streak of saliva was seen at the left angle of mouth.
  - a. List 4 autopsy findings that can help distinguish hanging from ligature strangulation.
  - b. Discuss the different types of hyoid fractures.
  - c. What is your opinion as to the cause of death in this case? Substantiate it.

**Short Answers:****(7 X 2 = 14 marks)**

2. A person sustained a stab injury in the chest involving the lung. He was immediately hospitalized, given proper treatment and discharged after 14 days. Thereafter he was following his ordinary pursuits. Is it hurt or grievous hurt? Give your opinion stating reasons.
3. A 26 yr old woman was brought to the casualty by the police. Her neighbour had complained that she was pregnant, had delivered a baby at home, and had disposed it off. How will you examine the woman and opine?
4. A 22 year old male came to the casualty with history of being attacked by two neighbours with a stick and a knife. There is an open wound on his scalp. Describe how you will identify the type of injury.
5. The accused in a murder case is brought to you for examination as per the orders of a court. His counsel claims that the accused was mentally ill. Discuss the criminal responsibility of the person.
6. Outline the objectives of a medicolegal autopsy.
7. Outline how time since death can be estimated using temperature.
8. Describe how DNA analysis can be used in paternity disputes.

**Section B (20 marks)**

**Essay:****(2 + 2 + 2 = 6 marks)**

1. A 9 year old boy was brought to the casualty with a history of snakebite. His left ankle is swollen, blistered and tender. He has bleeding from the gums.
  - a. List the first aid measures in a case of snakebite.
  - b. Describe the investigations you will undertake in this case.
  - c. Outline Antisnake Venom therapy in this case

**Short Answers:****(7 X 2 = 14 marks)**

2. A 30 year old farmer was brought to the casualty with history of consuming some poison. He had soiled his clothes and was profusely sweating. He had vomited many times before coming to the hospital. His pupils were constricted and rales were heard on auscultation. Discuss the management of this case.
3. Describe the procedure of administering activated charcoal. What are the contraindications for stomach wash? (1 + 1 = 2)
4. Twenty five people who developed blurring of vision, abdominal cramps and dizziness

were brought to the casualty. They had all consumed alcohol which was distributed as a part of an election process. Outline the diagnosis and management.

5. A 35 year old male who was found in a delirious state in a train compartment was brought to the casualty. He was not able to recall events very clearly but was able to state that he was given a *vada* by a co-passenger, after eating which he had become confused and delirious. Discuss the types of poisons which could have been used in this case.
6. A patient was diagnosed as having acute appendicitis. Emergency surgery was advised by the surgeon. Discuss the essential elements of the consent to be obtained in this case.
7. Discuss the scenarios where a doctor can disclose a secret obtained during the course of professional relationship with a patient. Discuss the essential facts which should be proven before a court of law to prove that a doctor was negligent.





**THIRD PROFESSIONAL MBBS DEGREE EXAMINATION**

Time 3 hours

Max marks –60

**COMMUNITY MEDICINE**

**Paper I**

**Instructions:-**

Answer Section A & Section B in **separate** answer books  
Draw labeled diagrams / bar diagrams wherever necessary

**SECTION A (30 Marks)**

**I. Substantiate the following statements:**

- Primordial prevention is a very useful strategy for the prevention of the life style disease.
- Alteration in the ecosystem has resulted in the development of many diseases.
- India is a yellow fever receptive area.
- Mother to child transmission of HIV can be prevented.
- Acute flaccid paralysis surveillance is an important strategy in the eradication of Poliomyelitis.

(2 marks each = 10 marks)

**II. Mention the public health importance of the following:**

- Secondary Attack Rate
- Epidemic curve
- Universal precautions
- Prophylactic disinfection
- Presumptive coli form count

(2 marks each = 10 marks)

**III. A 35 year old male was admitted with history of irregular fever, cough with expectoration and blood stained sputum of one month duration. He gives history of treatment for tuberculosis six months back. He had taken treatment for two months and discontinued treatment since last four months.**

- What is the treatment category for this patient under RNTCP and why?
- What is the treatment schedule?
- When will you advise the follow up sputum examination for this patient?
- When will you say he is cured of his illness?
- What all advice you want to give to this patient and his family?

(2 marks each = 10 marks)

**SECTION B (30 Marks)**

**IV. Comment on the relevance of the following:**

- Segregation of solid waste
- Foot care in a diabetic patient
- Practice of ergonomics in industry
- Blinding in randomized control trial
- Palliative care in cancer

(2 marks each = 10 marks)

**V. As a medical officer of the PHC what are the actions you will take in the following situations:**

- A two year old child is brought to you with severe dehydration following diarrhea.
- A death due to leptospirosis is reported in your area.
- A child is brought with history of hypo pigmented patch with sensory loss on his thigh.
- A boy with a lacerated wound on the lip due to dog bite is brought to your OP.
- A male patient comes to you with an ulcer in the genital area. (2 marks each = 10 marks)

**VI. Following is the data regarding measles cases and deaths reported in your PHC area.**

Year	Measles cases	Measles death
2004	10	1
2005	11	1
2006	11	1
2007	60	6

- Comment whether the data is sufficient to say there is an epidemic of measles and increase in deaths in the year 2007?
- What more information's are needed to make the data more meaningful?
- What do you mean by line listing cases and what is its importance?
- What are the reasons for the under reporting of cases?
- What actions can you take to improve reporting of cases? (2 marks each = 10 marks)



**THIRD PROFESSIONAL MBBS DEGREE EXAMINATION**

**Time 3 hours**

**Max marks –60**

**COMMUNITY MEDICINE  
Paper II**

**Instructions:**

Answer Section A & Section B in **separate** answer books  
Draw labeled diagrams / bar diagrams wherever necessary

**SECTION A (30 Marks)**

**I.** You are posted as medical officer in a primary health centre. A Gravida 2, Para 1 with history of 1 abortion (in the first trimester) and presently at 12 weeks of gestation comes to you.

- What is essential obstetric care?
- What is emergency obstetric care?
- What is the 'Vandemataram' scheme?
- What is the national immunization schedule?
- What is integrated management of neonatal and child hood illness?

(2 marks each = 10 marks)

**II. What is the importance of the following in Primary Health Care ?**

- Referral system
- Palliative care
- Indigenous system
- Voluntary agencies
- Communication

(2 marks each = 10 marks)

**III. Substantiate the following:**

- Most child hood deaths are preventable
- School health is a national priority
- Family and community have a major role in mental health care.
- Breast feeding and weaning are the foundations of a child's nutritional status.
- Inter-sectoral co-ordination will improve efficiency of health care

(2 marks each = 10 marks)

**SECTION B (30 Marks)**

**IV. Discuss the public health significance of:**

- Cold-chain
- Health skills education
- Geriatric friendly homes
- Nutritional surveillance
- MTP act of 1971

(2 marks each = 10 marks)

**V. Describe your action plan in the following situations:**

- A parent brings to you his son who is addicted to tobacco.
- Teenage pregnancies are reportedly increasing in your city and the Mayor has requested you to organize a programme.
- Patients complain of increasing costs of health care in your institution and the administration has asked you to analyze and report.
- A school head mistress seeks help as many of her girl students have been found to be anemic.
- A truck driver has been detected to be HIV positive on routine screening before blood donation.

(2 marks each = 10 marks)

**VI. Write briefly on:**

- Role play
- Culture and health
- Planning cycle
- World Bank
- Millennium development goals.

(2 marks each = 10 marks)



**THIRD PROFESSIONAL MBBS DEGREE EXAMINATION**  
**OPHTHALMOLOGY**  
**Draw Diagrams wherever necessary**  
**Section A (20 marks)**

Time 2 hours

Max marks -40

**I. One line answer Questions****(1 x 4 = 4 marks)**

1. Presbyopia is corrected by what type of lenses.
2. One cause of pseudomembranous conjunctivitis.
3. Characteristic finding of Central.
4. Bull's eye maculopathy is seen in drug toxicity due to which systemic drug

**II. Short Answer Questions****(2 x 1 = 4 marks)**

1. Iridodialysis
2. What is complicated cataract?
3. What is Lagophthalmos?
4. Define chalazion

**III. Draw and label****(2 x 1 = 2 marks)**

1. Draw and label cross section of retina.

**IV. Short Answer Questions****(2 x 2 = 4 marks)**

1. Name 4 causes of Mydriasis?
2. 4 most important signs of healed uveitis

**V. Write Short notes on****(2 x 3 = 6 marks)**

1. Antifungals in ocular disease.
2. Spring Catarrh.
3. Congenital dacryocystitis

**Section B (20 marks)****VI. Read this paragraph and answer the following questions****(10 marks)**

A 64 year old gentleman with diabetes for the last 30 years presented with sudden onset loss of vision in the right eye today morning at 7.30 AM.

1. Any 2 possible causes of loss of vision (1 mark)
2. Any 4 possible causes of slow diminution of vision in diabetes. (2 marks)

On examination he has an RAPD in the right eye. Anterior segment evaluation showed an NVI in the right eye.

3. What is the next step for diagnosis? (1 mark)
4. Give 2 management options for the condition (1 mark)

The left eye showed evidence of severe diabetic retinopathy

5. What are the signs of diabetic retinopathy? (2 marks)
8. Which lasers are used in the management of diabetic retinopathy? (1 marks)

The right eye had a cataract also.

7. What is the typical *named* cataract in diabetes? (1 mark)
8. What are the special features of this type of cataract? (1 mark)

**VII. Short answer questions****(2 x 2 = 4 marks)**

1. Non healing ulcers.
2. Differences between comitant and non comitant strabismus

**VIII. Write short notes on****(3 x 2=6 marks)**

1. Concept of 'REDUCED EYE'
2. Optic Nerve head in glaucoma
3. Snellen's chart



**THIRD PROFESSIONAL MBBS DEGREE EXAMINATION**

**OTORHINOLARYNGOLOGY**

**Time 2 hours**

**Max marks -40**

**Instructions**

1. Answer Section A and Section B in separate answer books.
2. Draw labeled diagrams wherever necessary.

**SECTION A (20 Marks)**

**I. Structured Essay Question:**

**(1+2+3+2 = 8 marks)**

42/F reports to ENT OPD with c/o gradually progressive hearing loss in both ears. She is a very soft-spoken lady. There is no h/o ear discharge. Otoscopy shows intact, perfectly normal tympanic membranes.

- a. Most likely diagnosis in the above case? (1)
- b. Relevant audiologic investigations and the expected findings for this diagnosis? (2)
- c. Compare and contrast the two treatment options for this condition.(3)
- d. List four other causes of hearing loss with intact tympanic membranes. (2)

**II. Short Notes:**

**(4 X 2 = 8 marks)**

- a. Draw and label the structure of Macula
- b. Temperature control function of the Nose
- c. Four methods to diagnose Choanal atresia in an infant
- d. Glycerol dehydration test

**III. Give Precise Answers:**

**(4 X 1 = 4 marks)**

- a. Name the surgical option in case of failure of the Heimlich's manoeuvre.
- b. Immuno-compromised child with ASOM develops high grade fever and fluctuant swelling in the upper part of neck. Specific diagnosis?
- c. Post surgery for parathyroid gland tumour excision, patient develops symptoms of aspiration. Most likely lesion?
- d. Wegener's granulomatosis: Along with the nose, which two organs are most commonly involved?

**SECTION B (20 Marks)**

**I. Structured Essay Question:**

**(1+3+4 = 8 marks)**

A 70/M presents in Casualty with severe bleeding from the nostrils and mouth. Enquiry revealed similar mild episodes not needing hospital care. He was hypertensive on medication.

- a. Possible causes of epistaxis in this case (1)
- b. Blood supply of the nose (3)
- c. Specific ENT-level management protocol (4)

**II. Short notes:**

**(4 X 2 = 8 marks)**

- a. Draw and label the normal view of indirect laryngeal mirror examination
- b. Classify and list the intrinsic muscles of larynx
- c. Risk factors for congenital hearing loss in children
- d. TNM classification of Glottic carcinoma

**III. Give precise answers:**

**(4 X 1 = 4 marks)**

- a. What is Hitzelberger's sign?
- b. List two clinical differentiation points between acute epiglottitis and croup
- c. What is the most common first step in functional endoscopic sinus surgery?
- d. 60 yr. old diabetic male presents with severe odynophagia, and mild breathing difficulty, following molar teeth infection. Most likely diagnosis?



**FINAL PROFESSIONAL MBBS DEGREE EXAMINATION  
GENERAL MEDICINE Paper I**

Time: 3 hrs

Max marks: 60

**Section A (30 marks)**

I. 65 year old male, alcoholic and smoker, complaints of high fever, catching pain right lower chest, cough with blood stained sputum and breathing difficulty of 2 days duration.

- What is the most probable diagnosis?
- What are the likely clinical findings?
- What are the complications anticipated?
- How do you investigate him?
- Mention the treatment.

(2 + 2 + 2 + 3 = 10 Marks)

**II. Match the following:**

- |                        |                  |
|------------------------|------------------|
| 1. Amitryptiline       | a. Scabies       |
| 2. Benzyl Benzoate     | b. Alcoholism    |
| 3. DEC                 | c. RA            |
| 4. Antabuse            | d. Panic attacks |
| 5. Hydroxy Chloroquine | e. Filariasis    |
| 6. Clonazepam          | f. Depression    |
|                        | g. Dermatitis    |
|                        | h. Herpes Zoster |

(6 x ½ = 3 Marks)

**III. Draw and Label:**

- X – Ray finding in pleural effusion
- Amoeba

(2 x 1 = 2 Marks)

**IV. Write briefly:**

- Treatment of Beri Beri
- Treatment of Malaria
- Treatment of pyogenic meningitis
- Treatment of organo phosphorous poisoning
- Treatment of Typhoid

(5 x 1 = 5 Marks)

**V. Write short notes on:**

- Depression.
- Management of Psoriasis
- Lepra reaction
- Disease Modifying Agents in Rheumatoid Arthritis
- Avitaminosis A

(5 x 2 = 10 Marks)

**Section B (30 marks)**

VI. 35 year old male patient sewage cleaner by profession is admitted with high fever, severe body ache, oliguria, high coloured urine : 2 days.

- What is your diagnosis?
- What is the causative organism?
- Describe the clinical features and complications.
- How do you treat this patient.

(1 + 1 + 4 + 4 = 10 Marks)

**VII. Write briefly on:**

- Hemarthrosis.
- Swan Neck Deformity.
- Kaplan Syndrome.
- Charcot's Joint.
- Blinding Filaria.
- LD Body.
- Larva Migrans.
- Hairy leukoplakia.
- Cryptococcus.
- Pneumocystis carini

(10 x 1 = 10 Marks)

**VIII. Write short notes on:**

- Treatment of hyperkalemia.
- Metabolic acidosis.
- Treatment of snake bite.
- Clinical features of tetanus.
- Rabies

(5 x 2 = 10 Marks)



**FINAL PROFESSIONAL MBBS DEGREE EXAMINATION  
GENERAL MEDICINE Paper II**

Time: 3 hrs

Max marks: 60

**Section A (30 marks)**

**I.** 15 year old male patient with Infected skin lesions over the feet is admitted with puffiness of face, oliguria, high coloured urine : 3 days duration. What is the most likely diagnosis? What are the clinical findings? What complications to be anticipated? What are the urinary findings? How will you treat this condition? (1 + 2 + 2 + 2 + 3 = 10 Marks)

**II. Match the following:-** Single response type. (Separate sheet attached)

- |                                      |                                   |
|--------------------------------------|-----------------------------------|
| 1. Allopurinol                       | a) Howell – Jolly bodies.         |
| 2. Chronic myeloid leukemia          | b) Arachnodactyly                 |
| 3. Biot's breathing                  | c) Paraplegia                     |
| 4. Megaloblastic anemia              | d) Gout                           |
| 5. Anterior spinal artery thrombosis | e) Meningitis                     |
| 6. Marfans Syndrome                  | f) Philadelphia chromosome.       |
|                                      | g) Metabolic Acidosis             |
|                                      | h) Hyperkalemia (6 x ½ = 3 marks) |

**III. Draw and Label:**

- Nephron.
- Conducting system of heart (2 x 1 = 2 Marks)

**IV. Write briefly on:**

- Definition of transient ischeamic attack.
- Define unstable angina.
- Define chronic bronchitis.
- Cardiac tamponade.
- Flapping tremor. (5 x 1 = 5 Marks)

**V. Write short notes on:**

- Clinical findings of mitral stenosis.
- Lutembacher's syndrome.
- Treatment of tuberculous meningitis.
- Management of Ischeamic stroke.
- Wallenberg Syndrome (5 x 2 = 10 Marks)

**Section B (30 marks)**

**VI. Read this paragraph and answer the following questions:**

A 55 year old female, diabetic for 15 years presents with H/O acute onset of right hemiparesis which progressed over 2 hours with complete hemiplegia.

- What further information would you require in her family history?
- What is the likely etiological factor?
- Name an investigation of choice.
- Discuss a treatment of this case. (2 + 2 + 2 + 4 = 10 Marks)

**VII. Write briefly on:**

- Jones Criteria for rheumatic fever.
- Short course anti tuberculous treatment.
- Treatment of chronic stable asthma.
- Treatment of Graves Disease.
- PDA.
- Thrombocytopenia.
- Blood component therapy.
- Side effects of glucocorticoid therapy.
- Signs of raised intracranial pressure.
- Types of respiratory failure (10 x 1 = 10 Marks)

**VIII. Write short notes on:**

- Management of DKA.
- Deep Vein Thrombosis.
- Klebsiella Pneumonia.
- ACE Inhibitors.
- WPW Syndrome (5 x 2 = 10 Marks)



**FINAL PROFESSIONAL MBBS DEGREE EXAMINATION**

**GENERAL SURGERY**

**Paper I**

**Answer Section A and B in separate answer books.**

**Time: 3 hrs**

**Max marks: 60**

**Section A (30 Marks)**

- I. 65-year-old male presents with high coloured urine, yellowish discolouration of skin and sclera and pale stools. (1+1+2+2=6 Marks)**
1. Enumerate the differential diagnosis.
  2. How will you evaluate this patient?
  3. What is Couvoisiers Law? What are the exceptions?
  4. Draw and label the extrahepatic biliary system.
- II. Write short notes on: (3 X 3 = 9 Marks)**
1. Diverticulitis.
  2. Intussusception.
  3. Fissure in ano
- III. Write briefly on: (1 X 5 = 5 Marks)**
1. Endoscopic management of esophageal varices.
  2. Charcot's triad.
  3. Etiology of Acute Pancreatitis.
  4. Murphy's Sign.
  5. Goodsalls Law
- IV. Write short notes on: (2 X 5 = 10 Marks)**
1. Complications of colostomy.
  2. Blood Supply of right colon.
  3. Indications for Splenectomy.
  4. Treatment options for hemorrhoids.
  5. Clinical presentation of Congenital Hypertrophic Pyloric Stenosis

**Section B  
(30 Marks)**

- 1. Read the paragraph and answer the questions. (1+1+1+2=5 Marks)**
- An 8-year-old boy is admitted with a history of progressively increasing pain and swelling of the lower end of the thigh, associated with irregular low-grade fever and weight loss. On examination, there is firm swelling over the lower end of the thigh, with minimal local tenderness and dilated veins over the swelling.
- a. What is the most likely diagnosis?
  - b. What will be the differential diagnosis?
  - c. What are the relevant investigations?
  - d. Outline the treatment plan for this patient.
- 2. Write Short Notes on: (2 X 5 = 10 Marks)**
- a. Foot drop
  - b. Exostosis
  - c. Volkmann's ischaemic contracture
  - d. Management of Clubfoot in an infant
  - e. Management of Tuberculosis of the spine
- 3. Describe Briefly: (3 X 5 =15 Marks)**
- a. Management of Osteoporosis
  - b. Complications of an open fracture
  - c. Hand deformities in Rheumatoid arthritis
  - d. Investigations in Hyperparathyroidism
  - e. Management of fracture neck of femur in a 70 year old



**FINAL PROFESSIONAL MBBS DEGREE EXAMINATION  
GENERAL SURGERY**

**Paper – II**

**Answer Section A & B in separate answer books.**

**Time: 3 hours**

**Max Marks: 60**

**Section A – 30 Marks**

**I. a).** A 50 year old gentleman brought to casualty with one-day history of distension of abdomen, pain abdomen, vomiting and constipation. (2 X 4 =8)

- a. Discuss differential diagnosis of this patient with intestinal obstruction.
- b. How will you evaluate the patient.
- c. Intraoperative lavage.
- d. Complication of resection and anastomosis of bowel in an emergency setting

**b)** Draw and label venous system of the lower limb. (2 X 1 =2)

**II. Short answer question**

(1 X 10 =10)

- a. Describe clinical test for assessing fixity of a breast lump to the pectoral muscle.
- b. Raynauds phenomenon.
- c. Definition of early gastric cancer
- d. Three different layers of a hydatid cyst.
- e. Contraindications for breast conservation surgery in cancer of the breast.
- f. Golden hour.
- g. Staghorn calculus
- h. Leukoplakia
- i. Rest pain.
- j. Cross-fluctuation

**III. Short notes**

(2 X 5 =10)

- a. Intercostal drainage
- b. Couinauds segments
- c. Transrectal ultrasound
- d. Dukes staging in carcinoma colon
- e. MEN II B syndrome

**Section B (30 Marks)**

**I. a).** A 50-year-old lady teacher comes to the OPD with complaints of a Painless lump noticed in left breast one-month back. On examination 3 X 1 cm hard lump in upper outer quadrant left breast fixed to breast tissue. Single mobile node measuring 2 cm on left axilla.

(2 X 4 =8)

- a. What is your clinical diagnosis
- b. How will you evaluate the patient
- c. Describe treatment option in this patient
- d. Neoadjuvant Chemotherapy

**b)** Draw and label Arterial supply of the stomach

(2 X 1 =2)

**II. Write short notes on**

(1 X 10 =10)

- a. Marjolin's Ulcer
- b. Trichobezoar
- c. Meckels diverticulum
- d. Saphena varix
- e. Zollinger Ellison syndrome
- f. Enumerate surgical option for hydrocele.
- g. Permissive hypotension
- h. Carbuncle
- i. Types of melanoma
- j. Frey's syndrome

**III. Short notes on**

(2 X 5 =10)

- a. Dermoid
- b. Sistrunks procedure
- c. Branchial cyst
- d. Ectopic testis
- e. Subdural haematoma



Hall Ticket No:

Code No:



**FINAL PROFESSIONAL MBBS DEGREE EXAMINATION**

**OBSTETRICS & GYNAECOLOGY  
PAPER – I**

**Time : 2 hrs.**

**Maximum marks :40**

**Section A (20 Marks)**

I. Primi Gravida, 34 weeks gestation with oedema, proteinuria 2+, BP 150/100mmhg, presented with blurring of vision, headache and epigastric pain.

- What is the diagnosis?
- What are the investigations to rule out multi organ damage.
- Mention the antihypertensive and other drugs that can be used in this case
- Briefly describe the obstetric management

(1+2+3+4 = 10 marks)

**II. Short answer questions:**

- What is Bandl's ring? What is its importance?
- What is Hegar's sign? At what period of gestation is it elicited?
- What is Chorion Villous Sampling? Give 2 indications.
- What is Caesarean section? Give 4 indications.

(1 x 4 = 4 marks)

**III. Short notes on:**

- Rh incompatibility.
- External Cephalic version.
- Missed abortion.

(2 x 3 = 6marks)

**Section B (20 Marks)**

IV. A 25 year old primigravida of 32 weeks gestation reports with a painless bout of bleeding.

- What is the probable diagnosis?
- What are the conditions to be differentiated?
- How will you confirm your diagnosis?
- What is conservative line of management?
- What are the indications for Caesarean section in this case?
- What is the management in a first referral unit?

(1+2+2+2+2+1= 10 marks)

**V. Short answer questions:**

- What is Obstetric Conjugate.
- What is caput succedaneum
- What is cord prolapse? Mention 2 causes?
- Define Maternal Mortality rate. What is the Maternal Mortality rate in India?

(1 x 4 = 4 marks)

**VI. Short Notes on:**

- Cervical tear?
- 2<sup>nd</sup> stage management of heart disease complicating pregnancy?
- Follow up of vesicular mole

(2 x 3 = 6Marks)

Hall Ticket No:

Code No:



**FINAL PROFESSIONAL MBBS DEGREE EXAMINATION**

**OBSTETRICS & GYNAECOLOGY  
PAPER – II**

**Time : 2 hrs.**

**Maximum marks: 40**

**Section A (20 Marks)**

I. A 30 year old nulliparous presented with severe congestive dysmenorrhoea, dys- pareunia and menorrhagia.

1. What is the diagnosis?
2. How will you confirm your diagnosis?
3. Medical management of the condition?
4. Surgical management of the condition

(1+2+3+4 = 10 marks)

**II. Short answer questions:**

1. Cervical fibroid?
2. Dodderlein bacilli?
3. Nabothian follicle
4. Rubins cannula

(1x4= 4 marks)

**III. Write Short notes on:**

1. Bacterial vaginosis.
2. Bartholin's cyst.
3. Chocolate cyst.

(2x3=6marks)

**Section B (20 Marks)**

IV. Read this case summary and answer the following questions 44 years old nulliparous woman, presenting with menorrhagia of six months duration.

1. What is the most probable diagnosis?
2. List one important investigation you will do and the findings you expect from that.
3. How will you medically treat menorrhagia?
4. Give the important steps of total abdominal hysterectomy

(1+3+3+3= 10 marks)

**V. Short answer questions:**

1. Emergency contraception.
2. Tubal patency tests
3. Pyometra
4. Blighted ovum

(1x4= 4 marks)

**VI. Write short notes on:**

1. Operative Laparoscopy?
2. Cryptomenorrhoea?
3. Fractional curettage

(2 X 3 = 6 marks)

Hall Ticket No:

Code No:



**FINAL PROFESSIONAL MBBS DEGREE EXAMINATION  
PAEDIATRICS INCLUDING NEONATOLOGY**

**Time: 2Hours**

**Maximum Marks: 40**

(Use separate Answer Books for section A & B)

**Section A (20 Marks)**

**(Neonatology ,Growth, development and Paediatric Surgery)**

**Write Short Notes on**

**(2 marks each)**

1. Causes of short stature
2. Risks in obesity
3. Indications of zinc supplementation
4. Vit A prophylaxis program
5. Adverse effects of junk foods
6. Assignment of hearing impairment
7. Kramer's index
8. Handicaps of prematurity
9. Management of respiratory distress in a new born
10. Intussusception clinical features, investigations, diagnosis and management

**Section B (20 Marks)**

**(Systems)**

**Write Short Notes on**

**(2 marks each)**

1. Clinical diagnosis ,investigations and management of a 2 yr old with fever of 2 weeks, significant pallor and petichiel spots all over the body
2. Clinical diagnosis of a 4 month old with bilateral wheeze and distress for the first time.
3. Baby of a45 old mother is found to have upward slant of eyes . What are the other features that you look in the baby?
4. Four month of old baby is having feeding difficulty and the physician detected a systolic murmur I the lower left sternal border. How will you proceed to reach the diagnosis?
5. Explain the measure you undertake to prevent diarrhoea in children.
6. How will you manage a child with massive generalized edema,4 plus protenuria and very few pus cells.
7. How will you investigate a 6 month old with constipation, lethargy, hoarse cry and mild jaundice?
8. What is your clinical management for a child with fever, erythematous rash over the body , thrombocytopenia but elevated haematocrit?
9. Investigations that you plan for a child with4 weeks history of fever?
10. What is the line of management of a 3 yr old child who didn't cry for half an hour after birth now can't move any limbs.

# **ACADEMIC CALENDAR**

## **August 2018- July 2019**

### **August 2018**

15th (Wed)- National Holiday.  
24th (Fri) Student Holiday.  
25th (Sat) *Thiruvonam*

### **September 2018**

2nd (Sun) - *Sreekrishnan Jayanthi*  
27th (Thu) - Amma's Birthday. *Seva* Day.

### **October 2018**

2nd (Tue) *Gandhi Jayanti*  
18th (Thu) *Mahanavami*  
19th (Fri) Student Holiday  
20th (Sat) Student Holiday  
25th (Thu) to 31st (Wed) - Arts Festival

### **November 2018**

First week: **1st Internal Assessment Examination (Anatomy, Physiology & Biochemistry).**  
6th (Tue) Student's Holiday

### **December 2018**

25th (Tue) Christmas

### **January 2019**

26th (Sat) Republic Day

### **February 2019**

Last Week. **2nd Internal Assessment Examination (Anatomy, Physiology & Biochemistry)**

### **March 2019**

### **April 2019**

### **May 2019**

1st (Wed) May Day

### **June 2019**

Second Week: **Final Internal Assessment Examination (Anatomy, Physiology & Biochemistry)**

### **July 2019**

Third Week: University Examination Theory (**Anatomy, Physiology & Biochemistry**)  
Last week: University Examination Practical (**Anatomy, Physiology & Biochemistry**)