“In the gurukulas of ancient rishis, when the master spoke it was love that spoke; and at the receiving end disciple absorbed by 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 ‘sraddha’ 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”.
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 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 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 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 lifelong 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, D. Umadethan, team of committed faculty and students have been regularly updating and innovating our syllabus and curriculum over the past decade 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 a 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, humanenes, respectfulness and thoroughness. Emphasis is also made on interpretation of new literature and research methodology needed for clinicians and academicians.

Simulaids play an important role in the training of the medical undergraduates. A skill laboratory equipped with most modern simulaids 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 continuously 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. Alexander John 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

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Medical Director  Principal, Chairman  Secretary

Members

Dr. C. Jayakumar, Professor & Head, Paediatrics

Dr. Sajitha Krishnan, Professor, Dept. of Biochemistry

Dr. Ajay.B, Professor, Forensic Medicine & Toxicology

Dr. Unnikrishnan.B, Associate Professor, Oto-rhino-laryngology

Dr. George Mathews, Associate Professor, Gen. Surgery

Mr. Aman Bhardwaj, Interns representative

Mr. Pranav Nair, Students representative
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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 16th 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 Gottsegan, Secretary-Curriculum Committee- Dr.Alexander John, all the administrators and staff and all the Ashramites for their support, which helped us to attain curricular and extra curricular excellence.

In Amma

Dr.(Col.) Vishal Marwaha
Preface

On behalf of the curriculum committee, I have great pleasure to welcome you, the XVI Batch of MBBS students to this prestigious institution. You have chosen a noble profession which embodies the values of compassion, love and devotion. During your training in this centre of excellence, you will acquire not only knowledge and skills, but also the right attitude and values. 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, the nidus of philanthropic and educational activities spreading 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. Postgraduate courses have been started in almost all the specialities and also courses in super specialities.

The key to effective learning is to organise the learning environment involving the learner, the facilitator and the material and media, focused on meeting the needs of the society. 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 and attitudes, values 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, ‘saviours of life and destroyers of disease.’

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. Prathapan Nair, 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.B.Umadethan, my predecessor, for his excellent stewardship in all matters pertaining to Medical Education and Curriculum development for well over a decade.

Dr.Alexander John, Secretary, Curriculum Committee
Hippocratic Oath

I swear by Apollo Physician and Asclepius and Hygieia and Panaceia and all the gods and goddesses, making them my witnesses, that I will fulfill according to my ability and judgment this oath and this covenant:

To hold him who has taught me this art as equal to my parents and to live my life in partnership with him, and if he is in need of money to give him a share of mine, and to regard his offspring as equal to my brothers in male lineage and to teach them this art—if they desire to learn it—without fee and covenant; to give a share of precepts and oral instruction and all the other learning to my sons and to the sons of him who has instructed me and to pupils who have signed the covenant and have taken an oath according to the medical law, but no one else.

I will apply dietetic measures for the benefit of the sick according to my ability and judgment; I will keep them from harm and injustice.

I will not give a deadly drug to anybody who asked for it, nor will I make a suggestion to this effect. Similarly I will not give to a woman an abortive remedy. In purity and holiness I will guard my life and my art.

I will not use the knife, not even on sufferers from stone, but will withdraw in favor of such men as are engaged in this work.

Whatever houses I may visit, I will come for the benefit of the sick, remaining free of all intentional injustice, of all mischief and in particular of sexual relations with both female and male persons, be they free or slaves.

What I may see or hear in the course of the treatment or even outside of the treatment in regard to the life of men, which on no account one must spread abroad, I will keep to myself, holding such things shameful to be spoken about.

If I fulfill this oath and do not violate it, may it be granted to me to enjoy life and art, being honored with fame among all men for all time to come; if I transgress it and swear falsely, may the opposite of all this be my lot.
DECLARATION OF GENEVA

“I solemnly pledge myself to consecrate my life to the service of humanity. I will give to my teachers the respect and gratitude which is their due; I will practise my profession with conscience and dignity; the health of my patient will be my first consideration; I will respect the secrets which are confided in me; I will maintain by all means in my power the honour and noble traditions of the medical profession; my colleagues will be my brothers; I will not permit considerations of religion, nationality, race, party politics, or social standing to intervene between my duty and my patient; I will maintain the utmost respect for human life, from the time of conception; even under threat, I will not use my medical knowledge contrary to the laws of humanity. 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. The Declaration is also included in the International Code of Medical Ethics which was adopted in 1949.

WMA International Code of Medical Ethics


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. These are mandatory for all the medical institutions of the country. In 1997 MCI has made new recommendations to change the undergraduate curriculum in par with the health professions education system of developed countries. Accordingly, since 1997, curriculum changes have been effected in all the medical colleges of the country.

The MBBS course is divided into nine semesters, each semester 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 specialties 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 who secures 35% of the total marks fixed for internal assessment in a particular subject including theory and practical alone will be eligible to appear for the University examination.

University examinations in theory and practical/clinical will be held at the end of Semesters II, V, VII and IX. The evaluation will be very 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 communication skills, management abilities and ability in problem solving.

The I 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, bedside 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 (Additional Students) 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 is given below

**Subject: ANATOMY**

**Distribution of marks for University examination and Internal assessment**

<table>
<thead>
<tr>
<th></th>
<th>Mark</th>
<th>Total Mark</th>
<th>Minimum for a pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory 1</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theory 2</td>
<td>50</td>
<td>100</td>
<td>45</td>
</tr>
<tr>
<td>Theory + Viva</td>
<td></td>
<td>120</td>
<td>60</td>
</tr>
<tr>
<td>Practical</td>
<td>40</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Internal Assessment (Theory)</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Practical)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>20</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

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:

- 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;
- Learn every aspect of National policies on health and devote himself/herself to its practical implementation;
- Achieve competence in practice of holistic medicine, encompassing promotive, preventive, curative and rehabilitative aspects of common diseases;
- Develop scientific temper, acquire educational experience for proficiency in profession and promote healthy living;
- Become exemplary citizen by observation of medical ethics and fulfilling social professional obligations, so as to respond to national aspirations.

Institutional goals:

In consonance with the national goals each medical institution should evolve institutional goals to define the kind of trained manpower (or professionals) they intend to produce. The undergraduate students coming out of a medical institute should;

- 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;
- be competent to practice preventive, promotive, curative and rehabilitative medicine in respect to the commonly encountered health problems;
- appreciate rationale for different therapeutic modalities, be familiar with the administration of the “essential drugs” and their common side effects;
- 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;
- posses the attitude for continued self learning and to seek further expertise or to pursue research in any chosen area of medicine.
- be familiar with the basic factors which are essential for the implementation of the National Health Programmes including practical aspects of the following:
  - Family Welfare and Maternal and Child Health (MCH),
  - Sanitation and water supply,
  - Prevention and control of communicable and non-communicable diseases,
  - Immunization,
  - Health Education.
- 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.
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 through 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 Vagina (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, Urine examination/albumin/sugar/ ketones/microscopic 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 intercostal 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.
- To insert and remove ICU’s and to perform tubectomy.

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;

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 trachostomy;

IX. Ophthalmic procedures:

- To invert eye-lids;
- 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;
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.
SQ 4R stands for: SURVEY QUESTION READ RECOLLECT REVIEW REINFORCE Survey

A. Surveying a book is done by

• Reading the title page: Note the subject area, author’s name, qualifications and year of publication.
• Reading the preface: This tells you whether it is worth reading.
• Looking at the Table of Contents: This tells you what topics are dealt with and how the author has organized them.
• Leafing quickly through the entire book: Note the chapter and section headings, read the chapter summaries if any and look at the charts, diagrams and figures.

Surveying a book should not take more than 30 minutes.

Surveying a chapter

Before you begin reading in detail survey the chapter by paying special attention to:

• First and last paragraphs.
• Summary, if any.
• Headings. Note the sizes of the letters in each heading. They tell you which topics come under which topic. They provide the key to the author’s structuring of ideas he wishes to convey.

Question

Never begin reading in detail without having in mind a set of questions that you want answered. Questions are a great stimulus to learning, for they give you a sense of purpose and keep you alert.

Write down the questions you will be able to answer when you have read the chapter properly. Headings and sub-headings you have noted in your survey should always bring questions into your mind. Questions can be your own or other people’s – author’s, examiner’s and teacher’s.

Read

So, actual reading is the third step in studying a chapter or book, not the first and only step. You must read with a purpose ie actively, in search of answers for questions you have framed and written down.

Look for the main idea in each paragraph. This is usually found as the first or the last sentence. Then pick out important details which clarify, support, illustrate or develop the main idea.

Look for signposts which may have been used by the author to help you read. Visual signposts are: (1) Words printed in italics, (2) Words underlined, (3) Words in bold face, (4) The numbering of points and (5) The lettering of points.

Verbal signposts are words and phrases like:- firstly, for instance, on the other hand, however, furthermore, therefore etc.

Look carefully at the diagrams and tables. The author uses them because they convey ideas better than words. Don’t skip them.
Read again - During this re-read period, you can underline or highlight important points and also take down notes. This is better avoided during the first reading.

Reread

This is a very important step. Try to answer all your questions without looking at the book. Make brief notes of the main ideas and those details you think important. Your writing may be in the form of sentences or list of key points. Quite a lot of your time must be spent on REREAD step, perhaps 50% or more. You can’t make notes without thinking. This activity helps you to understand and remember the material.

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 1/3 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 i.e 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 N” (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

1. 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 and 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**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Lecture Hrs</th>
<th>Practical/ innovative Sessions- Hours</th>
<th>Total</th>
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<td>136</td>
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Anatomy

**GOAL**

The broad goal of the teaching of undergraduate students in Anatomy aims at providing comprehensive knowledge of the gross and microscopic structure and development of human body to provide a basis for understanding the clinical correlation of organs or structures involved and the anatomical basis for the disease presentations

**Educational Objectives**

**A. Knowledge**

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

a) Comprehend the normal disposition, clinically relevant interrelationship, functional and cross sectional anatomy of various structures in the body.

b) Identify the microscopic structure and correlate elementary ultra structure of various organs and tissues and correlate the structure with the functions as a pre-requisite for understanding the altered state in various disease processes.

c) Comprehend the basic structure and connections of the central nervous system to analyze the integrative and regulative function of the organs and systems and able to locate the site of gross lesions according to the deficits encountered.

d) Able to explain the developmental basis of various congenital abnormalities and the effects of common teratogens, genetic mutations and environmental hazards.

**B. Skills**

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

a) Identify and locate all the structures of the body and mark the topography of the living anatomy.

b) Identify the organs and tissues under the microscope.

c) Understand the principles of karyotyping and identify the gross congenital anomalies.

d) The various appearances of normal human body in skiagrams and to understand principles of different newer imaging techniques e.g. CT scan, ultra sound, MRI etc.

e) Understand the clinical basis of some of the common clinical procedures e.g. intravenous, intradermal, intramuscular, subcutaneous injections, lumbar puncture, kidney biopsy etc.

f) Localize important pulsations and structures against which pressure can be applied in case of bleeding from a particular artery.

g) To locate superficial and deep reflexes, muscle power, and movements of joints.

h) To locate the site of lumbar puncture, sternal puncture, pericardial tapping, liver biopsy etc.

i) To locate veins for veni puncture.

j) To locate site for emergency tracheostomy.
C. Integration

From the integrated teaching of the other basic sciences, Radiology, Orthopedics, Surgery, Gynaecology and Neurology the students shall be able to comprehend the regulation and integration of the functions of the organs and systems in the body and thus interpret the anatomical basis of disease processes.

I. Syllabus
Details of the course
Duration of the course : 2 semesters
  Semester I - 24 weeks
  Semester II - 16 weeks
Total number of hours : 650
Lectures (including formative assessment) : 258 hours
Practicals (including innovative session) : 392 hours

* Innovative sessions like project work, group discussions, integrated teaching, seminars, table tests, and revisions are part of Practicals.

Curriculum Map
Duration of the course : Two Semesters, each of 120 working days
Total number of hours : 650
Region-wise course strength in number of hours (see below)

<table>
<thead>
<tr>
<th>Region</th>
<th>Lecture hours</th>
<th>Integrated Teaching</th>
<th>Practicals</th>
<th>Tutorials/ Table test/ case history discussion</th>
<th>Demonstration Of exam specimens</th>
<th>Seminar Group Discussion</th>
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<td>dissection</td>
<td>histology</td>
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<td>5</td>
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<td>3</td>
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<td>7</td>
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<td>3</td>
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<td>374</td>
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</tbody>
</table>

One Lecture
One hour One Seminar/Group discussion/table test
One hour One Dissection
Two hour One Histology Practical
Two hour One integrated teaching
One hour One demonstration
One hour One Tutorial
One hour
**Dissection includes osteology also

All seminars attract special emphasis on applied anatomy

**SCHEDULE OF LECTURES**

**A. INTRODUCTION** 5 hrs

1. Common Terms and movements - 1
2. Bone, cartilage and joints. - 1
3. Skin, Fascia, muscles and tendon - 1
4. Somatic nerves system - 1
5. Blood vessels, lymphatic system and synovial sheath. - 1

**B. GENERAL ANATOMY** 10 hrs

1. Epithelium: Classification, simple & compound epithelium, glandular & sensory epithelium - 1
2. Connective tissue: Cells, matrix - 1
3. Cartilage: Classification, structure, cells and matrix - 1
4. Bone: Types, types of epiphysis, microscopy. Ossification in brief, blood supply - 1
5. Joints: Classification and structure of synovial joint. - 1
(Details of joints to be deleted; to be taught in Orthopedics)
6. Vascular Tissue: Elastic artery, medium sized artery, large vein, medium sized vein - 1
7. Lymphatic tissue: Gen. Features, lymph node- structure and function, spleen- structure & circulation, Thymus, Tonsil. - 1
8. Muscular Tissue - 1
9. Skin: Structure of thin and thick skin - 1
10. Nervous tissue: Neurons, neuroglia, peripheral nerve, Optic nerve, Schwann cells, myelinated nerve fibre, ganglia - 1

**C. GENERAL EMBRYOLOGY** 11 hrs

1. Oogenesis, Ovarian cycle, Female reproductive system - 1
2. Menstrual cycle - 1
3. Male reproductive system, Spermatogenesis - 1
4. Fertilisation, implantation, assisted reproductive techniques - 1
5. Bi laminar embryo - 1
6. Trilaminar embryo - 1
7. Intra embryonic mesoderm and Folding of embryo - 1
8. Placenta Formation - 1
9. Circulation of placenta - 1
10. Foetal membranes - 1
11. Twinning and teratology - 1
(Structure of umbilical cord and placenta to be taught along with General Embryology)

**INTEGRATED TEACHING** 2 hrs

1. OB & G - 1
2. Paediatrics - 1

**SEMINARS** 2 hrs
1. Development at the embryonic period. - 1
2. Development at the foetal period. - 1

D. UPPER LIMB 8 hrs

1. Brachial plexus - 1
2. Axillary lymph nodes - 1
3. Mammary gland - 1
4. Shoulder joint - 1
5. Palmar spaces (dermatomes need to taken along with dermatomes of the lower limb) - 1
6. Radio-Ulnar joints - 1
7. Nerves of the upper limb –Median nerve & ulnar nerve - 1
8. Nerves of the upper limb – Musculocutaneous nerve, axillary nerve & radial nerve - 1

INTEGRATED TEACHING 2 hrs
Departments – Radiology & Orthopaedics - 2

TUTORIALS 7 hrs

1. Musculocutaneous nerve and axillary nerve - 1
2. Cutaneous innervation of upper limb - 1
3. Arterial anastomosis in upper limb - 1
4. Innervation of hand - 1
5. Plexus of forearm - 1
6. Extensors of forearm - 1
7. Cubital fossa - 1

DEMONSTRATIONS 3 hrs

1. Brachial plexus and axillary artery - 1
2. Radial nerve in the radial groove - 1
3. Deep dissection of the palm - 1

SEMINARS 5 hrs

1. Axilla and Axillary artery - 1
2. Venous and lymphatic drainage of upper limb - 1
3. Anastomosis around elbow joint - 1
4. Palmar arches - 1
5. Elbow joint, wrist joint, 1st carpo-metacarpal joint (X-rays to be demonstrated) - 1

E. LOWER LIMB 8 hrs

1. Femoral triangle - 1
2. Gluteal region - 1
3. Sole – I - 1
4. Venous & lymphatic drainage - 1
5. Hip joint - 1
6. Arches of foot - 1
7. Knee joint - 1
8. Dermatomes including dermatomes of lower limb. - 1

INTEGRATED TEACHING 2 hrs
Departments – Radiology & Orthopaedics - 2

TUTORIALS 7 hrs

1. Movements of hip joint - 1
2. Movements of knee joint - 1
3. Ankle joint - 1
4. Talar and midtarsal joints - 1
5. 2nd layer of sole - 1
6. 3rd and 4th layers of the sole - 1
7. Lymphatic drainage of the lower limb - 1

**DEMONSTRATIONS** 3 hrs
1. Structures under cover of gluteus maximus - 1
2. Structures of the posterior components of the leg - 1
3. Distribution of the femoral nerve and obturator nerve - 1

**SEMINARS** 5 hrs
1. Case history presentation - 1
2. Sciatic nerve - 1
3. Case history presentation - 1
4. Subtalar joint, inversion and eversion of foot - 1
5. Ankle joint, Popliteal fossa - 1

**F. ABDOMEN AND PELVIS** 17 hrs
1. Anterior Abdominal wall and Rectus Sheath - 1
2 +3. Inguinal canal, spermatic cord and descent of testis - 2
4. Peritoneum in brief (before dissection) - 1
5. Development of Gastro Intestinal Tract, its derivatives and anomalies - 1
6 + 7. Stomach including development - 2
8. Portal vein - 1
9. Liver - 1
10. Kidney, gross features, development and anomalies - 1
11. Diaphragm, gross features, development and anomalies - 1
12. Uterus, gross features, development and anomalies - 1
13. Prostate and male urethra - 1
14. Rectum and Anal canal - 1
15. Urinary bladder - 1
16. Ureter - 1
17. Cross sectional Anatomy – Cross section of Abdomen – at T 12, L 1, L 2 & L 4 levels-Pelvis – sagittal sections – male & female - 1

**INTEGRATED TEACHING** 5 hrs

**TUTORIALS** 6 hrs
1. Anterior abdominal wall - 1
2. Abdominal viscera - 1
3. Abdominal ANS - 1
4. Posterior abdominal wall- muscles - 1
5. Posterior abdominal wall-vessels - 1
6. Lumbar Plexus - 1

**SEMINARS** 2 hrs
1. Pelvic viscera - 1
2. Blood vessels and nerves of the Pelvis - 1
G. PERINEUM  3 hrs
1.  Ischiorectal fossa - 1
2 & 3.  Perineal Pouches - 2

INTEGRATED TEACHING  1 hrs
Departments – OB& G, Surgery - 1

DEMONSTRATIONS 1 hrs
Superficial and deep perineal pouches. - 1

H. THORAX  10 hrs
1.  Thoracic wall (including movements of thoracic cage) - 1
2.  Pleura - 1
3.  Lungs (including development of lungs- very briefly) - 1
4.  Pericardium - 1
5.  Blood supply of heart - 1
6.  Arterial arches. - 1
7.  Foetal circulation - 1
10.  Cross Sectional Anatomy – C.S. of thorax at T3, T4 & T5 levels - 1

INTEGRATED TEACHING  2 hrs
Departments – C.V.T.S. and Paediatrics

TUTORIALS 4 hrs
1.  Intercostal vessels - 1
2.  Interior of heart chambers - 1
3.  Oesophagus - 1
4.  Azygous system of veins - 1

DEMONSTRATIONS 3 hrs
1.  Intercostal nerve of its branches
2.  Structures in the superior mediastinum
3.  Structures related to the mediastinal surfaces of the lungs.

SEMINARS  4 hrs
1.  Superior mediastinum
2.  Heart – External features, blood supply, interior of the chambers
3.  Posterior mediastinum
4.  X-rays and surface markings of thorax

HEAD AND NECK  25 hrs
1.  Scalp - 1
2.  Development of face - 1
3.  Pituitary gland - 1
4.  Dural venous sinuses - 1
5.  Cervical fascia - 1
6.  Posterior Triangle - 1
7.  Anterior Triangle - 1
8.  Thyroid gland - 1
9.  Structures at the root of the neck - 1
10. Development of branchial arches - 1
11. Extra ocular muscles - 1
12. Parotid gland - 1
13. Temporo-mandibular Joint - 1
14. Thyroid gland - 1
15. Cervical sympathetic - 1
16+17. Pharynx - 2
18. Larynx - 1
19. Tongue - 1
20. Submandibular region - 1
21. Middle ear - 1
22. Lymphatic drainage of head & neck - 1
23 & 24. Cranial nerves - 2
25. Cross sectional Anatomy – mid sagittal & horizontal sections, sections at C4 & C6 levels - 1

INTEGRATED TEACHING 3 hrs
Departments – Radiology, ENT, Neurosurgery, Physiology and Ophthalmology

TUTORIALS 7 hrs
1. Cervical fasciae - 1
2. Extra cranial course of the facial nerve - 1
3. Structures at the root of the neck - 1
4. Carotid triangle - 1
5. Parotid bed - 1
6. Hyoglossus and its relations - 1
7. Nasal cavity - 1

DEMONSTRATIONS 5 hrs
1. Mandibular nerve and its branches
2. Oropharynx and Nasopharynx
3. Extra ocular muscles
4. Intrinsic muscles of the larynx
5. Thyroid gland and its relations

SEMINARS 6 hrs
1. Muscles of facial expression and vessels and nerves of the face
2. Posterior triangle of the neck
3. Anterior triangle of the neck
4. Eyelids, lacrimal apparatus and extra ocular muscles
5. Nasal cavity and PNS
6. Cranial nerves- 3,4,5,6 and 7
7. Dural folds

I. BRAIN AND SPINAL CORD 16 hrs
1. Spinal Cord – internal and external features and blood supply - 1
2. Superficial blood supply of brain - 1
3 & 4. Medulla Oblongata - 2
5. Pons - 1
6. Cerebellum - 1
7. 4th ventricle - 1
8. 3rd ventricle, lateral ventricles - 1
9. Midbrain - 1
10. Sulci, gyri and functional areas of cerebrum - 1
11. Internal capsule - 1
12. Basal ganglia - 1
13. Thalamus - 1
14. Development of CNS in brief - 1
15. Cross Sectional Anatomy of Spinal Cord & Brain - 1

INTEGRATED TEACHING 3 hrs
1. Medicine
2. Radiology
3. Surgery

TUTORIALS 3 hrs
1) SPINAL CORD -Cross section – Cervical, Thoracic, Lumbar & Sacral levels
2) BRAIN (i) Mid sagittal section (ii) Horizontal at I.V. foramen
3) Cross section of brain (iii) At anterior commissure (iv) At mammillary body

GROUP DISCUSSION /SEMINAR 4 hrs
1 + 2 MEDULLA levels (i) Pyramidal decussation (ii) Sensory
decussation (iii) Mid olivary

3. PONS Levels
   (i) Upper part
   (ii) Lower part

4. MID BRAIN level
   (i) Superior colliculus
   (ii) Inferior colliculus

J. GENETICS 3 hrs
1. Introduction, Karyotyping - normal male and female.
2. Classification of chromosomes, sex chromosomes and Barr body
3. Chromosomal aberrations – Turner syndrome, Klienfelter syndrome and Down syndromes (charts to be shown)

INTEGRATED TEACHING (1 hr)
Departments – Paediatrics

K. HISTOLOGY 20 hrs
1. Epithelium
2. Connective tissue
3. Cartilage – hyaline, elastic and fibro cartilage
4. Bone – Cross Section, Longitudinal Sections.
5. Muscles- skeletal, smooth and cardiac
6. Nervous tissue- neuron, nerve fibre, sciatic & optic nerves, sympathetic & spinal ganglia
7. Blood vessels- large and medium sized artery, large and medium sized veins.
8. Lymphoid tissue- lymph node, spleen, thymus, palatine tonsil
9. Skin- thin, thick.
10. Mammary gland- active, inactive, placenta, umbilical cord.
13. Endocrine system- thyroid, parathyroid, supra renal and pituitary.
14. Excretory system- kidney, ureter, urinary bladder
15. Male reproductive system-: testis, epididymis, vas deferens and prostate
16. Female reproductive system -: ovary, (uterus), proliferative and secretory, fallopian tube, cervix and vagina.
17 + 18. Digestive system – mucous, serous and mixed salivary glands, pancreas, liver, gall bladder and tongue
19+20. Oesophagus, stomach- fundus, pylorus, duodenum, jejenum, ileum, large intestine and appendix.

INTEGRATED TEACHING 2 hrs
Departments – Physiology and Biochemistry.

SCHEDULE OF PRACTICALS

A. DISSECTION (INCLUDING OSTEOLOGY, TUTORIALS AND DEMONSTRATIONS) (370 + 30 + 30 = 430 hrs)
a. Upper Limb 23 X 2 = 46 hrs
1 & 2. Introduction, Pectoral region and axilla, cutaneous nerves and vessels.
3 & 4. The brachial plexus, the dissection of back.
5. The free upper limb, Lymph vessels and lymph nodes of upper limb
6. Cutaneous nerves of upper limb and deep fascia of upper limb
7. The shoulder- movements of the limb at the shoulder, the shoulder joint.
8 & 9. The arm- anterior and posterior compartments
10 & 11. Cubital fossa and superficial flexors of the forearm.
12. Deep dissection of the flexor compartment of forearm.
13. Superficial dissection of palm.
14. Deep dissection of palm
15. The extensor compartment of the forearm and extensor tendons of the fingers
18. X-rays of upper limb
19. Surface marking of upper limb
20,21,22. Revision of U.L.
23. Spotting exam for upper limb

b. Lower Limb

1. Sole of the foot – 1st and 2nd layers
2 & 3. 3rd, 4th, 5th and 6th layers of the sole
4. Femoral triangle
5. Front of the thigh, adductor canal and medial side of thigh.
6 & 7. Gluteal region
8 & 9. Hip joint and back of thigh
11 & 12. Front of leg and dorsum of the foot.
13. Lateral and medial compartments of the leg
14. Back of Leg
15 & 16. Sole of the foot
17 & 18 Joints of the lower limb
19. X-rays
20. Surface marking of the lower limb
21. Revision of the lower limb
22. Spotting exam for lower limb

c. Abdomen & Pelvis

1 & 2. Anterior abdominal wall- nerves, vessels and muscles.
3. Rectus sheath and its contents.
4 & 5. Inguinal canal, revision of the anterior abdominal wall
6 & 7. Male external genital organs
8. Dissection of the loin.
9 & 10. Peritoneum and peritoneal cavity – (reflections of the peritoneum)
11 & 12 Sub divisions of the peritoneal cavity and peritoneal recesses.
13 Spleen and revision of the peritoneal cavity
14 & 15. Coeliac artery and its branches
16. Stomach
17,18 & 19. Liver and extra hepatic biliary tract.
20 & 21. Superior and inferior mesenteric arteries
22,23. Intestines
24. Portal vein and sites of porto-systemic anastomosis
27 & 28. Kidneys, ureter and supra renal glands
29. Diaphragm
30,31 & 32. Posterior abdominal wall.
33,34. Lumbar plexus
35. Bony Pelvis
36. Pelvic peritoneum
37,38. Internal iliac artery and its branches
39,40. Male Pelvic viscera-
41,42. Female Pelvic viscera
43,44. Revision of the viscera
45,46. Pelvic Diaphragm
47,48. Nerves of the pelvis
49. Joints
50. Surface anatomy of the pelvis
51. X-Ray of pelvis
52 & 53 Revision
54. Spotting exam.

d. Perineum

6 hrs
e. Thorax  19 X 2 = 38 hrs
1 & 2. Introduction: Osteology, walls of thorax and Cavity of the thorax.
3 & 4. Mediastinum – lungs
5. Autonomic nervous system of the thorax
6 & 7. Superior Mediastinum
8, 9 Middle Mediastinum- Heart- surface anatomy and external features.
10 & 11 Blood supply of the heart
12 & 13 Chambers of the heart
14. Posterior mediastinum
15. Joints of the thorax
16. Surface markings
17. X-rays of thorax
18. Revision of the thorax
19. Spotting exam thorax

f. Head And Neck  50 X 2=100 hrs
1 & 2. General introduction of the skull
3. The scalp
4+5. The Face - muscles, nerves and blood vessels
6. Deep dissection of the face
7. Posterior triangle
8 +9. Suboccipital triangle
10,11. Anterior triangle of the neck.
12,13. Cranial cavity- removal of brain
14. Cranial fossae
15. Deep dissection of the Neck
16,17. Structures at the root of the neck.
18,19. Neuro vascular bundles of the neck.
20. The orbits- Osteology
21. Extra ocular muscles and other orbital contents
22,22. Parotid region
25,26. Submandibular region
27,28. Mouth and pharynx
27,28. The larynx
29,30. Nasal cavity and PNS
31,32. Middle ear
33,34. Eye ball - coats
35,36. Joints of the neck
37,38. Revision of Osteology
39,40. X-ray of the head and neck.
41. Surface anatomy of the Head & Neck
42,43,44. Osteology revision.
45,46.
47,48. Gross revision
49. Case history discussions
50. Spotting exam for the Head and Neck.

g. Brain And Spinal Cord  15 X 2 = 30 hrs
1 + 2. Spinal Cord – external features, cross sections and blood supply.
3. Meninges of the brain
4. Blood vessels of the brain
5 + 6. The Cerebellum
7. Floor of the fourth ventricle
8 + 9. Medulla
10 + 11.Pons and midbrain
12. The cerebrum- white matter
13,14. Ventricles of the brain
15. Revision
h. HISTOLOGY 20 X 2 = 40 hrs

1. Epithelium
2. Connective tissue
3. Cartilage – Hyaline, elastic and fibro cartilage
5. Muscles- Skeletal, smooth and cardiac
6 & 7. Nervous tissue- neuron, nerve fibre, sciatic and optic nerves, sympathetic spinal ganglia
8. Blood vessel- Large and medium sized artery, large and medium sized vein,
9. Lymphoid tissue- lymph node, spleen, thymus, palatine tonsil
10. Skin- thin, thick.
11. Mammary gland- active, inactive, Placenta, umbilical cord.
12. Respiratory system- trachea, lung.
15 & 16. Endocrine system- thyroid, parathyroid, supra spinal, pituitary.
17. Excretory system- kidney, ureter, urinary bladder
18. Reproductive system- Male: Testis, epididymis, vas deferens, prostate
Female: Ovary, uterus- proliferative and secretory, fallopian tube, cervix.
19. Digestive system – Salivary glands, pancreas, liver, gall bladder, tongue & oesophagus,
20. Stomach- fundus, pylorus, duodenum, jejunum, ileum, large intestine, appendix.

Assessment

Schedule of Internal Assessment and University Examinations:

<table>
<thead>
<tr>
<th>First Internal Assessment (Theory)</th>
<th>Second Internal Assessment (Theory)</th>
<th>1st Practical Examination</th>
<th>Final Internal Examination (theory)</th>
<th>2nd Practical examination</th>
<th>University Examination (theory)</th>
<th>University Examination (practical)</th>
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<tbody>
<tr>
<td>1st week of November 2016</td>
<td>Last week of February 2017</td>
<td>3rd week of March 2017</td>
<td>2/3rd week of June 2017</td>
<td>Last week of June 2017</td>
<td>3rd week of July 2017</td>
<td>Last week of July 2017</td>
</tr>
</tbody>
</table>

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

Distribution or marks for Internal assessment and university examinations

<table>
<thead>
<tr>
<th>University examination</th>
<th>Internal assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory-I</td>
<td>Theory-II</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Viva</td>
<td>Practical</td>
</tr>
<tr>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>160</td>
<td></td>
</tr>
<tr>
<td>Theory</td>
<td>Practical</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
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<tr>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>40</td>
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</tr>
</tbody>
</table>

1st MBBS Degree examination in Anatomy (1st Professional examination in Anatomy).

Theory – Division of topics

<table>
<thead>
<tr>
<th>Paper I (50 Marks)</th>
<th>Paper II (50 marks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lower limb</td>
<td>1. Upper limb &amp; Thorax</td>
</tr>
<tr>
<td>General embryology</td>
<td>3. Genetics</td>
</tr>
<tr>
<td>General anatomy</td>
<td>- 28 marks</td>
</tr>
<tr>
<td>General histology</td>
<td>- 2 marks</td>
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</tbody>
</table>

General Embryology & histology from the above topics.
### Division of Practicals

<table>
<thead>
<tr>
<th>Practical No.</th>
<th>Name of the practical</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical - I</td>
<td><strong>Gross anatomy/dissection</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Distribution of marks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Spotting – 10 numbers</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>b) Discussion – 2 numbers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1) Above diaphragm</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>2) Below diaphragm</td>
<td>5</td>
</tr>
<tr>
<td>Practical - II</td>
<td><strong>Histology</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Spotting – 10 numbers</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>b) Discussion – 2 numbers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1) General histology</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>2) Systemic histology</td>
<td>5</td>
</tr>
</tbody>
</table>

**GRAND TOTAL** 40

### Viva Voce

The four examiners will conduct the viva voce independently and the topics will be divided among them as follows:

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

Each candidate is examined by all the four examiners.

Total marks for the viva is 20, which will be divided equally among the examiners.

**Items for Histology Practicals:** Hematoxylin and Eosin pencils

**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 No.
<table>
<thead>
<tr>
<th>S. N</th>
<th>Name of the books</th>
<th>Author</th>
<th>Edition</th>
<th>Publishers</th>
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<tbody>
<tr>
<td>1.</td>
<td><strong>GROSS ANATOMY</strong></td>
<td></td>
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<td><strong>Text books</strong>: -</td>
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<tr>
<td></td>
<td>Human Anatomy Regional &amp; Applied - Vol - I, II &amp; III.</td>
<td>B.D.Chaurasia</td>
<td>5th</td>
<td>CBS Publishers &amp; Distributors</td>
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<td></td>
<td><strong>Reference books</strong>: -</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>1. Clinical Anatomy for Medical students</td>
<td>Richard Snell</td>
<td>5th</td>
<td>Lippincott Williams &amp; Wilkins</td>
</tr>
<tr>
<td></td>
<td>3. Essential of Human Anatomy- 3 volumes</td>
<td>Inderbir Singh</td>
<td>6th</td>
<td>Lippincott Williams &amp; Wilkins</td>
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<tr>
<td></td>
<td>4. Human Anatomy Vol I, II, &amp; III</td>
<td>Peter L.Williams</td>
<td>1st</td>
<td>Current Book International</td>
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<tr>
<td></td>
<td>5. Text book of Anatomy – 3 volumes</td>
<td>Anne M.R. Agur</td>
<td>4th</td>
<td>Jaypee</td>
</tr>
<tr>
<td></td>
<td>6. Gray’s Anatomy</td>
<td>Richard Drake, A. Wayne Vogl, &amp; Adam W. M. Mitchell,</td>
<td>5th</td>
<td>Lippincott Williams &amp; Wilkins</td>
</tr>
<tr>
<td></td>
<td>7. Grant’s Atlas of Anatomy</td>
<td>Inderbir Singh</td>
<td>5th</td>
<td>Elsevier</td>
</tr>
<tr>
<td></td>
<td>8. Students Gray</td>
<td>T.W.Sadler</td>
<td>10th</td>
<td>ELSEVIER</td>
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<tr>
<td></td>
<td></td>
<td>Keith L. Moore</td>
<td>2nd</td>
<td>Lippincott Williams &amp; Wilkins</td>
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<tr>
<td></td>
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<td>K.V.N. Persaud</td>
<td>40th</td>
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<tr>
<td>2.</td>
<td><strong>Embryology Text book: -</strong></td>
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<tr>
<td></td>
<td>Human Embryology</td>
<td>Inder Bir Singh</td>
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<td>Macmillon</td>
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<tr>
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<td>Langman’s Medical Embryology</td>
<td>T.W.Sadler</td>
<td>8th</td>
<td>Lippincott Williams &amp; Wilkins</td>
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<tr>
<td></td>
<td>The Developing human clinically oriented embryology</td>
<td>Keith L. Moore</td>
<td>8th</td>
<td>Elsevier</td>
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<td></td>
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<td>K.V.N. Persaud</td>
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<tr>
<td>3.</td>
<td><strong>NeuroAnatomy Text book:-</strong></td>
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<tr>
<td></td>
<td>Text book of Human Neuroanatomy</td>
<td>Vishram Singh</td>
<td>2nd</td>
<td>Elsevier</td>
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<td></td>
<td><strong>Reference book:-</strong></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Clinical Neuroanatomy for medical students</td>
<td>I.B. Singh</td>
<td>7th</td>
<td>Jaypee</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Richard Snell</td>
<td>6th</td>
<td>Lippincott Williams &amp; Wilkins</td>
</tr>
<tr>
<td>4.</td>
<td><strong>Histology</strong></td>
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<tr>
<td></td>
<td><strong>Reference book:</strong>*</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Atlas of Histology with Functional Correlations</td>
<td>I.B. Singh</td>
<td>1st</td>
<td>Jaypee</td>
</tr>
<tr>
<td></td>
<td>Histology a text and atlas</td>
<td>De Fiore</td>
<td>9th</td>
<td>Lippincott Williams &amp; Wilkins</td>
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<tr>
<td></td>
<td></td>
<td>Michael H.Ross</td>
<td>3rd</td>
<td>Lippincott Williams &amp; Wilkins</td>
</tr>
</tbody>
</table>
Physiology

Human Physiology including Bio-physics

Goal

The broad goal of teaching undergraduate students in Physiology aims at providing the student comprehensive knowledge of the normal functions of the organ systems of the body to facilitate an understanding of the physiological basis of health and disease. The broad goal of teaching Biophysics to undergraduate students is that they should understand basic physical principles involved in the functioning of body organs in normal and diseased conditions.

Objectives

Knowledge

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

1. Explain the normal functioning of all the organ systems and their interactions for well coordinated total body function.
2. Assess the relative contribution of each organ system to the maintenance of milieu interieur.
3. Elucidate the physiological aspects of normal growth and development.
4. Describe the physiological response and adaptation to environmental stresses.
5. List the physiological principles underlying pathogenesis and treatment of disease.

Skills

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

1. Conduct experiments designed for study of physiological phenomena
2. Interpret experimental / investigative data
3. Distinguish between normal and abnormal data derived as a result of tests which he/she has performed and observed in the laboratory.

Integration

At the end of the integrated teaching, the student shall acquire an integrated knowledge of organ structure and function and its regulatory mechanisms.

Teaching schedule

Duration of the Course: 2 Semesters

<table>
<thead>
<tr>
<th>Teaching Hours</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total teaching hours</td>
<td>: 480</td>
</tr>
<tr>
<td>Lectures</td>
<td>: 160 Hrs.</td>
</tr>
<tr>
<td>Practicals</td>
<td>: 320</td>
</tr>
<tr>
<td>Innovative session</td>
<td>: Part of practicals</td>
</tr>
<tr>
<td></td>
<td>(Tutorials, seminars, structured discussion, integrated teaching, formative evaluation and revision)</td>
</tr>
</tbody>
</table>
Schedule of lectures

Topic

1. Muscle and nerve Physiology 12 Hrs


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 practicals)], 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.

Nerve Physiology


2. Haematology 18 Hrs

Homeostasis: Body fluid compartments. Blood-Composition, normal & variations. Functions

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


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, 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


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

**Blood volume** Normal value, abnormalities-mention. application of fick’s principle.

### 3. Respiratory system

General Organisation


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

### 4. Cardiovascular System

16 Hrs

### 5. Nervous system

34 Hrs

Introduction. Organisation of nervous system and functions. General morphology of Brain, Spinal cord including Lamination.

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


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

6. Special senses 10 Hrs


Smell and taste : Receptor organs and pathways.

7. Digestive System 11 Hrs


8. Endocrinology 18 Hrs


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


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 counteracting stress.

9. Reproductive system 10 Hrs


10. Renal system 10 Hrs


11. 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

Schedule of Practicals

Human Physiology 110 Hrs

1. Use and care of compound microscope and microscopic examination of blood.
2. PCV, ESR, osmotic fragility
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.
10. General examination.
11. Examination of respiratory system.
12. Examination of CVS.
13. Examination of higher functions and sensory system.
14. Examination of motor system.
15. Examinations of reflexes.
16. Examination of cranial nerves 1-6.

Experimental physiology – only photo/videograph 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.
4. Two successive stimuli, repetitive stimuli and fatigue.
5. Genesis of tetanus and starling’s law of muscle.
6. Effects of variations of temperature on muscle contraction and velocity of nerve impulse.
10. Effects of vagal stimulation on heart.

Biophysics Practical 10 hrs
Demonstration of a) ECG b) Perimetry (optional to have demonstration of EEG, EMG, Ophthalmoscopic examination.) c) Physiograph d) Spirometry

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.

Endocrinology
5. Calcium homeostasis
6. Hormonal control of blood glucose

Reproductive system
7. Physiology of lactation

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. RMP and Action Potential
3. Erythropoiesis.
4. Leucopoiesis and functions of leucocytes
5. Immunity.
6. Platelets.
7. Haemostasis and bleeding disorders
8. Body fluids – Composition and regulations of volume
9. Cardiac cycle – phases and pressure changes.
10. Heart rate.
11. Cardiac output.
14. Shock and compensatory mechanism.
16. Pressure changes and volume changes
Clinical orientation / vertical integration – Cases/ procedures to be shown to students.


Horizontal Integration

Related topics in Physiology, Anatomy and Biochemistry can be taken simultaneously.

<table>
<thead>
<tr>
<th>Topics</th>
<th>Physiology</th>
<th>Biochemistry</th>
<th>Anatomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastrointestinal Abdomen system</td>
<td>Functions</td>
<td>Digestion &amp; absorption</td>
<td>Dissection of</td>
</tr>
<tr>
<td>Cardiovascular system</td>
<td>Functions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Respiration

Nervous System Functions

Dissection and Histology should precede the classes on Physiology and Biochemistry of that organ. This can be best achieved by periodical discussions among the Heads of these three Departments.

**assessment**

Schedule of Internal assessment and University examination

<table>
<thead>
<tr>
<th>First internal assessment (Theory)</th>
<th>Second internal Assessment (Theory)</th>
<th>1st Practical Examination</th>
<th>Final Internal examination (Theory)</th>
<th>2nd Practical Examination</th>
<th>University examination Theory</th>
<th>University Examination Practicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st week of November 2016</td>
<td>Last week of February 2017</td>
<td>2nd week of March 2017</td>
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<td>Last week of July 2017</td>
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</tbody>
</table>

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 examination

<table>
<thead>
<tr>
<th>University Examination</th>
<th>Internal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory I</td>
<td>Theory II</td>
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<tr>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

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.

- 3rd and 4th week of 10th month (May) – Revision
- 3rd and 4th week of 11th month (June) – Revision

The first three Internal Assessment examinations will be of two hours duration each. Each internal assessment examination will be followed by Viva voce.

Practicals - First Practical examination - after theory second Internal assessment

Second practical examination - after theory final internal assessment (in the pattern of University exam)

University Examination

**Theory Division of topics**

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

Paper II
Nervous System, Special Senses, Muscle and nerve, Endocrinology, Growth and development, Reproductive system. (50 marks)
Practical - Total : 40 marks

Practical I
Short experiment - One amphibian graph: 5 marks

One short haematology experiment : 5

Spotters- Two Calculations, Two observations, Three interpretations, 2 Graphs, One Clinical skill test. (total ten stations X 1 =10 marks) : 10

Practical II marks marks

Long experiment - One Haematology experiment : 10
One system examination : 10
TOTAL 20 MARKS

Viva-voce marks

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

Prescribed books

Text Books Recommended

2. Text Book of Medical Physiology: Guyton & Hall - W.B Saunders (Elsvier)
3. Text Book of Medical Physiology: Dr. N.Geetha - Paras Publications
Biochemistry

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.

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.

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)
***************************************************************************

Schedule of Lectures

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.
   a. Glucose Transporters 2 hrs
   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 hr
   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 1 hr amino acids, nitrogen balance, glucogenic and ketogenic amino acids.
   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 hain 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

5. Chemistry and metabolism of Carbohydrates 17 hrs
   (i) Chemistry
   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 leubering cycle,
fate of pyruvate in aerobic and anaerobic conditions, PDH reaction. 3hrs
b. Gluconeogenesis-key enzymes, regulation and significance. Cori’s cycle 1hr
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 1hr

6. Vitamins 8hrs
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 4hrs
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 4hrs

7. Minerals 5hrs
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
c. Iron, copper and anemia 1 hr

8. Haemoglobin 4hrs
a. Synthesis and degradation 3hrs
b. Haemoglobinopathies, thalassemias and porphyrias (brief mention only as examples in each case). 1 hr

9. Liver function Tests: 3hrs
Including formation of bilirubin, hyper bilirubinemias and differential diagnosis of jaundice (S. bilirubin, enzymes, A/G ratio, BSP test, urine test)

10. Specialised Laboratory investigations – RIA, ELISA, principles of colorimetry 1 hr

11. Radioactivity 1 hr
Applications-Diagnostic, research and therapeutic. Radiation hazards

12. Chemistry and metabolism of Lipids 13hrs
(i) Chemistry of Lipids 2 hrs
a. Definition, classification with example, saturated and unsaturated fatty acids, triacyl glycerol, phospholipids. Structure and function of biomembrane.

(ii) Metabolism of Lipids 2 hrs
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

c. Formation and utilization of ketone bodies, ketoacidosis in diabetes and starvation 1hr
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 2hrs
f. Transport of plasma lipids, lipoprotein metabolism, apoproteins, functions,
lipid profile and dyslipidemias, atherosclerosis, biochemical basis of management of hyperlipidemias – 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

13. TCA Cycle 4 hrs

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

14. Maintenance of homeostasis 6hrs

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 1 hr (Hormonal regulation covered in Physiology)

15. Nucleic Acids (Chemistry and metabolism) 17hrs

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 1 hr

16. Biochemistry of Cancer 2hrs

Mutagens, carcinogens and its role in carcinogenesis, viruses in carcinogenesis, tumour markers and oncogenes.

Vertical integration classes: 10 hrs

a. Malnutrition and PEM (Pediatric department) 1 hr
b. Diabetes mellitus (Internal Medicine) 1 hr
c. Jaundice (Internal Medicine) 1 hr
d. Clinical enzymology (Internal Medicine) 1 hr
e. Inborn errors of carbohydrates and protein metabolism (Pediatric) 1 hr
f. Calcium and phosphorus metabolism-derangement (Orthopedics) 1hr

g. Atherosclerosis – Ischemic heart diseases (Cardiology) 1hr

h. Acid base balance in clinical settings (Internal Medicine) 1hr

i. Etiology and management of cancers (Oncology)

j. AIDS (Internal Medicine) 1hr

**Seminar/ Tutorials** 27hrs

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 2hrs

f. Fat soluble vitamins 1 hr

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 2hrs

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 FOR 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 1 session (2 hrs)
   (specific urease test for urea. Benedict’s uric acid test and Schiff’s test for uric acid)
10. Identification of biologically important compounds in given solution 2 sessions (4 hrs)
11. Normal urine: organic constituents 1 session (2 hrs)
12. Normal Urine: inorganic Constituents 1 session (2 hrs)
13. Abnormal urine: Report 2 sessions (4 hrs)
14. Introduction to clinical chemistry, collection of samples, anticoagulants and preservatives, principles of colorimetry 1 session (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 1 session (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 will be 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

<table>
<thead>
<tr>
<th>First Internal assessment (Theory)</th>
<th>Second Internal assessment (Theory)</th>
<th>1st Practical Examination</th>
<th>Final Internal assessment (Theory)</th>
<th>2nd Practical Examination</th>
<th>University examination (Theory)</th>
<th>University examination (Practical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st week of November 2016</td>
<td>Last week of February 2017</td>
<td>3rd week of March 2017</td>
<td>1/3rd week of June 2017</td>
<td>Last week of June 2017</td>
<td>3rd week of July 2017</td>
<td>last week of July 2017</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>University examination</th>
<th>Internal assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theory I</strong></td>
<td><strong>Theory II</strong></td>
</tr>
</tbody>
</table>

**University examination- division of topics** (50 Marks)

**Theory paper 1**
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**

**Practicals I Total :** 40 marks

**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)

**Prescribed books**

**Text Books Recommended**
1. Text book of Biochemistry for Medical students - Dr. D.M. Vasudevan, Dr. S. Sreekumari (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

Preamble

The first curriculum of Community Medicine (CM) of Amrita School of Medicine (ASM) under Amrita Vishwa Vidyapeetham (AVV) was prepared in 2002 conserving 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, intersectoral 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. Departmental objectives

3.1. 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

3.2. Specific objectives

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

3.2.1. 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

3.2.2 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

3.2.3. Skills
• 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 and health promotion initiatives
• 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

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
## Curriculum map

<table>
<thead>
<tr>
<th>Semester</th>
<th>Nature of Academic Activity</th>
<th>Course Strength (in contact hours)</th>
<th>Frequency of the activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>* Interactive Lectures</td>
<td>** Community Exercises</td>
<td>Exam</td>
</tr>
<tr>
<td>S1</td>
<td>Interactive lectures/ family/community exposure</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>S3</td>
<td>Interactive Team Teaching</td>
<td>24</td>
<td></td>
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<tr>
<td>S4</td>
<td>Interactive Team Teaching</td>
<td>24</td>
<td></td>
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<tr>
<td>S5</td>
<td>Interactive Team Teaching</td>
<td>16</td>
<td></td>
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<tr>
<td>S6</td>
<td>Interactive Team Teaching</td>
<td>24</td>
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<tr>
<td>S7</td>
<td>Integrated Team Teaching</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>R1</td>
<td>Innovative community based problem solving exercises &amp; skills training</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>R2</td>
<td>Project work in Research Methodology and group exercise on BCC</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>R3</td>
<td>Community action programmes &amp; Clinico Social case study</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>150</td>
<td>306</td>
<td></td>
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</tbody>
</table>

_S1, S2 ....– Semester ONE, Semester TWO
R1, R2....– FIRST clinical rotation, SECOND clinical rotation... etc._
# 5. Profile of the Syllabus of Community Medicine

<table>
<thead>
<tr>
<th>Sl No:</th>
<th>Topics</th>
<th>*Interactive Learning</th>
<th>**Community based problem solving Exercises</th>
<th>Total</th>
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<tbody>
<tr>
<td>1</td>
<td>Concept of health and disease and community medicine</td>
<td>4</td>
<td>5</td>
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<tr>
<td>2</td>
<td>Basic epidemiology and screening</td>
<td>5</td>
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<tr>
<td>3</td>
<td>Bio statistics</td>
<td>7</td>
<td>15</td>
<td>22</td>
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<tr>
<td>4</td>
<td>Demography and National Population Policy</td>
<td>7</td>
<td>6</td>
<td>13</td>
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<tr>
<td>5</td>
<td>Environment and Health including Medical Entomology</td>
<td>6</td>
<td>24</td>
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<td>Health Care Waste Management</td>
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<td>7</td>
<td>Disaster Management</td>
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<td>8</td>
<td>Communicable diseases and Non-Communicable diseases</td>
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<td>National health programmes</td>
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<td>Emerging and Re-emerging diseases</td>
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<td>Occupational Health</td>
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<td>12</td>
<td>Communication for health education</td>
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<td>13</td>
<td>RCH and MCH including Fertility Regulation</td>
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<td>Genetics including Human Genome Project</td>
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<td>4</td>
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<td>15</td>
<td>Nutrition in Health Disease</td>
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<td>16</td>
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<tr>
<td>16</td>
<td>Health planning, mangement &amp; health economics including Panjayati Raj &amp; National policies</td>
<td>8</td>
<td>14</td>
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<tr>
<td>17</td>
<td>Health care of the community including Millennium development goals, Public health standards &amp; Health care delivery system- public private sectors</td>
<td>12</td>
<td>16</td>
<td>28</td>
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<tr>
<td>18</td>
<td>International Health</td>
<td>2</td>
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<td>19</td>
<td>Mental Health</td>
<td>2</td>
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<td>6</td>
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<tr>
<td>20</td>
<td>Geriatric Health care</td>
<td>2</td>
<td>4</td>
<td>6</td>
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<tr>
<td>21</td>
<td>Health Legislations</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>
22 Medicine and social sciences including medico social and ethical issues in Health care 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 & 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 dimensions of health - Stress Management and Personally Personally Development 2 2 4
30 Guest lectures, Integrated teaching 'Must know' Revision, Updates in Community Medicine 18 - 18

Total strength 150 306 456

* 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, schoolhealth, 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 minimised 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:

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)

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)

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 training 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
  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)**

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.

In addition to these, the Department shall conduct minimum one assessment at the end of every semester as shown under 13.1.1. and 13.1.2 above and several recap assessment of different types during the 7th semester.

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

**Written** 20

and

**Practical** 20

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 all end of semester assessments scheduled by the Dept under 13.1.2 and /or by the principal under 13.2.1.1

**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 Plus

Marks of end of rotation assessments (R1, R2, R3) and model examination is computed to 10 marks.

Total practical marks 20 MARKS

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:

<table>
<thead>
<tr>
<th>Practical</th>
<th>Description</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Clinico-social case/family health discussion</td>
<td>10</td>
</tr>
<tr>
<td>II</td>
<td>Spotters</td>
<td>3</td>
</tr>
<tr>
<td>III</td>
<td>OSPE</td>
<td>3</td>
</tr>
<tr>
<td>IV</td>
<td>Epidemiological exercises</td>
<td>5</td>
</tr>
<tr>
<td>V</td>
<td>Statistical Exercise</td>
<td>5</td>
</tr>
<tr>
<td>VI</td>
<td>Project discussion</td>
<td>4</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>I Internal Assessment</th>
<th>II Internal Assessment</th>
<th>III Internal Assessment</th>
<th>Final Internal Assessment</th>
<th>University Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last week of January 2018</td>
<td>Last week of July 2018</td>
<td>Last week of July 2019</td>
<td>First week of December 2019</td>
<td>First week of January 2020</td>
</tr>
</tbody>
</table>

**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

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.

Teaching Hours
Third Semester- Saturdays 3-4 P.M.

<table>
<thead>
<tr>
<th>Lectures/Innovative Sessions / Practicals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>
**Schedule of Lectures**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medical informatics</strong></td>
<td>1hrs</td>
</tr>
<tr>
<td>Introduction to Health Informatics</td>
<td></td>
</tr>
<tr>
<td>Medical databases</td>
<td></td>
</tr>
<tr>
<td>Information filtering and information retrieval</td>
<td></td>
</tr>
<tr>
<td>Dataware housing, data mining for public health care</td>
<td></td>
</tr>
<tr>
<td>Remote sensing and geographical information system</td>
<td></td>
</tr>
<tr>
<td>Standards in Hospital information system</td>
<td></td>
</tr>
<tr>
<td><strong>Electronic Medical records</strong></td>
<td>2hrs</td>
</tr>
<tr>
<td>Introduction to EMR</td>
<td></td>
</tr>
<tr>
<td>Structure of a Hospital Information System (HIS)</td>
<td></td>
</tr>
<tr>
<td>Advantages and disadvantages of EMR systems</td>
<td></td>
</tr>
<tr>
<td>Decision support systems and Artificial Intelligence (AI)</td>
<td></td>
</tr>
<tr>
<td>Principles of good medical documentation and communication skills</td>
<td></td>
</tr>
<tr>
<td><strong>Medical Simulation</strong></td>
<td>1hrs</td>
</tr>
<tr>
<td>Overview</td>
<td></td>
</tr>
<tr>
<td>Case studies</td>
<td></td>
</tr>
<tr>
<td><strong>Tele medicine</strong></td>
<td>2hrs</td>
</tr>
<tr>
<td>Clinical application of tele medicine</td>
<td></td>
</tr>
<tr>
<td>Choosing the right technology</td>
<td></td>
</tr>
<tr>
<td>Ethical and legal aspects of telemedicine</td>
<td></td>
</tr>
<tr>
<td>Future trends of telemedicine</td>
<td></td>
</tr>
<tr>
<td>Scope, benefits, limitations of telemedicine development</td>
<td></td>
</tr>
<tr>
<td><strong>Textbooks Recommended</strong></td>
<td></td>
</tr>
<tr>
<td>1) Introducing telemedicine by B.D Gupta</td>
<td></td>
</tr>
<tr>
<td>2) Computers in Medicine by R D Lele</td>
<td></td>
</tr>
<tr>
<td>3) Essentials of Telemedicine and Tele care by A C Norris</td>
<td></td>
</tr>
<tr>
<td>4) Clinical Research Methodology and Evidence-based Medicine: The basics by Ajit N Babu</td>
<td></td>
</tr>
</tbody>
</table>
Simulation Based Medical Education

Objectives
Aquisition 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 medicos' 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

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 simulads. It can be used to evaluate the performance of skills, especially for the Post Graduate students of Emergency medicine.

Simulads for utilised 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 simulads with programmed clinical conditions to conduct undergraduate and postgraduate 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 Simulads aspiration of pleural effusion, pneumothorax, pericardiocentesis etc. can be practiced.

II. Surgery: Simulads 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 & Gynaecology: Palpation of abdomen for identifying various presentations and positions of the foetus inside the uterus can be practiced with the help of mannequins. Simulads 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. Simulads 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 simulads.

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 Surgeoncy

* 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 1st theory and practical examination conducted at the end of 3rd semester. Intensive training can be given during house surgery.
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.

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

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

<table>
<thead>
<tr>
<th>Subject</th>
<th>Last week of January 2018</th>
<th>Last week of July 2018</th>
<th>First week of December 2018</th>
<th>First week of January 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacology</td>
<td>do</td>
<td>do</td>
<td>do</td>
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<tr>
<td>Pathology</td>
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<tr>
<td>Microbiology</td>
<td>do</td>
<td>do</td>
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<td>do</td>
</tr>
<tr>
<td>Forensic Medicine</td>
<td>do</td>
<td>do</td>
<td>do</td>
<td>do</td>
</tr>
</tbody>
</table>

Distribution of marks for the Internal assessment and University examinations

<table>
<thead>
<tr>
<th>Subject</th>
<th>University Examination</th>
<th>Internal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacology</td>
<td>40 25 15</td>
<td>120 15 15</td>
</tr>
<tr>
<td>Pathology</td>
<td>40 25 15</td>
<td>120 15 15</td>
</tr>
<tr>
<td>Microbiology</td>
<td>40 25 15</td>
<td>120 15 15</td>
</tr>
<tr>
<td>Forensic Medicine</td>
<td>40 30 10</td>
<td>80 10 10</td>
</tr>
</tbody>
</table>

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

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. 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. Recognise 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.

3. 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
   C) Revisions - 20hrs

4. Syllabus :
The Broad area of study shall be:-
   I General Pathology
   II Systemic Pathology
   III Haematology
   IV Clinical Pathology

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 leucocyte 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 immunosurveillance 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, Filaria, 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
Pneumonia; 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, reflex 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: Odontogenics 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; Prostatic; Metaplastic lesions of bladder

17. **FGS and Breast**
**Must know:** Carcinoma Cervix; Carcinoma Uterus; Leiomyoma; Endometriosis and adenomyosis
Tumours of Ovary; Complete and Partial Hydatidiform mole; Choreocarcinoma
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

Urinalysis: Physical, Chemical, Microscopic exam 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

**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. Monckeberg's sclerosis
3. Hyaline change
4. Coagulative necrosis
5. Fat necrosis
6. Acute appendicitis
7. Osteomyelitis
8. TB intestine
9. TB lymph node
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
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
39. Hodgkin's disease
40. Secondary lymph node
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 lymph node
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
25. Carcinoma ovaries
26. Leiomyoma uterus
27. Carcinoma cervix
28. Carcinoma uterus
29. Fibroadenoma breast
30. Ca breast
31. MNG-thyroid
32. Osteosarcoma
33. Osteoclastoma

**Haematology Slides**

**Charts**

**Instruments**

**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**

<table>
<thead>
<tr>
<th>First Internal assessment</th>
<th>Second Internal assessment</th>
<th>Final Internal assessment</th>
<th>University Examination</th>
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<tbody>
<tr>
<td>Last week of January 2018</td>
<td>Last week of July 2018</td>
<td>First Week of December 2018</td>
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Distribution of marks for Internal assessment

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Distribution of marks for University Examination

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<th>Theory Paper II</th>
<th>Practical</th>
<th>Viva voce</th>
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**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 paper)

**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 Practicals**

<table>
<thead>
<tr>
<th>Spotters (20x20x2)</th>
<th>Peripheral smear preparation &amp; staining</th>
<th>Reporting of peripheral smear</th>
<th>Blood grouping</th>
<th>Hb/ WBC estimation</th>
<th>Urine analysis</th>
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**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.

Text books recommended

1. Pathological basis of disease. - Robbins and Cotran
2. General and systemic Pathology – JCE Underwood
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
Model Question paper
PATHOLOGY-Paper I
General Pathology, Hematology & Clinical Pathology.
Answer all questions
Draw diagrams wherever necessary

Time: 2 hours
Maximum: 40 Marks

Section A

General Pathology

Structured Essay (1+3+2+2=8 marks)

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=8 marks)

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, ecchmyosis 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

.................................................................
Model Question paper
PATHOLOGY-Paper II
Systemic Pathology

Time : 2 hours Maximum:40 Marks

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 (3x4=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
Microbiology

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.

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, water, 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.

Teaching hours

<table>
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<th>Practical</th>
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88
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<tr>
<td>1 Introduction to Microbiology</td>
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<tr>
<td>2 Morphology &amp; physiology of bacteria</td>
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<td>3 Culture media, identification of bacteria</td>
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<tr>
<td>4 Sterilization &amp; disinfection</td>
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<td>5 Bacterial genetics and drug resistance</td>
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<tr>
<td>6 Molecular methods in lab diagnosis</td>
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<td>7 Antibacterial agents &amp; antibiotic sensitivity tests</td>
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<td>8 Infection</td>
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<td><strong>Immunology -17</strong></td>
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<td>3 Antibody</td>
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<td>4 Antigen- Antibody reactions</td>
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<td>5 Structure and functions of Immune system</td>
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<td>6 Immune response</td>
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<td>7 Complement in health &amp; disease</td>
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<td>8 H L A antigens in health &amp; disease</td>
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<td>9 Hypersensitivity</td>
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<td>6 Mycobacteria</td>
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<td>Intestinal Nematodes I – Trichuris, Enterobius, Strongyloides</td>
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**Virology** - 20

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13 Intestinal Nematodes II – Ascaris and Trichinella  
14 Intestinal Nematodes II – Hookworm and Larva Migrans  
15 Tissue nematodes - Filarial Nematodes I  
16 Filarial Nematodes II and Dracunculus

**Applied Microbiology- 4**

1 Infection control practices  
2 Healthcare associated infections  
3 Bacteriological analysis of food, water, milk & air  
4 Disposal of Hospital waste

**Schedule of Practicals**

**Exercises /Demonstration 48hrs**

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

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

1 Collection & despatch of specimens  
2 Oropharyngeal infection  
3 Wound infections  
4 Respiratory tract infections  
5 Meningitis-Pyogenic/fungal  
6 Gastrointestinal infections  
7 Urinary tract infections  
8 Urethritis  
9 Aseptic meningitis & encephalitis  
10 Blood culture techniques  
11 Equipments/ Instruments (Lab visit)  
12 Interpretation of lab results  
13 Pyrexia of Unknown Origin  
14 Zoonotic infections  
15 Sexually transmitted diseases  
16 Tuberculosis  
17 Vector borne diseases
Assessment

Schedule of Internal and University examinations

<table>
<thead>
<tr>
<th>First Internal assessment</th>
<th>Second Internal assessment</th>
<th>Final Internal assessment</th>
<th>University Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last week of January 2018</td>
<td>Last week of July 2018</td>
<td>First week of December 2018</td>
<td>First week of January 2019</td>
</tr>
</tbody>
</table>

Distribution of marks for Internal assessment and University examination

<table>
<thead>
<tr>
<th>University examination</th>
<th>Internal examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory I</td>
<td>Theory II</td>
</tr>
<tr>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

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

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.

(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
a) What is your diagnosis?
b) Describe the structure of the causative organism
c) Describe the serological markers of this disease
d) What are the prophylactic measures to be taken?

(5 marks)

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

(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?

(10 x1= 10 marks)
**Viva voce**

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

**********************************************************

*Textbooks recommended*

**Prescribed books (Latest edition)**
- Textbook of Microbiology – R.Ananthanarayanan & C.K. Jayaram Panicker
- Essentials of Medical Microbiology- Apurba Sankar Sastry/Sandhya Bhat K
- Medical Microbiology by David Greenwood / Mike Barer/Richard Slack/Will Irving
- Textbook of Medical Parasitology – by C.K.Jayaram Panicker
- Essentials of Medical Parasitology - Apurba Sankar Sastry/Sandhya Bhat K
- Textbook of Medical Parasitology –Subhash Chandra Parija

**Reference books**
- Basic Immunology : Functions and Disorders of the Immune System By Abdul K Abbas/ Andrew Lichtman/ Shiv Pillai
- Medical Microbiology & Immunology by Warren Levinson / Ernest Jawetz
- Textbook of Parasitology by Chatterjee K.D
- Medical Parasitology by RL Ichhpujani / Rajesh Bhatia
- Text Book of Medical Mycology by Jagdish Chander
- FieldsVirology(Knipe,Fields Virology)- 2 Volume Set [Hardcover] by David M. Knipe/ Peter Howley
- Mackie & McCartney – Practical Medical Microbiology by Collee/Fraser/Marmion/Simmons
- Bailey & Scott’s Diagnostic Microbiology by Forbes/ Sahm/Weissfeld
Pharmacology

**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.

**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 prevention 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

System wise Distribution of Lecture Hours: Total Hours - 110

<table>
<thead>
<tr>
<th>Systems</th>
<th>Hours</th>
<th>Systems</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Pharmacology</td>
<td>-12</td>
<td>Autonomic Nervous System</td>
<td>-10</td>
</tr>
<tr>
<td>Autacoids and Related drugs</td>
<td>-6</td>
<td>Respiratory System</td>
<td>-3</td>
</tr>
<tr>
<td>Kidney</td>
<td>-4</td>
<td>Cardiovascular Systems</td>
<td>-10</td>
</tr>
<tr>
<td>Peripheral Nervous System</td>
<td>-2</td>
<td>Central Nervous System</td>
<td>-14</td>
</tr>
<tr>
<td>Antimicrobial Chemotherapy</td>
<td>-12</td>
<td>Chemotherapy of Parasites</td>
<td>-6</td>
</tr>
<tr>
<td>Chemotherapy of Neoplasms</td>
<td>-4</td>
<td>Immunomodulators</td>
<td>-3</td>
</tr>
<tr>
<td>Hormones &amp; Antagonists</td>
<td>-1</td>
<td>Blood &amp; Blood formation</td>
<td>-4</td>
</tr>
<tr>
<td>Gastrointestinal Function</td>
<td>-3</td>
<td>Toxicology</td>
<td>-2</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>-2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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 1
Section A (20 marks) Maximum Marks – 40

SI#   Topics
1   General Pharmacology
- Introduction: Definitions, Nomenclature, Essential drug concept, Rational drug use
- Routes of drug administration
- Pharmacokinetics: Absorption, Bioavailability, Distribution, Biotransformation and Excretion
- Adverse effects of drugs

2. Autacoids & Related Drugs
   Antihistamines: H₁ 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_{12}

**PHARMACOLOGY PAPER 2**

**Section A (20 marks) Maximum Marks – 40**

<table>
<thead>
<tr>
<th>Sl#</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>Gastrointestinal Tract</strong></td>
</tr>
<tr>
<td></td>
<td>Drug therapy of peptic ulcer</td>
</tr>
<tr>
<td></td>
<td>Drugs affecting gastrointestinal motility: Drugs for constipation, diarrhoea, emetics and anti emetics</td>
</tr>
<tr>
<td></td>
<td>Emetics and anti emetics</td>
</tr>
<tr>
<td>2.</td>
<td><strong>Hormones</strong></td>
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<tr>
<td></td>
<td>Hypothalamus and pituitary gland: Preparations and uses</td>
</tr>
<tr>
<td></td>
<td>Thyroid and antithyroid drugs</td>
</tr>
<tr>
<td></td>
<td>Pancreatic hormones and antidiabetic drugs</td>
</tr>
<tr>
<td></td>
<td>Adrenocorticosteroids and their analogues</td>
</tr>
<tr>
<td></td>
<td>Agents modifying bone mineral homeostasis: calcium, parathyroid hormone, calcitonin, vitamin D, biphosphonates</td>
</tr>
<tr>
<td>3.</td>
<td><strong>Reproductive System</strong></td>
</tr>
<tr>
<td></td>
<td>Gonadal hormones and inhibitors</td>
</tr>
<tr>
<td></td>
<td>Fertility and antifertility agents</td>
</tr>
<tr>
<td></td>
<td>Oxytocics, abortifacients, and tocolytics</td>
</tr>
</tbody>
</table>

**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 |
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 (T. 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.

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**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)**

<table>
<thead>
<tr>
<th>Exercises</th>
<th>Number</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spotters</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Prescription writing/Prescription audit</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Problem solving exercise</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Calculation of dosage/ADE Form filling/Drug Interaction</td>
<td>1</td>
<td>2</td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Exercises</th>
<th>Number</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dispensing pharmacy</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Experimental Pharmacology</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Graph/chart / flowchart</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Communication skill</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

**ORAL (Max marks-15)**

101
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

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Practical</th>
<th>Innovative Sessions</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>128</td>
<td>82</td>
<td>320</td>
</tr>
</tbody>
</table>

TENTATIVE SCHEDULE OF EXAMINATIONS

<table>
<thead>
<tr>
<th>First Internal assessment</th>
<th>Second Internal assessment</th>
<th>Final Internal assessment</th>
<th>University Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last week of January 2018</td>
<td>Last week of July 2018</td>
<td>First week of December 2018</td>
<td>First week of January 2019</td>
</tr>
</tbody>
</table>

METHOD OF CALCULATION OF INTERNAL ASSESSMENT

**Theory: 15 marks**
- Average of different Class and Sessional Examinations and marks for Seminar / project... 12 marks
- 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

<table>
<thead>
<tr>
<th>University</th>
<th>Internal Assessment</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory</td>
<td>Practical</td>
<td>Total (Th+Pr)</td>
</tr>
<tr>
<td>Written</td>
<td>Oral</td>
<td>Min: 50%</td>
</tr>
<tr>
<td>40+40=80</td>
<td>15</td>
<td>95/48</td>
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</tbody>
</table>
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 (3rd 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
Forensic Medicine and Toxicology

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.

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.

Teaching hours

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Practicals</th>
<th>Innovative sessions*</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>20</td>
<td>50</td>
<td>104</td>
</tr>
</tbody>
</table>
* (Project Work, Seminars, Structured discussion, Integrated teaching, Formative evaluation, Revision)

## Schedule of lectures/Innovative sessions

<table>
<thead>
<tr>
<th>Topic</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forensic Medicine &amp; Toxicology</td>
<td>40</td>
</tr>
<tr>
<td>Introduction of Forensic Medicine</td>
<td>1</td>
</tr>
<tr>
<td>Definition, synonyms, historical aspects, modern Forensic Medicine, sub-division etc.</td>
<td></td>
</tr>
<tr>
<td>Courts and legal procedures</td>
<td>4</td>
</tr>
<tr>
<td>Courts and their powers, Inquest, types of evidence, Dying declaration, Types of witnesses, Recording of medical evidence, Doctor as witness</td>
<td></td>
</tr>
<tr>
<td>Ethical and legal aspects of medical practice</td>
<td>6</td>
</tr>
<tr>
<td>MCI and SMC - Functions, Duties and privileges, Medical Ethics</td>
<td></td>
</tr>
<tr>
<td>Infamous conduct, Medical negligence, Consent in medical practice</td>
<td></td>
</tr>
<tr>
<td>Doctor and Consumer Protection Act, Euthanasia</td>
<td></td>
</tr>
<tr>
<td>Personal identity</td>
<td>3</td>
</tr>
<tr>
<td>Factors for establishing identity, Determination of age and sex in the living and dead, Medicolegal importance of age, Forensic odontology DNA profiling</td>
<td></td>
</tr>
<tr>
<td>Forensic thanatology</td>
<td>6</td>
</tr>
<tr>
<td>Definition of death, moment of death, types of death - somatic and molecular Brainstem death &amp; organ transplantation, Suspended animation Sudden death, sudden infant death syndrome, Postmortem changes and estimation of time since death, Crime scene investigation</td>
<td></td>
</tr>
<tr>
<td>Medicolegal autopsy</td>
<td>2</td>
</tr>
<tr>
<td>Objectives – procedures - negative autopsy, Examination of skeletal remains Exhumation</td>
<td></td>
</tr>
<tr>
<td>Asphyxial deaths</td>
<td>3</td>
</tr>
<tr>
<td>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</td>
<td></td>
</tr>
<tr>
<td>Forensic traumatology</td>
<td>8</td>
</tr>
<tr>
<td>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</td>
<td></td>
</tr>
<tr>
<td>Human sexual function</td>
<td>3</td>
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<tr>
<td>Medicolegal considerations of virginity, sex offences and paraphilias, pregnancy, delivery, Medical Termination of Pregnancy Act - provisions – criminal abortion, impotence, sterility, artificial insemination, sterilisation, surrogacy</td>
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<td>Odallum, Castor, Strychnos nux vomica,</td>
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<td>and management of snake bite,</td>
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<td><strong>Barbiturates and Benzodiazepines</strong></td>
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<td>Heroin</td>
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<td>and hallucinogens</td>
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<td><strong>Integrated teaching</strong></td>
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<td>a. <strong>With Emergency Medicine</strong></td>
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<td>Identification of mechanical injuries,</td>
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<td>wound certification, ethical aspects</td>
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<td>of consent, examination of assault</td>
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<td>b. <strong>With Poison Control Centre</strong></td>
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<td>Toxicology - Clinical aspects</td>
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<td>c. **With Analytical Toxicology</td>
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<td>Laboratory**</td>
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<td>Toxicology - basic analytical aspects.</td>
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</table>
Seminars/Symposia  5
Ethics
   a. Euthanasia  1
Toxicology
   a. Plant poisons, chemicals and substance abuse 3
   b. Bites and stings 2

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

------------------------------------------------------------------------------------------------------------------

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

------------------------------------------------------------------------------------------------------------------

Assessment

Schedule of Internal assessment and University examinations

<table>
<thead>
<tr>
<th>First Internal Assessment</th>
<th>Second Internal Assessment</th>
<th>Final Internal Assessment</th>
<th>University Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last week of January 2019</td>
<td>Last week of July 2019</td>
<td>First week of December 2019</td>
<td>First week of January 2020</td>
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</tbody>
</table>

Distribution of marks for Internal assessments and University examinations

<table>
<thead>
<tr>
<th>University Examination</th>
<th>Internal Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory</td>
<td>Practical</td>
</tr>
<tr>
<td>40</td>
<td>30</td>
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</tbody>
</table>
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:

1. Age estimation and issuance of age certificate in the supplied proforma after perusing data/x-rays.
2. Issuing wound certificate in the supplied proforma after analyzing set of data &/or photographs.
3. Issuing drunkenness certificate in the supplied proforma after examination of a subject/data.
4. Problem solving exercise based on medicolegal autopsy report.
5. Problem solving exercise of a case of poisoning.
6. Medicolegal reporting on victim/ accused in sexual assault case in the supplied proforma after perusing data &/or photographs.
7. Identifying the weapon; analysis of injury and drafting a statement to be given to police
8. 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

1. Forensic Medicine and Toxicology – PC Ignatius
2. Forensic Medicine for Medicos – B Umadethan
3. Textbook of Forensic Medicine and Toxicology – VV Pillay
4. Modern Medical Toxicology – VV Pillay

Reference books

1. Taylor’s Principles & Practice of Medical Jurisprudence - Keith Simpson
2. Knight’s Forensic Pathology – Bernard Knight, Saukko P
3. Principles and Practice of Forensic Medicine – B Umadethan
4. Comprehensive Medical Toxicology – VV Pillay

Model Question Paper

Forensic Medicine & Toxicology

Time: 2 hrs Max marks: 40

Section A (20 marks)

Essay:

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. (2)
   b. Discuss the different types of hyoid fractures. (2)
   c. What is your opinion as to the cause of death in this case? Substantiate your opinion. (2)
Short Answers:

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:

9. 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 
   (2)
   b. Describe the investigations you will undertake in this case. 
   (2)
   c. Outline Antisnake Venom therapy in this case 
   (2)

Short Answers:

10. 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. 

(2)
11. Describe the procedure of administering activated charcoal. What are the contraindications for stomach wash?

\[ (1 + 1 = 2) \]

12. 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.

(2)

13. 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.

(2)

14. 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.

(2)

15. 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.

(2)
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 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 and Paediatrics. At the end of semester IX third professional (final) examination is held.

Total hours of lectures/practical/innovative sessions

<table>
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<tr>
<th>Subjects</th>
<th>Lectures</th>
<th>Practical/Clinical</th>
<th>Innovative sessions</th>
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<td>Otorhinolaryngology</td>
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<td>Orthopaedics</td>
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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

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<th>MCI Requirement</th>
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<td>Clinical Pathology</td>
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Ophthalmology

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.

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:

- Elicit a history pertinent to general health and ocular status.
- Assist in diagnostic procedures such as visual acuity testing, examination of eye, pupillary reflex, Schiotz tonometry, staining for corneal pathology, confrontation perimetry, subjective refraction including correction of presbyopia and aphakia, direct ophthalmoscopy and conjunctival smear examination and cover test, corneal sensations
- Diagnose and treat common problems affecting the eye
- Interpret ophthalmic signs in relation to common systemic disorders.
- Assist/observe therapeutic procedures such as subconjunctival injection, corneal conjunctival foreign body removal, carbolic cautery for corneal ulcers, naso lacrimal duct syringing and tarsorrhaphy
- Provide first aid in ophthalmic emergencies like ACG, Foreign body, Chemical burns, CRAO, CRVO, Trauma.
- Assist to organise community surveys for visual check up
- Assist to organise primary eye care service through primary health centers
- Use effective means of communication with the public and individual to motivate for cataract surgery and for eye donation
- Establish rapport with his seniors, colleagues and paramedical workers, so as to effectively function as a member of the eye care team.
Integration

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

<table>
<thead>
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<th>IV</th>
<th>VI</th>
<th>VII</th>
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<td>Lecture</td>
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<td>336</td>
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</table>

Schedule of Lectures

**BASICS**

- Anatomy
- Physiology include vit A Deficiency
- Embryology

**OPTICS**

- Elementary optics
- Refractive error
- Accommodation, presbyopia

**CONJUNCTIVA**

- Acute conjunctivitis
- Chronic conjunctivitis (Trachoma, spring catarrah)
- Degeneration & dry eye
- Assessment

**CORNEA**

- Introduction
- Microbial Keratitis
  - Bacterial
  - Fungal
  - Interstitial,
- Acanthamoeba Keratitis
- Viral keratitis
- Corneal degeneration, Dystrophies

**LENSES**

- Anatomy / Physiology
- Etiopathogenesis
- Senile cataract – stages, symptoms
GLAUCOMA

Introduction
Tonometry/ gonioscopy/ perimetry
Classification : POAG
PACG

Secondary

Therapeutics in glaucoma
Congenital glaucoma

INJURIES OF EYE

Introduction - classification/
concussion, perforation
Management

Chemical

chemical burns

ORBIT

Introduction – anatomy of orbit
Orbital cellulitis

Exophthalmos (Thyroid)

EYELID

Anatomy
Inflammation

Ptosis

Ectropion, Entropion
Assessment

SCLERA & EPISCLERA

Episcleritis, sclerites
Styphaloma

Congenital

UVEA

Introduction
Anterior uveitis (symptom, signs, sequelae)
Investigations & management

Uveitis in

special condition
Tuberculosis, HIV, Toxoplasma
Assessment

RETINA

Introduction
Diabetic retinopathy

Vascular

block & Hypertensive retinopathy
ARMD/ RP
RD/ Tumors
Tumors – Retinoblastoma, malignant melanoma
Assessment

OPTIC NERVE

Introduction
Pupillary reflexes – abnormalities

- Papilledema
- Optic neuritis
- Optic atrophy

**STRABISMUS**

- Introduction/ EOM anatomy
- Classification

Evaluation

- of squint
- Diplopia
- Treatment
- Assessment

**MISCELLANEOUS**

<table>
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<th>Section</th>
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<td>Ocular emergencies</td>
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<tr>
<td>Ocular manifestation of systemic diseases such as syphilis, Leprosy,</td>
<td>TB, AIDS,</td>
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<td>Herpes Sarcoidosis</td>
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<tr>
<td>Ocular therapeutics</td>
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<tr>
<td>Eye banking</td>
<td>1</td>
</tr>
<tr>
<td>Community Ophthalmology</td>
<td>1</td>
</tr>
<tr>
<td>Newer techniques in Ophthalmology</td>
<td>1</td>
</tr>
<tr>
<td>Ocular emergencies</td>
<td>1</td>
</tr>
</tbody>
</table>

**INSTRUMENTS**

Revision classes by each consultant

- **Clinical training**

<table>
<thead>
<tr>
<th>First 4 weeks</th>
<th>Second 4 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>History taking</td>
<td>Procedures (In VII semester)</td>
</tr>
<tr>
<td>Examination in VI semester</td>
<td>Instruments</td>
</tr>
<tr>
<td>Introduction to ocular diseases</td>
<td>Operating room posting</td>
</tr>
<tr>
<td></td>
<td>Clinical cases</td>
</tr>
</tbody>
</table>

Organic emergencies

- Ocular emergencies
- Ocular manifestation of systemic diseases such as syphilis, Leprosy,
- Herpes Sarcoidosis
- Ocular therapeutics
- Eye banking
- Community Ophthalmology
- Newer techniques in Ophthalmology
- Ocular emergencies

**Common topics to be covered for all medical subjects**

- 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

- **Second 4 weeks**
  - Procedures (In VII semester)
  - Instruments
  - Operating room posting
  - Clinical cases

******************************************************************************

**Clinical training**

- Topic presentations by the students: 1 hour per week; two or three students select a topic.
- Operative surgery:
  - Demonstration of procedures in the operation theatre and video demonstrations.
- Practical training:
  - Clinical postings in the outpatient, wards, operating theatre on all days by rotation.

******************************************************************************
**Assessment**

**Schedule of Internal assessment and University examinations**

<table>
<thead>
<tr>
<th>First Internal assessment</th>
<th>Final Internal assessment</th>
<th>University examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last week of July 2019</td>
<td>First week of December 2019</td>
<td>First week of January 2020</td>
</tr>
</tbody>
</table>

**Distribution of marks for Internal assessment and University examinations**

<table>
<thead>
<tr>
<th>University examination</th>
<th>Internal assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theory</strong></td>
<td><strong>Practical</strong></td>
</tr>
<tr>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td><strong>Theory</strong></td>
<td><strong>Practical</strong></td>
</tr>
<tr>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

**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 19th edition)
Otorhinolaryngology

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.

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 speciality as a career

Teaching schedule

<table>
<thead>
<tr>
<th>Lectures/Practicals/ Innovative sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester</td>
</tr>
<tr>
<td>Hours</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical Posting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semesters</td>
</tr>
<tr>
<td>Weeks</td>
</tr>
</tbody>
</table>
Teaching hours

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Practical/Clinical</th>
<th>Innovative sessions</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>192</td>
<td>48</td>
<td>280</td>
</tr>
</tbody>
</table>

SCHEDULE OF LECTURES

As per the latest MCI requirement, the number of didactic lectures has been increased to 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
22. Tracheostomy – Indications, procedure and complications

**Ear**

23. Anatomy of ear
   a) External
   b) Middle
   b) Inner

24. Physiology of ear
   a) Middle ear
   b) Inner ear

25. Symptamatology 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) Presbyacusis
   i) Ototoxicity

31. Audiology I
   a) Basic principles of audiology
   b) PTA
   c) Tympanogram

32. Audiology II
   a) Hearing assessment in children
   b) Hearing aids and Cochlear implant

33. Vertigo
   a) Causes
   b) Investigations and Management

34. Radiology in ENT

35. Instruments in ENT

36 - 39. Common case presentation (Seminar or Flipped classroom)

40. 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 am:** 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

<table>
<thead>
<tr>
<th>Topic</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Anatomy of ear nose and throat</td>
<td>Anatomy</td>
</tr>
<tr>
<td>2. Physiology of hearing and balance, olfaction and phonation</td>
<td>Physiology</td>
</tr>
</tbody>
</table>

Schedule of Internal assessment and University examinations

<table>
<thead>
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<tr>
<td>Last week of July 2019</td>
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</tbody>
</table>

Distribution of marks for Internal assessment and University examinations

<table>
<thead>
<tr>
<th>University examination</th>
<th>Internal assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory 40</td>
<td>Practical 30</td>
</tr>
<tr>
<td></td>
<td>Viva voce 10</td>
</tr>
<tr>
<td>Total 80</td>
<td>Theory 10</td>
</tr>
<tr>
<td></td>
<td>Practical 10</td>
</tr>
<tr>
<td></td>
<td>Total 20</td>
</tr>
</tbody>
</table>

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. *(detailed plan sent separately)*

**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
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 undergraduate students in Medicine is to have knowledge, skills and behavioural attributes to function effectively as the first contact physician.

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 contraindications.
- 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 bedside investigative procedures like pleural/peritoneal tap, lumbar puncture, bone marrow aspiration/biopsy and liver biopsy

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”.

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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**

<table>
<thead>
<tr>
<th>Semester</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
<th>IX</th>
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</thead>
<tbody>
<tr>
<td>Hours</td>
<td>24</td>
<td>24</td>
<td>16</td>
<td>48</td>
<td>32</td>
<td>96</td>
<td>64</td>
<td>304</td>
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</table>

### Clinical posting

<table>
<thead>
<tr>
<th>Semester</th>
<th>III</th>
<th>V</th>
<th>VI</th>
<th>VIII</th>
<th>IX</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weeks</td>
<td>8</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>4</td>
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</table>

### Teaching hours

<table>
<thead>
<tr>
<th></th>
<th>Lecture</th>
<th>Practical/Clinical</th>
<th>Innovative sessions</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>100</td>
<td>624</td>
<td>204</td>
<td>928</td>
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</tbody>
</table>

### Schedule of lectures

**Topic**

**Nutrition, exposure to chemical and physical agents**

- Obesity
- Vitamin deficiency and excess
- Fluid and electrolyte balance, acidosis, alkalosis
- Common poisonings
- Snake bite, insect stings
- Disturbance of temperature
- Drowning, electrical injury, radiation hazards

**Infections**

- Enteric fever
- Cholera, gastroenteritis, food poisoning
- Influenza, other respiratory viral diseases
- Rabies
- Tetanus
- Herpes simplex, zoster, chicken pox
Amoebiasis 1
Helminthic infections and filariasis 2
Malaria 2
Leptospirosis 1
Common fungal infections 1
Common exanthem 1
Tuberculosis 2
Leprosy 1
HIV, AIDS 2
Syphilis 1
Dengue fever 1
Chikungunya 1
Toxoplasmosis 1
Kala Azar 1
Hydatid Disease / Cysticercosis 1
Rickettsial Infections - Scrub typhus 1
Brucellosis/Melioidosis 1

Haematology 8
Red cell disorders (nutritional deficiency anemias to be emphasised) 2
Bleeding disorders, Disseminated Intravascular Coagulation, Platelet Disorders 2
Leukemias, leukopenia 2
Lymphoma, myeloma 2

Respiratory system 15
Respiratory physiology, respiratory function test 1
Upper and lower respiratory tract infection 1
Pneumonia 2
Bronchiectasis, lung abscess 1
Bronchial asthma, tropical eosinophilia 2
COPD, cor pulmonale 2
Respiratory failure 1
Non cardiogenic pulmonary oedema / ARDS 1
Pleural diseases 2
Occupational lung diseases 1
Smoking and diseases 1
Diseases of Mediastinum 1
Bronchogenic Carcinoma 1

Cardio vascular disease 18
Dislipidemia, atherosclerosis 1
Coronary artery disease 1
Rheumatic fever and RHD 3
Infective endocarditis 1
Systemic hypertension, hypertensive emergencies 2
Cardiac failure, acute pulmonary oedema 2
Congenital heart disease 2
Rhythm disturbances 1
Conduction disturbances 1
Pericardial diseases 1
Cardio myopathy 1
Peripheral vascular disease 1
Pulmonary embolism-pulmonary infarction 1

Myocardial Infarction 1
Valvular Diseases 1
ECG - Normal - Common abnormalities(VIII semester-2 classes) 1

Gastro intestinal disease 8
Acid peptic disease – GERD, gastric ulcer, duodenal ulcer 1
<table>
<thead>
<tr>
<th>Category</th>
<th>Subcategories</th>
<th>Count</th>
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<tbody>
<tr>
<td>Mal absorption syndrome</td>
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<tr>
<td>Irritable bowel disease, colitis, inflammatory bowel disease</td>
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</tr>
<tr>
<td>Hepatitis – virus + drug induced, Cirrhosis of the Liver</td>
<td></td>
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<tr>
<td>Alcohol Abuse, Constipation</td>
<td></td>
<td>2</td>
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<tr>
<td>Abdominal tuberculosis</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Pancreatic diseases</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Gall bladder disease</td>
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<tr>
<td>Gastrointestinal disease</td>
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</tr>
<tr>
<td>Acid peptic disease – GERD, gastric ulcer, duodenal ulcer</td>
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<tr>
<td>Mal absorption syndrome</td>
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<tr>
<td>Irritable bowel disease, colitis, inflammatory bowel disease</td>
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<tr>
<td>Hepatitis – virus + drug induced, Cirrhosis of the Liver</td>
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<td>Alcohol Abuse, Constipation</td>
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<tr>
<td>Abdominal tuberculosis</td>
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<tr>
<td>Pancreatic diseases</td>
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<td>Gall bladder disease</td>
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<tr>
<td>Neurological diseases</td>
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<tr>
<td>Cerebrovascular disease (TIA, Stroke, SAH, SDH)</td>
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</tr>
<tr>
<td>Meningitis (pyogenic/Tubercular/Viral)</td>
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<tr>
<td>Epilepsy, status epilepticus</td>
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<tr>
<td>Peripheral neuropathy</td>
<td></td>
<td>1</td>
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<tr>
<td>Demyelination, GBS</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Extra pyramidal disease</td>
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<td>2</td>
</tr>
<tr>
<td>Spinal cord disease</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Motor neuron disease, polio, myasthenia gravis</td>
<td></td>
<td>2</td>
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<tr>
<td>Intra cranial space occupying lesion</td>
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<tr>
<td>Diagnosis and management of comatose patient</td>
<td></td>
<td>2</td>
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<tr>
<td>Cranial nerve disorders</td>
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<tr>
<td>Cerebellar disorders</td>
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<tr>
<td>Dementias</td>
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<td>Renal medicine</td>
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<tr>
<td>Acute renal failure</td>
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<tr>
<td>Chronic renal failure</td>
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</tr>
<tr>
<td>Glomerular disease – AGN</td>
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<td>1</td>
</tr>
<tr>
<td>Nephrotic syndrome</td>
<td></td>
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</tr>
<tr>
<td>Urinary tract infection</td>
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<tr>
<td>Connective tissue disease</td>
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<tr>
<td>Rheumatoid disease</td>
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<td>3</td>
</tr>
<tr>
<td>Collagen vascular disease – SLE in detail</td>
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<td>2</td>
</tr>
<tr>
<td>Degenerative joint disease, cervical spondylosis</td>
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<td>1</td>
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<tr>
<td>Endocrine disease</td>
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<td>12</td>
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<tr>
<td>Diabetes mellitus</td>
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<td>5</td>
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<tr>
<td>Thyroid disease</td>
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<td>2</td>
</tr>
<tr>
<td>Pituitary disorders</td>
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</tr>
<tr>
<td>Adrenal disorders</td>
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<td>2</td>
</tr>
<tr>
<td>Gonadal disorders</td>
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<td>1</td>
</tr>
<tr>
<td>Menopausal syndrome</td>
<td></td>
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</tr>
<tr>
<td>Geriatrics</td>
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</tr>
<tr>
<td>Care of the elderly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Therapeutics</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>
Cancer chemotherapy 1
Blood transfusion and blood component therapy 1
Anti coagulant therapy 1

**General topics**

- Principles of palliative care, care of the dying 1
- Art of communication 1
- ABC of medical research and methodology 1
- Principles of medical ethics 1

**Dermatology**

- Urticaria 1
- Psoriasis 1
- Dermatomycosis 1
- Scabies 1
- Skin in systemic disease 1

**Schedule of Clinical/practical**

**Clinical posting**

- **8.00 - 9.00am:** Symposia / group discussions: (basic science topics in preclinical and para clinical subjects)
- **9.00 – 10.30 am:** 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**

<table>
<thead>
<tr>
<th>Topics</th>
<th>Hour</th>
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</thead>
<tbody>
<tr>
<td>Pallor, bleeding disorders</td>
<td>1</td>
</tr>
<tr>
<td>Enlargement of lymphnodes and hepatosplenomegaly</td>
<td>1</td>
</tr>
<tr>
<td>Anorexia, nausea, vomiting</td>
<td>1</td>
</tr>
<tr>
<td>Jaundice, hepatosplenomegalyHaematemesis, malena</td>
<td>1</td>
</tr>
<tr>
<td>Ascites</td>
<td>1</td>
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<tr>
<td>Coma</td>
<td>1</td>
</tr>
<tr>
<td>Dyspnoea, cough, hemoptysis, cyanosis</td>
<td>1</td>
</tr>
<tr>
<td>Chest Pain</td>
<td>1</td>
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<tr>
<td>Headache</td>
<td>1</td>
</tr>
<tr>
<td>Seizures and syncope, vertigo</td>
<td>1</td>
</tr>
<tr>
<td>Topics</td>
<td>Department</td>
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<td>--------------------------------------------</td>
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<tr>
<td>Weight loss, weight gain</td>
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<tr>
<td>Generalised and localised oedema</td>
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<tr>
<td>Joint disorders</td>
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<tr>
<td>Mitral valve disease</td>
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<tr>
<td>Aortic valve disease</td>
<td></td>
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<tr>
<td>Congenital heart disease</td>
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<tr>
<td>Congestive cardiac failure</td>
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<tr>
<td>Fibro Cavitary Lesions</td>
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<tr>
<td>Bronchogenic carcinoma</td>
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<tr>
<td>Pneumonia</td>
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<tr>
<td>Pleural effusion</td>
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<tr>
<td>Pneumothorax</td>
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<tr>
<td>Evaluation of renal function</td>
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<tr>
<td>Shock, anaphylaxis</td>
<td></td>
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<tr>
<td>Hemiplegia</td>
<td></td>
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<tr>
<td>Paraplegia and quadriplegia</td>
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<tr>
<td>Involuntary movements</td>
<td></td>
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<tr>
<td>Cerebellar disorders</td>
<td></td>
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<tr>
<td>Second cranial nerve – visual pathways</td>
<td></td>
</tr>
<tr>
<td>3, 4, 6 cranial nerves</td>
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<tr>
<td>7th cranial nerve</td>
<td></td>
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<tr>
<td>9th 10th cranial Nerve / Examination / Clinical Importance</td>
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</table>

**Integrated teaching session - vertical and horizontal**

<table>
<thead>
<tr>
<th>Topics</th>
<th>Department</th>
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</thead>
<tbody>
<tr>
<td>Genetics in clinical medicine</td>
<td>Anatomy, Biochemistry</td>
</tr>
<tr>
<td>Alcoholism</td>
<td>Psychiatry / Pharmacology/</td>
</tr>
<tr>
<td>Pathology</td>
<td></td>
</tr>
<tr>
<td>Common gram positive / negative infections</td>
<td>Microbiology / Pathology</td>
</tr>
<tr>
<td>PUO</td>
<td>Microbiology/ Pathology /</td>
</tr>
<tr>
<td>Pharmacology</td>
<td></td>
</tr>
<tr>
<td>Sepsis syndrome</td>
<td>Microbiology/ Pathology /</td>
</tr>
<tr>
<td>Pharmacology</td>
<td></td>
</tr>
<tr>
<td>Pulmonary tuberculosis</td>
<td>Microbiology / Pathology /</td>
</tr>
<tr>
<td>Pharmacology</td>
<td></td>
</tr>
<tr>
<td>Lung neoplasm</td>
<td>Pathology/Radiotherapy/</td>
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<tr>
<td>Pharmacology</td>
<td></td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>Anatomy / Biochemistry /</td>
</tr>
<tr>
<td>Pathology</td>
<td></td>
</tr>
<tr>
<td>Cardiac arrest – CPR</td>
<td>Anaesthesiology</td>
</tr>
<tr>
<td>Cirrhosis of liver</td>
<td>Physiology / Biochemistry /</td>
</tr>
<tr>
<td>Pathology</td>
<td></td>
</tr>
<tr>
<td>Diabetic keto acidosis / hypoglycemia</td>
<td>Biochemistry / Physiology</td>
</tr>
<tr>
<td>Severe asthma</td>
<td>Biochemistry / Physiology</td>
</tr>
<tr>
<td>Oxygen therapy, assisted ventilation</td>
<td>Anaesthesiology</td>
</tr>
</tbody>
</table>
Upper GI bleed GastroEnterology
Hepatic encephalopathy Biochemistry / Physiology
Cerebro vascular disease (3 hours) Anatomy
Renal replacement therapy Nephrology
Calcium Phosphorous metabolism, parathyroid disorders Biochemistry / Physiology
Antibiotic therapy (detailed discussion – 4 hours) Pharmacology

Assessment

Schedule of Internal assessment and University examinations

<table>
<thead>
<tr>
<th>First Internal assessment</th>
<th>Second Internal assessment</th>
<th>Third Internal assessment</th>
<th>Final Internal assessment</th>
<th>University examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last week of January 2018</td>
<td>Last week of July 2019</td>
<td>Last week of July 2020</td>
<td>First week of December 2020</td>
<td>First week of January 2021</td>
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Distribution of marks for Internal assessment and University examinations

<table>
<thead>
<tr>
<th>University examination</th>
<th>Internal assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory I</td>
<td>60</td>
</tr>
<tr>
<td>Theory II</td>
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<tr>
<td>Practical</td>
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<tr>
<td>Viva voce</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>240</td>
</tr>
<tr>
<td>Theory</td>
<td>30</td>
</tr>
<tr>
<td>Practical</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
</tr>
</tbody>
</table>

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, radio – diagnosis, basic sciences as applied medicine, genetics, immunology, rheumatology, tropical diseases, nutrition, poisoning, toxicology
Paper 2 – CVS, GIT, nephrology, CNS, endocrinology, haematology

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)

Text books recommended

Prescribed text books
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
Psychiatry and Behaviour Medicine

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, neuropsychiatric 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

<table>
<thead>
<tr>
<th>Semester</th>
<th>VI</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hour</td>
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<td>24</td>
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Clinical Posting

<table>
<thead>
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<th>Semester</th>
<th>V</th>
<th>VI</th>
<th>Total</th>
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<tbody>
<tr>
<td>Weeks</td>
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<td>2</td>
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Teaching hours

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Practical/Clinical</th>
<th>Innovative sessions</th>
<th>Total</th>
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<tbody>
<tr>
<td>8</td>
<td>140</td>
<td>16</td>
<td>164</td>
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</tbody>
</table>

Schedule of lectures

Topics

- Science of the mind – psychology – sociology 1
- Emotions and their influence in health 1
- Influence of society and culture in health 1
- Importance of study of the mind for the practice of medicine 1
- Symptoms and signs of mental illnesses 2
- Diagnosis and nosology of mental disorders 1
- Organic psychiatric disorders 2
- Psychoses 2
- Neuroses 1
- Personality disorders 1
- Alcohol & other substances of abuse 2
- Childhood psychiatric disorders 1
- Psychiatric disorders of old age 1
- Treatment - approaches & principles in psychiatry 2
- Psychiatry in India 1
- Suicide and social psychiatry 1
- Mind, spirituality and medicine 1

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 session and 12 hrs in VI session. 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:

- With Bio Chemistry: Neuro chemistry of the human behaviour 2
- With Physiology / Anatomy: Limbic lobe functioning and human behaviour 2
- With Pharmacology: Psychopharmacology-therapeutics aspects 4
- With Community Medicine: Epidemiology of mental disorders
  - National mental health programme

Child and women mental health:

- Psycho - social rehabilitation 4
- Mental Health Act’ 87
- Persons’ with disability Act
- Crime and mental illness
Outline of psychiatric criminology  3

With Internal Medicine: Organic psychiatric disorders
Dementia, delirium,
Epileptic psychosis etc.
Alcohol & drug abuse
Psychosomatic disorders general-principles
Sexuality and behaviour  5

With Obstetrics & Gynecology: Psychological disorders of women  2
With Pediatrics: Psychological development
Behaviour disorders of children  4

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

Text books recommended:

1. Clinical Examination in Medicine - Prof. K.V.Krishna Das
2. Text Book of Medicine - Prof. K.V.Krishna Das

Reference book:

1. Psychological Medicine - Curran & Patridge, Morgan & king
2. Oxford Text Book of Psychiatry
3. Synopsis of Psychiatry
Dermatology and Sexually Transmitted Diseases

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/uneusual manifestations of common diseases, to the specialist.

Objectives
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

<table>
<thead>
<tr>
<th>Lectures/Practicals/Innovative sessions</th>
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<tbody>
<tr>
<td>Semester</td>
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<td>Hours</td>
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Clinical posting

<table>
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<tr>
<th>Clinical posting</th>
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</thead>
<tbody>
<tr>
<td>Semester</td>
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<tr>
<td>Weeks</td>
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</table>

Teaching Hours

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<tr>
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<th>Innovative sessions</th>
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<tr>
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**Schedule of lecture**

<table>
<thead>
<tr>
<th>Topic</th>
<th>14 hrs</th>
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<tbody>
<tr>
<td>Basics of dermatology - including structure and functions of the skin and dermatological case taking</td>
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<tr>
<td>Infections - bacterial, fungal, viral, and parasitic</td>
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<tr>
<td>Eczemas</td>
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<tr>
<td>Papulosquamous diseases - including psoriasis and lichen planus</td>
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<tr>
<td>Hair and Nail disorders</td>
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<tr>
<td>Leprosy</td>
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<tr>
<td>Urticaria and drug reactions</td>
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<tr>
<td>Bullous dermatosis</td>
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<tr>
<td>Nevi and cutaneous malignancies</td>
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<tr>
<td>Connective tissue disorders and skin</td>
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<tr>
<td>Topical therapeutics</td>
<td></td>
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<tr>
<td>STDs and HIV</td>
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<tr>
<td>Cosmetic dermatology and dermatosurgery</td>
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<tr>
<td>Procedures like UV Therapy &amp; Newer types of laser procedures for dermatological indications</td>
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**Symposia, Seminars**  

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<thead>
<tr>
<th>14 hrs</th>
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Radio-diagnosis & Imaging

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, gastrointestinal 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 *

<table>
<thead>
<tr>
<th>Lecture/Practicals/Innovative sessions</th>
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</thead>
<tbody>
<tr>
<td>Semester</td>
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<tr>
<td>Hours</td>
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</table>

Clinical posting

| Semester | V | Total |
| Weeks | 2 (One week each in Radiology & Rad. oncology) | 2 |

Teaching hours

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Practicals/Clinical</th>
<th>Innovative sessions</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>8</td>
<td>48</td>
<td>16</td>
<td>72</td>
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</tbody>
</table>

Includes teaching of Radiotherapy.

Schedule of lectures

14 hours

- Commonly performed skeletal radiography, various types of locations, infections, tumours, metabolic bone disease, joint (Infections, Immunological metabolic condition)
- Normal chest, various lung parenchymal pathologies, congenital and acquired cardiac conditions, pneumothorax, pleural effusion, mediastinal masses.
- Upper GI examination, lesions of oesophagus, stomach and duodenum – small bowel diseases, various colonic pathologies.
- Ultrasound examination, contrast studies, CT, MRI
- Plain film, ultrasound examination, contrast studies, IVU, urethrogram and CT and emergencies.
- Radiological manifestations of infarcts, haemorrhage, tumours inflammations in brain and spine and emergencies.
- Common IR procedures and their role in clinical practice.
- Mammography, Imaging of the foetus and pregnant imaging gynecologic diseases and emergencies.
Radiation Therapy And Medical Oncology

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.

Schedule of lectures

Topics
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
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

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.

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

<table>
<thead>
<tr>
<th>Semester</th>
<th>VI</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours</td>
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<td>24</td>
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Clinical posting

<table>
<thead>
<tr>
<th>Semester</th>
<th>IV</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weeks</td>
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<td>2</td>
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<table>
<thead>
<tr>
<th>Lectures</th>
<th>Practicals/Clinical</th>
<th>Innovative sessions</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>48</td>
<td>16</td>
<td>72</td>
</tr>
</tbody>
</table>
# Schedule of lectures/Innovative sessions

<table>
<thead>
<tr>
<th>Topics</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory physiology, respiratory function test</td>
<td>1</td>
</tr>
<tr>
<td>Obstructive or sleep apnoea</td>
<td>1</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>1</td>
</tr>
<tr>
<td>Bronchiectasis, lung abscess</td>
<td>1</td>
</tr>
<tr>
<td>Bronchial asthma, Eosinophilic Pneumonia</td>
<td>2</td>
</tr>
<tr>
<td>COPD, cor pulmonale</td>
<td>2</td>
</tr>
<tr>
<td>Respiratory failure</td>
<td>1</td>
</tr>
<tr>
<td>Text book of Pulmonary Medicine - Dr. D Behra</td>
<td></td>
</tr>
<tr>
<td>Tuberculosis - 2nd Edition - S.K. Sharma/ Alladi Mohan</td>
<td></td>
</tr>
<tr>
<td>Non cardiogenic pulmonary oedema / ARDS</td>
<td>1</td>
</tr>
<tr>
<td>Pleural diseases</td>
<td>2</td>
</tr>
<tr>
<td>Occupational lung diseases, Interstitial lung disease</td>
<td>1</td>
</tr>
<tr>
<td>Smoking and diseases</td>
<td>1</td>
</tr>
<tr>
<td>Investigative modalities in pulmonology</td>
<td>1</td>
</tr>
<tr>
<td>Pulmonary tuberculosis</td>
<td>1</td>
</tr>
<tr>
<td>Extra pulmonary tuberculosis - RNTCP</td>
<td>1</td>
</tr>
<tr>
<td>Pulmonary manifestation of systemic diseases</td>
<td>1</td>
</tr>
<tr>
<td>Pulmonary Vasculitis, Pulmonary thrombo embolism</td>
<td>1</td>
</tr>
</tbody>
</table>

**Reference books recommended**

Respiratory Diseases - Crofton (5th.ed.)
Manual of Clinical Problems in Pulmonary Medicine- Bordow (5th.ed.)
General Surgery

Goal
The broad goal of teaching undergraduate students in Surgery is to produce graduates capable of delivering efficient first contact surgical care.

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
At the end of the course, the student should be able 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, septicaemic 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.

In addition to the skills referred above, he shall have observed/assisted/performated 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
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

<table>
<thead>
<tr>
<th>Semester</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
<th>IX</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Hours</td>
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<td>24</td>
<td>16</td>
<td>48</td>
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Clinical Posting *

<table>
<thead>
<tr>
<th>Semester</th>
<th>III</th>
<th>V</th>
<th>VI</th>
<th>VIII</th>
<th>IX</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours</td>
<td>8</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>26</td>
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</table>

* This includes posting in anaesthesiology and Casualty

Teaching hours – General surgery

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Practical/Clinical</th>
<th>Innovative session</th>
<th>Total</th>
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<tbody>
<tr>
<td>100</td>
<td>624</td>
<td>204</td>
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</table>


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.

Schedule of lectures / Integrated teaching

Topics
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.

**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 pediatric 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.

**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
Congential heart disease Coronary artery diseases. Valvular lesions affecting the heart.
Chins 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.

Practical training
Clinical posting in the wards on all days Clerkship on admission days.

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

<table>
<thead>
<tr>
<th>Assessment</th>
<th>First Internal assessment</th>
<th>Second Internal assessment</th>
<th>Third Internal assessment</th>
<th>Final Internal assessment</th>
<th>University examination</th>
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</thead>
<tbody>
<tr>
<td>Log books</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Theory examination</td>
<td></td>
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</tr>
<tr>
<td>Practical</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viva voce</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Total</td>
<td></td>
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</tr>
</tbody>
</table>

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
Orthopaedics
(Including Physical Medicine)

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.

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 :
- 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.
- Use techniques of splinting, plaster, immobilization etc.;
- Manage common bone infections, learn indications for amputations and corrective measures for bone deformities.;
- Advise aspects of rehabilitation for polio, cerebral palsy and amputation.

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 be done.

Teaching schedule

Lectures/ Practicals/ Innovative sessions

<table>
<thead>
<tr>
<th>Semester</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
<th>IX</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours</td>
<td>24</td>
<td>16</td>
<td>36</td>
<td>32</td>
<td>108</td>
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</table>

Clinical Postings

<table>
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<tr>
<th>Semester</th>
<th>IV</th>
<th>VII</th>
<th>IX</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Weeks</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>10</td>
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</table>

* Includes Posting in Physical Medicine & Rehabilitation for 1 week

Teaching hours

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Practical/ clinical</th>
<th>Innovative session</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>2400</td>
<td>72</td>
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## Schedule of lectures

<table>
<thead>
<tr>
<th>Topic</th>
<th>Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traumatology</strong></td>
<td>15</td>
</tr>
<tr>
<td>1. Definition of a fracture and types of fracture and general principles of management</td>
<td>1</td>
</tr>
<tr>
<td>2. Complications of fracture – open fractures and pathological fracture, external fixation</td>
<td>1</td>
</tr>
<tr>
<td>3. Fracture clavicle, fracture neck of humerus and shoulder dislocation</td>
<td>1</td>
</tr>
<tr>
<td>4. Fracture humerus shaft and supra condylar fracture/condylar fracture</td>
<td>1</td>
</tr>
<tr>
<td>5. Elbow dislocation and forearm fracture</td>
<td>1</td>
</tr>
<tr>
<td>6. Monteggia fracture and gallezi fracture</td>
<td>1</td>
</tr>
<tr>
<td>7. Colle’s fracture and fracture scaphoid</td>
<td>1</td>
</tr>
<tr>
<td>8. Tendon injuries and hand injuries</td>
<td>1</td>
</tr>
<tr>
<td>9. Fracture spine and traumatic paraplegia</td>
<td>1</td>
</tr>
<tr>
<td>10. Fracture pelvis and hip fracture – fracture neck of femur</td>
<td>1</td>
</tr>
<tr>
<td>11. Hip dislocation and fracture shaft of femur</td>
<td>1</td>
</tr>
<tr>
<td>12. Condylar fracture femur and tibia</td>
<td>1</td>
</tr>
<tr>
<td>13. Meniscus tear and fracture patella</td>
<td>1</td>
</tr>
<tr>
<td>14. Leg fracture</td>
<td>1</td>
</tr>
<tr>
<td>15. Ankle injuries – Pott’s fracture</td>
<td>1</td>
</tr>
<tr>
<td>16. Fracture Calcaneum and fracture Talus</td>
<td>1</td>
</tr>
<tr>
<td><strong>Cold Orthopaedics</strong></td>
<td>15</td>
</tr>
<tr>
<td>1. C.T.E.V. and flat Foot</td>
<td>1</td>
</tr>
<tr>
<td>2. C.D.H.</td>
<td>1</td>
</tr>
<tr>
<td>3. Torticollis, congenital pseudoarthrosis of Ttbia and arthrogryposis multiplex congenita</td>
<td>1</td>
</tr>
<tr>
<td>4. Osteomyelitis</td>
<td>1</td>
</tr>
<tr>
<td>5. Septic arthritis</td>
<td>1</td>
</tr>
<tr>
<td>6. Tuberculosis – spine, hip, knee, elbow, wrist and other sites</td>
<td>1</td>
</tr>
<tr>
<td>7. AVN Head Femur</td>
<td>1</td>
</tr>
<tr>
<td>8. Introduction to Ilizarov/arthroscopy/arthroplasty</td>
<td>2</td>
</tr>
<tr>
<td>9. Perthe’s and SCFE</td>
<td>1</td>
</tr>
<tr>
<td>10. Rickets and osteomalacia</td>
<td>1</td>
</tr>
<tr>
<td>11. Rheumatoid arthritis and ankylosing spondylitis</td>
<td>1</td>
</tr>
<tr>
<td>12. IVDP and Kyphosis</td>
<td>1</td>
</tr>
<tr>
<td>13. Scoliosis and spondylolisthesis</td>
<td>1</td>
</tr>
<tr>
<td>14. Bone tumour, osteochondroma, simple bone cyst,</td>
<td>1</td>
</tr>
<tr>
<td>15. ABC, enchodroma, GCT, Ewing’s Tumour</td>
<td>1</td>
</tr>
<tr>
<td>16. Osteosarcoma, multiple myeloma, metastatic bone diseases and chondrosarcoma</td>
<td>2</td>
</tr>
<tr>
<td>17. Osteogenesis, imperfecta nerve injuries – radial/ulnar nerves</td>
<td>2</td>
</tr>
<tr>
<td>Sciatic/brachial plexus, osteoarthritis of hip and knee.</td>
<td>2</td>
</tr>
</tbody>
</table>

**Seminars / Symposia**
Symposium with clinical cases – Trauma

**Schedule of practicals / Clinical Posting**

**Text books recommended**
Crawford Adam’s – Operative techniques (Orthopaedics)

**Reference Book**
Campbell’s operative orthopaedics
Physical Medicine and Rehabilitation

Schedule of lectures / Innovative sessions

1. Introduction to Physical Medicine and Rehabilitation
2. Concepts of impairment, disability, handicap and the rehabilitation team
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
    To get oriented to basic principles of community based rehabilitation of people with disabilities.

Text book recommended

Physical Medicine and Rehabilitation—Randall and Braddom
Anaesthesiology

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

<table>
<thead>
<tr>
<th>Semester</th>
<th>VI</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours</td>
<td>24</td>
<td>24</td>
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Teaching hours

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Practical’s</th>
<th>Innovative sessions</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>48</td>
<td>16</td>
<td>72</td>
</tr>
</tbody>
</table>

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

New Innovative Methods

1. Ultrasound guided vascular access
2. Ultrasound guided regional nerve block

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)

Goal
The broad goal of teaching undergraduate students in Obstetrics and Gynaecology is that they shall acquire understanding of anatomy, physiology and pathophysiology of the reproductive system and gain the ability to optimally manage common conditions affecting it.

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, pre-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, vacuum aspiration for Medical Termination of Pregnancy (MTP).

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

- Examine a pregnant woman; recognize high risk pregnancies and make appropriate referrals.
- Conduct a normal delivery, recognize 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.
- Make a vaginal cytology smear, perform a postcoital test and wet vaginal smear examination for Trichomonas vaginalis, moniliasis and gram stain for gonorrhoea.
- Interpretation of data of investigations like biochemical, histopathological, radiological, ultrasound etc.
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 coordination 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:
   (a) 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.
   (b) 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.

Schedule of lectures

<table>
<thead>
<tr>
<th>Lectures/Practical/Innovative sessions</th>
<th>Semester VI</th>
<th>VII</th>
<th>VIII</th>
<th>Total</th>
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<tbody>
<tr>
<td>Hours</td>
<td>48</td>
<td>32</td>
<td>120</td>
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Clinical Posting

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<th>VI</th>
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Teaching hours

<table>
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<th>Innovative sessions</th>
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<tr>
<td>90</td>
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Schedule of lectures

<table>
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<tr>
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<tbody>
<tr>
<td>Obstetrics</td>
<td>49</td>
</tr>
<tr>
<td>Applied anatomy</td>
<td></td>
</tr>
<tr>
<td>pelvis, foetus in normal pregnancy, foetal circulation</td>
<td>1</td>
</tr>
<tr>
<td>Physiology of pregnancy</td>
<td></td>
</tr>
<tr>
<td>maternal changes-anatomical, physiological and endocrinological</td>
<td>1</td>
</tr>
<tr>
<td>diagnosis and differential diagnosis of pregnancy, antenatal care</td>
<td>1</td>
</tr>
<tr>
<td>Physiology of labour</td>
<td></td>
</tr>
<tr>
<td>stage of labour, mechanism of normal labour, conduct of normal labour</td>
<td>1</td>
</tr>
<tr>
<td>Physiology of puerperium</td>
<td></td>
</tr>
</tbody>
</table>

151
normal puerperium, care of pureperium
New born
care
lactation
Pathology of pregnancy
I trimester: hyperemesis, abortion, vesicular mole, Ectopic, antepartum haemorrhage, preterm labour, PROM,
Hypertensive disorders of pregnancy
Medical diseases
heart disease, anaemia, diabetes, UTI, hepatitics, TB-c chest disease, infections, HIV,
Pathology of labour
dystocia malpresentations + malposition, multiple pregnancy + hydramnios, dysfunctonal labour dystocia due to abnormalities of maternal soft parts, foetal causes – tumours complicating pregnancy, contracted pelvis, CPD –obstructed labour.
III stage complications
PPH, retained placenta, inversion of uterus, postpartum collapse injuries to parturient canal –rupture uterus, tears
Puerperium
puerperal infections, CVT, DVT
Special Cases
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
caesarean section, episiotomy, destructive operation, manual removal of Placenta.
Neonatology, congential malformations
Drugs in pregnancy –oxytocin, obstetric analgesia
Induction of labour
USG in obstetrics.

Gynaecology
Applied anatomy
Development-developmental anomalies
Physiology
Menstrual disorders –DUB , amenorrhoea
Puberty – problems of
Menopause – Hormone replacement therapy (HRT)
Disease of vulva and vagina
PID
Endometriosis
Infertility
Contraception
Diseases of uterus
Diseases of cervix
Diseases of ovary
Hormones, hormone replacement therapy
Radiation chemotherapy, preventive gynaecology
Adolescent problems
Endoscopy (laparoscopy , hysteroscopy, culdoscopy)

Family planning
MTP
Sterilization
Contraception.

************************************************************
Schedule of practicals

Details of practicals /clinical
Total Hours 576 ‘!’ 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
10.30-12.00 -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, 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 dysfunctional 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.

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 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,1st Trimester complication in pregnancy, Heart disease in pregnancy, IUGR in obstetrics,Gestational & overt diabetiese 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 DUB, 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 in menopausal patients, Adolescent gynaecological problems

Family planning
Contraceptive methods – obstetrics temporary & permanent, Medical termination of pregnancy-1st Trimesters, 

**Integrated teaching sessions (vertical/ horizontal)**

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<thead>
<tr>
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<tbody>
<tr>
<td>Lymphatic drainage of female genital tract in relation to pelvic malignancy</td>
<td>Anatomy</td>
</tr>
<tr>
<td>Embryology of genital tract and developmental anomalies with clinical relevance</td>
<td>Anatomy</td>
</tr>
<tr>
<td>Mechanism of coagulation and its impact on Obstetric problems like PIH, abruptio placenta</td>
<td>Physiology</td>
</tr>
<tr>
<td>Amniotic fluid embolism</td>
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<td>Physiology of menstruation in relation to DUB</td>
<td>Physiology</td>
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<tr>
<td>Carbohydrate metabolism in normal and gestational diabetes and its impact in pregnancy</td>
<td>Biochemistry</td>
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<td>Uterotonic drugs</td>
<td>Pharmacology</td>
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<td>Hormones in gynecology</td>
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<tr>
<td>Safety of drugs in pregnancy</td>
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<tr>
<td>Imaging techniques in obstetrics &amp; gynaecology</td>
<td>Radiology</td>
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<tr>
<td>Cytopathology in genital tract malignancies</td>
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<td>Significant microbes in O&amp;G</td>
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<td>Microbiology</td>
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<td>medicine Medico legal aspects in O&amp;G</td>
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<tr>
<td>Liver disorders in pregnancy</td>
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<td>Other-Medical Disorders in pregnancy</td>
<td>Internal Medicine</td>
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**Assessment**

**Schedule of Internal assessment and University examination**

<table>
<thead>
<tr>
<th>First Internal assessment</th>
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<th>Third Internal assessment</th>
<th>Final Internal Assessment</th>
<th>University examination</th>
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<tbody>
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<td>Last week of July 2018</td>
<td>Last week of July 2019</td>
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**Distribution of marks for Internal assessment and University examinations**

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<th>Internal assessment</th>
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<td>20</td>
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<tr>
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</table>

*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 Examinations:**

**Theory**

Four theory Examinations will be conducted during the course.

1. At the end of 4th semester posting the topics will include a few preliminary chapters of obstetrics and gynaecology text.
   (Marks - 40)
2. At the end of the family planning posting in the 5th semester. (Marks - 40)
3. At the end of the 7th semester posting - Obstetrics exam (Marks - 40)
4. At the end of 8th semester - Gynaecology exam.
5. 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 for internal assessment. (Final Internal Assessment Marks Are Compulsorily Included)

**Clinical/Practical**

1. At the end of the 9th 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** 20 marks

4 examiners-Topics to be divided and all examiners to examine each student

**Record of delivery cases** 10 marks

******************************************************************************

**Text books recommended - Prescribed books**

Clinical Obstetrics by Mudaliar
Holland and Brews – Manual of Obstetrics
Clinical Gynaecology by A Bhasker Rao & N N Roy Chowdary.
Text book of Gynaecology by Wilfred Shaw
Antenatal Clinics by Browne
Principles of Gynaecology by TNA Jeffcoat.
Pediatrics and Neonatology

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.

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, make clinical diagnosis, conduct common bedside investigative procedures, interpret laboratory investigations’ results and plan and institute therapy.
- Resuscitation of newborns at birth, prepare ORS, perform tuberculin test, administer vaccines, perform venesection, provide nasogastric feeding.
- Conduct diagnostic procedures like, lumbar puncture, liver and renal biopsy, bone marrow aspiration, pleural and ascitic tap.
- Distinguish between normal newborn baby from those requiring special care and institute early care to all newborn 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.

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 disciples, e.g., Anatomy, Physiology, Forensic Medicine, Community Medicine, Physical Medicine, and Rehabilitation.

Teaching schedule

<table>
<thead>
<tr>
<th>Lectures/Innovative sessions</th>
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</thead>
<tbody>
<tr>
<td>Semesters</td>
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<tr>
<td>Hours</td>
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Clinical postings / Innovative sessions

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Teaching Hours

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<tr>
<td>44</td>
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<td>88</td>
<td>372</td>
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</table>

*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

**********************************************************************************

**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)
Assessment

Schedule of Internal assessment and University examination

<table>
<thead>
<tr>
<th></th>
<th>First Internal assessment</th>
<th>Second Internal assessment</th>
<th>Final Internal assessment</th>
<th>University examination</th>
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<tr>
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Distribution of marks for internal assessment & University examinations

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<th>Internal assessment</th>
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<tbody>
<tr>
<td></td>
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<td>Viva</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>10</td>
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</table>

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:

- 5th Semester: 6 cases
- 8th Semester: 3 cases
- 9th Semester: 1 case

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.

5th and 8th 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

- **Theory** -one paper-whole subject – 2 hours duration : 40 mark
- **Practical** -2 short cases, and OSCE : 30 mark
- Viva voce – based on X rays, Instruments, drugs etc. : 10 mark

Recommended text books

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

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

<table>
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<tr>
<th>TOPICS</th>
<th>Hours</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction to medical research</td>
</tr>
<tr>
<td>2</td>
<td>Study designs – observational studies, analytical studies</td>
</tr>
<tr>
<td>3</td>
<td>Fundamentals of clinical trials</td>
</tr>
<tr>
<td>4</td>
<td>Ethical principles in clinical research</td>
</tr>
<tr>
<td>5</td>
<td>Diagnostic test evaluation (interpretation of sensitivity, specificity, positive and negative predictive values)</td>
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</tbody>
</table>
| 6 | Basics of statistics in research  
   a) Hypothesis testing, P value, power, type I and II errors, confidence interval  
   b) Sampling, validity, reliability, bias, confounding  
   c) Measures of disease frequency  
   d) Types of variables, data entry, presenting and summarizing data  
   e) 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 |

**TOTAL** 13

Teaching Schedule - Semester VII

Time: 1-2 pm

Text books for reference

3. Basic Epidemiology by R Bonita, R Beaglehole, T Kjellstrom WHO 2006
ANNEXATIONS
# Teaching schedule

## Total number of teaching hours

**Lectures/Practicals/Innovative sessions**

<table>
<thead>
<tr>
<th>Subjects</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
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**Note:**

Lectures should not exceed one third of the total teaching hours

The rest of the time should be allotted to Practical/Innovative sessions such as, problem based learning, self learning, group learning, seminars, group discussion, simulation, role play etc.
### Total hours of lectures/practical/Innovative session

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<th>Practical/Clinical / Innovative sessions</th>
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# Phase I

## Teaching Schedule

### Semester I

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<tr>
<th>Day</th>
<th>8 – 9 am</th>
<th>9 – 10 am</th>
<th>10.15 – 11.15 am</th>
<th>11.15 - 1.15 pm</th>
<th>1.15 – 2 pm</th>
<th>2 to 4 pm</th>
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<tbody>
<tr>
<td>Monday</td>
<td>Physiology Theory</td>
<td>Biochemistry Theory</td>
<td>Anatomy Demonstration</td>
<td>Anatomy dissection</td>
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<tr>
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<td>Anatomy Theory</td>
<td>Physiology Theory</td>
<td>Anatomy Theory</td>
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<td>Biochemistry Theory</td>
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<td>Anatomy Dissection</td>
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<tr>
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<td>Physiology Theory</td>
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<tr>
<td>Friday</td>
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<td>Physiology Theory</td>
<td>Anatomy Tutorial / Demonstration</td>
<td></td>
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<tr>
<td>Saturday</td>
<td>Community Medicine</td>
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### PRACTICALS – 4 Batches – A, B, C, D
- D-Biochemistry
- B-Anatomy
- A-Anatomy
- C-Biochemistry

**LUNCH BREAK**

<table>
<thead>
<tr>
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Semester II

<table>
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<th>2 pm to 4 pm</th>
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<tbody>
<tr>
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<td>Anatomy Demonstration</td>
<td>Physiology Theory</td>
<td>Biochemistry Theory</td>
<td>Anatomy dissection</td>
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<tr>
<td>Tuesday</td>
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<td>Anatomy Dissection</td>
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<td>Value Based Education</td>
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<td>Anatomy Tutorial / Demonstration</td>
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<td>Saturday</td>
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<td>11.15 – 12.15 pm</td>
<td>12.15 – 1.15 pm</td>
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**PRACTICALS – 4 Batches – A, B, C, D**
- A – Anatomy
- BD – Physiology
- C – Biochemistry
- B – Anatomy
- BD – Physiology
- A – Anatomy
- BD – Physiology
- C – Biochemistry

**LUNCH BREAK**

<table>
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<td>Friday</td>
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<td>Saturday</td>
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**Anatomy / Physiology / Biochemistry Integration**

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Month of August 2017 will be vacation for the students who pass the I Professional Examination in the 1st chance.
II Phase of Training will commence from 1st September 2017.
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

<table>
<thead>
<tr>
<th>Day</th>
<th>8 – 9 am</th>
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<tbody>
<tr>
<td>Monday</td>
<td>Clinical Lectures</td>
<td>Clinical Posting</td>
<td>Lunch Break</td>
<td>Forensic Medicine Theory</td>
<td>Pathology Theory</td>
<td>Microbiology Theory</td>
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<tr>
<td>Tuesday</td>
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<td></td>
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<td>Microbiology Theory</td>
<td>Pharmacology Theory</td>
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<tr>
<td>Wednesday</td>
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<td>1 pm – 2.30 pm Practicals</td>
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<td>Patho – C Batch Micro – A Batch Pharma – B Batch</td>
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## Semester IV

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<tr>
<td>Saturday</td>
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### Semester V

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### PHASE III

### Semester VI

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<td>Obstetrics &amp; Gynaecology Theory</td>
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## Semester VIII

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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.
<table>
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<td>Microbiology</td>
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<tr>
<td>Paediatrics including Neonatology</td>
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*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
MODEL QUESTION PAPER

Instructions

1. Draw labeled diagrams wherever necessary.
2. Add clinical notes wherever necessary.
3. Do not write anything on the question paper other than your Hall Ticket No. on top left.

SECTION A (25 Marks)

I. Long essay

A 15 year old boy presented with complaints of pain around the umbilicus associated with fever and vomiting. Later the pain shifted to the right lower quadrant of abdomen. The case was diagnosed as acute appendicitis. Based on this history answer the following:

a. Name the point where maximum tenderness can be elicited and give its surface marking
b. Give the reason for referred pain around umbilicus
c. Classify types of appendix
d. Arterial supply (2 + 2 + 5 + 1 = 10 marks)

II. Short essay

(3 X 5 = 15 marks)

a. Factors keeping uterus in anteverted and anteflexed position
b. Anatomical basis of femoral hernia

SECTION B (25 Marks)

III. Short notes

(5 X 3 = 15 marks)

a. Differences between monozygotic and dizygotic twins
b. Primitive streak
c. Role of popliteus muscle in the movement of knee joint
d. Blood supply of long bone
e. Microscopic structure of lymph node

IV. Short answers

(3 X 2 = 6 marks)

a. Superficial perineal pouch and its contents
b. Boundaries and applied aspects of hepatorenal pouch
c. Ectopic testis

V. 

(2 X 2 = 4 marks)

a. Comment briefly on superficial peroneal nerve
b. Draw a neatly labelled diagram of anterior relations of left kidney
SECTION A

I. Long Essay

A 25 year old woman presented to the surgical OPD with complaints of swelling in front of the neck which suddenly increased in size resulting in breathlessness. The swelling moved on swallowing. On examination: the swelling was firm situated on the left of the midline of the neck above the thyroid cartilage. After further investigations the diagnosis of adenoma of thyroid gland was made. Based on your knowledge on anatomy answer the following questions:

a) List the structures in the midline of the neck from above downwards.
b) What is the cause for breathlessness in this case.
c) Describe the anatomical basis for the movement of the swelling with deglutition.
d) Explain the anatomical basis of the following during thyroidectomy procedure:
   i) Direction of skin incision
   ii) Excision of the capsule
   iii) Ligation of vessels

   (4 + 1 + 2 + 3 = 10 marks)

II. Short Essay

a) Arterial supply of cerebral hemisphere
b) Boundaries and contents of cubital fossa
c) Development of face

(3 X 5 = 15 marks)

SECTION B (25 Marks)

III. Short Notes

a) Right coronary artery
b) Corpus callosum
c) Microanatomy of thymus
d) Radial nerve in spiral groove
e) Microanatomy of cerebellum

(5 X 3 = 15 marks)

IV. Short Answers

a) Development of inter-atrial septum
b) Sex chromatin
c) Medial leminiscus

(3 X 2 = 6 marks)

V. 

a) Comment briefly on median cubital vein
b) Draw a neatly labelled diagram of the transverse section of thorax at the level of T 4 vertebra

(2 X 2 = 4 marks)
AMRITA SCHOOL OF MEDICINE
First Professional MBBS Degree Examination

Time 3 hours Max marks - 50

Physiology Paper I

ANSWER SECTION A & B IN SEPARATE ANSWER SHEETS
Draw neatly labeled diagrams & add clinical notes 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:
   a. Increased venous return results in increased cardiac output
   b. Filling of urinary bladder does not normally cause incontinence
   c. Haematocrit value of venous blood is different from that of arterial blood
   d. Gastric mucosa is not affected by gastric acid & enzymes normally
   e. Vitamin B₁₂ is given as injection in pernicious anaemia

   (2 marks each 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:
   a. Second phase of deglutition
   b. Hormonal regulation of pancreatic juice secretion
   c. Conducting tissues of the heart
   d. Buffers in renal tubular fluid
   e. Digestion & absorption of fat in GIT

   (3 marks each x 5 = 15 Marks)
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 marks each 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 marks each x 5 = 15 Marks)
MBBS DEGREE I PROFESSIONAL EXAMINATION

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:
   a. Fluoride is added to blood sample for measuring blood sugar.
   b. Congenital cataract occurs in infants with galactosemia.
   c. Mental retardation occurs in patients with phenylketonuria
   d. Iron deficiency produces anemia.
   e. 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)

II. Write short notes on:

   a. Clinically important transaminases

   b. Three diagnostic applications of radioisotopes

   c. Sandwich ELISA

   d. Biochemical basis of diabetic ketoacidosis

   e. Alkaptonuria

(3 marks each = 15 marks)
MBBS DEGREE I PROFESSIONAL EXAMINATION

Time: 3 hours

BIOCHEMISTRY

Max. Marks - 50

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)

II. 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
Model Question paper

PATHOLOGY-Paper I
General Pathology, Hematology & Clinical Pathology

Time : 2 hours  
Maximum: 40 Marks

Answer all questions  
Draw diagrams wherever necessary

Section A (20 Marks)
General Pathology

1. Structured Essay  
(1+3+2+2=8 marks)

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

2. 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 (20 Marks) Hematology and Clinical Pathology

3. Structured Essay  
(1+2+2+1+2=8 marks)

6. A 5 yr old boy has become increasingly lethargic for the past 2 months. He also gives history of 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)

4. 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

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Second Professional MBBS Degree Examination  
Model Question paper

PATHOLOGY-Paper II  
Systemic Pathology

Time : 2 hours  
Maximum:40 Marks

Answer all questions  
Draw diagrams wherever necessary

Section A (20 Marks)

(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

2. Write short notes on
   (3x4=12marks)
   2. Lobar pneumonia
   3. Morphological features of acute viral hepatitis
   4. Cardiac lesions of Acute rheumatic fever
   5. Schwannoma

Section B (20 Marks)

(Renal, Reproductive, Endocrines, Musculoskeletal and reticuloendothelial system)

3. 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.
   4 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

4. Write short notes on  
   (3x4=12marks)
   7. Etiological factors, gross morphology and histology of osteosarcoma
   8. Hashimoto’s thyroiditis
   9. Fibroadenoma breast
**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

II. **Write short notes on:**
   - a. Bacterial growth curve
   - b. Transport media
   - c. Cold sterilization
   - d. Sequestered antigen

**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?

**V. Write short notes on:**
1. Listeria monocytogenes
2. Graft versus host reaction
3. MRSA
4. Bacterial Conjugation
5. Satellitism
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)

II. Write short notes on:
   1. Viral inclusion body
   2. Rhinosporidiosis
   3. Laboratory diagnosis of Malaria
   4. Procedure of collection of blood for culture

III. Short Essay:
   1. Hydatid disease
   2. Hepatitis A

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?

V. Write short notes on:
   1. Dengue fever
   2. Microfilariae
   3. Pulmonary Aspergillosis
   4. Dermatophytes
   5. LD Body
Section A

I  Draw a schematic diagram showing the synthesis of prostaglandins and leukotrienes. Mark the site of action and one use of:
   1) Indomethacin
   2) Zafirlukast

II  Explain the pharmacological basis for the following:
   A) Glycopyrrolate in pre anaesthetic medication
   B) Warfarin in deep vein thrombosis
   C) Nitroglycerine in angina pectoris
   D) Morphine in acute left ventricular failure
   E) Ethyl alcohol in Methyl alcohol poisoning

III  Write short notes on:
   A) Bio availability
   B) Enalapril
   C) Lignocaine
   D) Bronchodilators

Section B

IV  Mr. Rajan, 40 years old, was admitted in the hospital with acute respiratory infection. He was given benzyl penicillin intravenously. Suddenly he collapsed. He was sweating profusely. His pulse was feeble and rapid. His blood pressure was 90/62 mm of Hg. He had bronchospasm and laryngeal oedema

   A) What is your Diagnosis? Write the drug of choice with dosage schedule.
   B) Explain the pharmacological basis of using the above drug
   C) Mention the other drugs effective in this condition and Write the precaution to be taken to prevent this complication
   D) Write the merits and demerits of intravenous route of administration of drugs

V  From the following pairs of drugs which one would you select for the said condition? Justify your selection and rejection.
   A) Phenobarbitone/Diazepam to treat acute anxiety state
   B) Ketamine/Thiopentone as anaesthetic in a patient with ischaemic heart disease
   C) Mannitol/Frusemide in pulmonary oedema
   D) Levodopa/Benzhexol in drug induced parkinsonism

I  Write short notes on:
   A) Uses of prostaglandins
   B) Lamotrigine
   C) Low molecular weight heparin

*******************************************************************************
Section A

II Draw a diagram, showing the different steps of synthesis and release of thyroid hormones. Mark the site of action and one specific side effect of

A) Carbimazole
B) Lugol’s Iodine

II Write the pharmacological basis of the following drug combination

A) Ifosfamide + Mesna in Testicular carcinoma
B) Ampicillin + Clavulanic acid in Staphylococcal infection
C) Metronidazole + Diloxanide furoate in Amoebic hepatitis
D) Imipenum + Cilastatin in Septicaemia
E) Estrogen + Progesterone as hormonal contraceptives

5 x 1 = 5 marks

III Write short notes on:

A) Dimercaprol
B) Rifampicin
C) Human insulins
D) Acyclovir

4 x 3 = 12 marks

Section B

IV David, 30 years old business man was admitted in the hospital with high fever, malaise and chills. His peripheral smear was checked and was positive for plasmodium Vivax

A) Prescribe suitably for this patient
B) Write the basis of this drug combination
C) Write the mechanism of action and adverse effects of one of the drugs prescribed
D) Outline the management of Cerebral malaria

1 + 1 + 2 + 1 = 5 marks

V From the following pairs of drugs which one do you choose for the said condition? Justify your selection or rejection.

A) Oxytocin/Ergometrine for induction of labour
B) Rifampicin/Rifambutin for treating tuberculosis in H.I.V. patients.
C) Propyl thiouracil/ Carbimazole for Thyroid storm
D) Hydrocortisone/Betamethasone for Cerebral oedema

4 x 11/2 = 6 marks

VI Write short answers

A) DOTS regime in Tuberculosis
B) Hormone therapy in Cancer
C) Dihydrofolate reductase inhibitors

3 x 3 = 9 marks
Forensic Medicine

Time: 2 hrs

Max marks: 40

Section A (20 marks)

Short note type

1. Enumerate 4 features, which help in personal identification. Which one is most conclusive and why? (2 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. Ishurt or grievous hurt? Give your opinion stating reasons. (2 marks)

3. A woman is charged with infanticide. List the clinical findings and the laboratory test which would establish the fact that she had delivered a baby 2 to 3 days ago. (2 marks)

4. There is an incised-looking wound on the head. How would you establish that it was caused by a blunt weapon, not by a heavy cutting weapon? (2 marks)

5. Enumerate the external post-mortem findings in the head and neck in a case of hanging. Name 2 specific findings which would indicate that the body was suspended while alive. (2 marks)

Short answer type

6. A person committed a crime under the influence of alcohol. Mention a situation wherein such a person will be criminally responsible and another wherein he will not be responsible. (½ + ½ = 1 mark)

7. A garment soaked with blood has to be sent for laboratory examination. How will you preserve it and why? (½+½ = 1 mark)

8. List 2 physical findings which establish that brain stem death has occurred. (½+½ = 1 mark)

9. Name 2 postmortem artifacts and indicate their importance. (½+½ = 1 mark)

10. You are inspecting a dead body at the scene of crime. Name 2 findings which would indicate that death occurred at some other site and the body was brought to the scene. (½+½ = 1 mark)

11. Name 2 materials which could be subjected to DNA profiling to establish personal identity? What is the full form of DNA? (½+½ = 1 mark)

12. What is the most important objective of exhumation? State clearly the designation of an officer who can authorise exhumation. (½ + ½ = 1 mark)

13. What is the duration of pregnancy beyond which its termination is not allowed by the MTP Act? What is the condition which justifies termination of pregnancy irrespective of its duration? (½ + ½ = 1 mark)

14. List 2 postmortem findings in asphyxial deaths which are considered non-specific and not pathognomonic of any specific form of death. (½ + ½ = 1 mark)

15. What is a patterned injury? Indicate its medicolegal importance citing a specific example. (½+½ = 1 mark)

[P.T.O]
Section B (20 marks)

Short note type
16. Name the organs collected and the preservative used for chemical examination in deaths due to poisoning. (2 marks)

17. Enumerate the clinical features which are diagnostic of organo-phosphorus poisoning. (2 marks)

18. List the salient neurological features in chronic cannabis poisoning. What is its medico legal importance? (2 marks)

19. Explain the doctrine of vicarious liability. Indicate how it is applied to cases of civil and criminal negligence. (2 marks)

20. A Patient was diagnosed as having acute appendicitis likely to perforate any time. Immediate operation was advised, but patient insisted that he would undergo only conservative treatment with medicines. Explain how you, as the doctor in-charge, will handle the situation. (2 marks)

Short answer type
21. Name one poison other than a corrosive, after whose consumption stomach wash is contraindicated. What is the reason? (½ + ½ = 1 mark)

22. How does strychnine cause convulsions? Name its antidote. (½ + ½ = 1 mark)

23. Name 2 poisons which could be recognised by smelling stomach contents at autopsy. (½ + ½ = 1 mark)

24. What is the class of poisons for which BAL is the specific antidote? How is BAL administered? (½ + ½ = 1 mark)

25. State 2 circumstances under which consent obtained will be invalid. (½ + ½ = 1 mark)

26. State 2 situations in which the doctor can perform physical examination of a person without his consent. (½ + ½ = 1 mark)

27. State 2 circumstances under which the doctor can disclose professional secrets. (½ + ½ = 1 mark)

28. Name 2 functions of the MCI, which cannot be exercised by the State Medical Councils. (½ + ½ = 1 mark)

29. State two important factors/conditions which should be proved to establish that the doctor has been negligent. (½ + ½ = 1 mark)

30. What are the penalties for disclosing a professional secret? (½ + ½ = 1 mark)
SECTION A (30 Marks)

1. Substantiate the following statements:
   a. Primordial prevention is a very useful strategy for the prevention of the lifestyle disease.
   b. Alteration in the ecosystem has resulted in the development of many diseases.
   c. India is a yellow fever receptive area.
   d. Mother to child transmission of HIV can be prevented.
   e. 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:
   a. Secondary Attack Rate
   b. Epidemic curve
   c. Universal precautions
   d. Prophylactic disinfection
   e. 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.

   a. What is the treatment category for this patient under RNTCP and why?
   b. What is the treatment schedule?
   c. When will you advise the follow up sputum examination for this patient?
   d. When will you say he is cured of his illness?
   e. 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:
   a. Segregation of solid waste
   b. Foot care in a diabetic patient
   c. Practice of ergonomics in industry
   d. Blinding in randomized control trial
   e. 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. A two year old child is brought to you with severe dehydration following diarrhea.
   b. A death due to leptospirosis is reported in your area
   c. A child is brought with history of hypo pigmented patch with sensory loss on his thigh
   d. A boy with a lacerated wound on the lip due to dog bite is brought to your OP
   e. 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

<table>
<thead>
<tr>
<th>Year</th>
<th>Measles cases</th>
<th>Measles death</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>2005</td>
<td>11</td>
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</tr>
<tr>
<td>2006</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>2007</td>
<td>60</td>
<td>6</td>
</tr>
</tbody>
</table>

a. Comment whether the data is sufficient to say there is an epidemic of measles and increase in deaths in the year 2007?

b. What more information’s are needed to make the data more meaningful?

c. What do you mean by line listing cases and what is its importance?

d. What are the reasons for the under reporting of cases?

Ee. What actions can you take to improve reporting of cases?

(2 marks each = 10 marks)

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SECTION B (30 Marks)

Paper II

Time: 3 hours                                         Max. Marks: 60

Instructions:-
Answer Section A & Section B in separate answer books
Draw labeled diagrams / bar diagrams wherever necessary
Do not write anything on the question paper other than your Hall Ticket No: on Top left

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.

a. What is essential obstetric care?
b. What is emergency obstetric care?
c. What is the ‘Vandemataram’ scheme?
d. What is the national immunization schedule?
e. What is integrated management of neonatal and childhood illness?

(2 marks each = 10 marks)

II. What is the importance of the following in Primary Health Care?

a. Referral system
b. Palliative care
c. Indigenous system
d. Voluntary agencies
e. Communication

(2 marks each = 10 marks)

III. Substantiate the following:

a. Most child hood deaths are preventable
b. School health is a national priority
c. Family and community have a major role in mental health care
d. Breast feeding and weaning are the foundations of a child’s nutritional status
e. 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:-

   a. Cold-chain
   b. Health skills education
   c. Geriatric friendly homes
   d. Nutritional surveillance
   e. MTP act of 1971

V. Describe your action plan in the following situations.

   (2 marks each = 10 marks)

   a. A parent brings to you his son who is addicted to tobacco

   b. Teenage pregnancies are reportedly increasing in your city and the Mayor has requested you to organize a programme.

   c. Patients complain of increasing costs of health care in your institution and the administration has asked you to analyze and report.

   d. A school head mistress seeks help as many of her girl students have been found to be anemic.

   e. A truck driver has been detected to be HIV positive on routine screening before blood donation.

VI. Write briefly on:-

   (2 marks each = 10 marks)

   a. Role play
   b. Culture and health
   c. Planning cycle
   d. World Bank
   e. Millennium development goals.

   (2 marks each = 10 marks)
**Section A (20 marks)**

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 Catarrah
3. Congenital dacrocystitis

**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
6. Which lasers are used in the management of diabetic retinopathy? 5 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 21 = 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
AMRITA INSTITUTE OF MEDICAL SCIENCE
OTORHINOLARYNGOLOGY

Instructions

1. Answer Section A and Section B in separate answer books.
2. Draw labeled diagrams wherever necessary.

Time: 2 hours Marks: 40

SECTION A (20 Marks)

I. A 35 year old woman presents in the ENT OPD with h/o intermittent, copious, mucopurulent otorrhoea associated with hearing loss in her left ear since more than 5 years.

   a) What is the most likely diagnosis?
   b) Describe tuning fork test findings for this diagnosis?
   c) Medical management and advice to be given to this patient?
   d) Name two relevant investigations to be done by the ENT surgeon for her?
   e) What are the principles of surgery in this case?
      (2+2+2+2+2=10 marks)

II) Write short notes on:

   a) Draw and label an indirect laryngoscopic mirror image
   b) Middle ear muscles-attachments and nerve supply
   c) Name four causes of oro-antral fistula
   d) Management of juvenile Nasopharyngeal Angiofibrinoma.
   e) Puberphonia.
      (2+2+2+2=10 marks)

SECTION B (20 Marks)

I) Parents of an 8 year old boy report mouth-breathing, snoring, recurrent sore throat and reduced hearing in the child. Snoring is present daily. There is no h/o ear discharge.

   a) What is your most probable diagnosis from the history?.
   b) Name two investigations that you would advise for this child to confirm your diagnosis?
   c) Describe the pathophysiology of the hearing loss in this case?
   d) How will you manage this case surgically?
   e) What are the complications of the surgical procedures involved?.
      (2+2+2+2+2=10 marks)

II Write short note on:

   a) Rhinolith
   b) Name four cases of congenital stridor.
   c) Name four clinical features in a case of fracture of orbital floor.
   d) Name four intra-temporal complications of suppurative otitis media.
   e) Treatment of Ludwig’s angina
General Medicine
Paper I

Time: - 3 hrs Max marks:- 60
Answer sections A & B in separate answer books

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
   a. What is the most probable diagnosis?
   b. What are the likely clinical findings?
   c. What are the complications anticipated?
   d. How do you investigate him?
   e. Mention the treatment. 2 + 2 + 2 + 3 = 10 Marks

II. Match the following:-
   1. Amitryptiline  
   2. Benzyl Benzoate  
   3. DEC  
   4. Antabuse  
   5. Hydroxy Chloroquine  
   6. Clonazepam  
   a. Scabies  
   b. Alcoholism  
   c. RA  
   d. Panic attacks  
   e. Filariaisis  
   f. Depression  
   g. Dermatitis  
   h. Herpes Zoster  6 x \( \frac{1}{2} \) = 3 Marks

III. Draw and Label:-
   1. X – Ray finding in pleural effusion  
   2. Amoeba  
   2 x 1 = 2 Marks

IV. Write briefly:-
   1. Treatment of Beri Beri  
   2. Treatment of Malaria  
   3. Treatment of pyogenic meningitis  
   4. Treatment of organo phosphorous poisoning  
   5. Treatment of Typhoid  
   5 x 1 = 5 Marks

V. Write short notes on:-
   1. Depression  
   2. Management of Psoriasis  
   3. Lepra reaction  
   4. Disease Modifying Agents in Rheumatoid Arthritis  
   5. 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
   a. What is your diagnosis?
   b. What is the causative organism?
   c. Describe the clinical features and complications.
   d. How do you treat this patient 1 + 1 + 4 + 4 = 10 Marks

VII. Write briefly on
   1. Hemarthrosis  
   2. Swan Neck Deformity  
   3. Kaplan Syndrome  
   4. Charcot’s Joint  
   5. Blinding Filaria  
   6. LD Body  
   7. Larva Migrans  
   8. Hairy leukoplakia  
   9. Cryptococcus  
   10. Pneumocystis carini  
   10 x 1 = 10 Marks

VIII. Write short notes on
   1. Treatment of hyperkalemia  
   2. Metabolic acidosis  
   3. Treatment of snake bite  
   4. Clinical features of tetanus  
   5. Rabies  
   5 x 2 = 10 Marks
General Medicine
Paper II

Answer sections A and B in separate answer books

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

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
      g) Metabolic Acidosis
      h) Hyperkalemia 6 x ½ = 3 marks

III. Draw and Label
   1. Nephron
   2. Conducting system of heart 2 x 1 = 2 Marks

IV. Write briefly on:-
   1. Definition of transient ischeamic attack
   2. Define unstable angina
   3. Define chronic bronchitis
   4. Cardiac tamponade
   5. Flapping tremor. 5 x 1 = 5 Marks

V. Write short notes on :-
   1. Clinical findings of mitral stenosis
   2. Lutembacher’s syndrome
   3. Treatment of tuberculous meningitis
   4. Management of Ischeamic stroke
   5. 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.
   A. What further information would you require in her family history ?
   B. What is the likely etiological factor ?
   C. Name an investigation of choice.
   D. Discuss a treatment of this case. 2 + 2 + 2+ 4 = 10 Marks

VII. Write briefly on:-
   1. Jones Criteria for rheumatic fever
   2. Short course anti tuberculous treatment
   3. Treatment of chronic stable asthma
   4. Treatment of Graves Disease
   5. PDA
   6. Thrombocytopenia
   7. Blood component therapy
   8. Side effects of glucocorticoid therapy
   9. Signs of raised intracranial pressure
   10. Types of respiratory failure 10 x 1 = 10 Marks

VIII. Write short notes on:-
   1. Management of DKA
   2. Deep Vein Thrombosis
   3. Klebsiella Pneumonia
   4. ACE Inhibitors
   5. WPW Syndrome 5 x 2 = 10 Marks

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General Surgery
Paper – I

Answer Section A and B in separate answer books.

Time: 3 hours 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 Orthopedics (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
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 anastamosis 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
I. Primi Gravida, 34 weeks gestation with oedema, proteinuria 2+, BP 150/100mmhg, presented with blurring of vision, headache and epigastric pain.

   a) What is the diagnosis?
   b) What are the investigations to rule out multi organ damage
   c) Mention the antihypertensive and other drugs that can be used in this case
   d) Briefly describe the obstetric management

   (1+2+3+4 = 10 marks)

II. Short answer questions

1. What is Bandl’s ring? What is its importance?
2. What is Hegar’s sign? At what period of gestation is it elicited?
3. What is Chorion Villous Sampling? Give 2 indications
4. What is Caesarean section? Give 2 indications

   (1x4 = 4 marks)

III. Short notes on

1. Rh incompatibility
2. External Cephalic version
3. Missed abortion

   (2x3 = 6 marks)

Section B (20 Marks)

IV. A 25 year old primigravida of 32 weeks gestation reports with a painless bout of bleeding

1. What is the probable diagnosis?
2. What are the conditions to be differentiated?
3. How will you confirm your diagnosis?
4. What is conservative line of management?
5. What are the indications for Caesarean section in this case?
6. What is the management in a first referral unit?

   (1+2+2+2+1 = 10 marks)

V. Short answer questions:

1. What is Obstetric Conjugate
2. What is caput succedaneum
3. What is cord prolapse? Mention 2 causes?
4. Define Maternal Mortality rate. What is the Maternal Mortality rate in India?

   (1x4 = 4 marks)

VI. Short Notes on:

1. Cervical tear?
2. 2nd stage management of heart disease complicating pregnancy?
3. Follow up of vesicular

   (2x3 = 6 Marks)
I. A 30 year old nulliparous patient presented with severe congestive dysmenorrhoea, dyspareunia 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

(1×4 = 4 marks)

III. Write Short notes on

1. Rh incompatibility
2. External Cephalic version
3. Missed abortion

(2×3 = 6 marks)

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. Causes of maternal mortality in Kerala?
3. Pyometra
4. Blighted ovum

(1×4 = 4 marks)

VI. Write short notes on:

1. Operative Laparoscopy?
2. Cryptomenorrhoea?
3. Fractional curettage

(2×3 = 6 marks)
Paediatrics including Neonatology

Time: 2Hours

Maximum Marks: 40

(Use separate Answer Books for section A & B)

Section A

1. Define Growth and Development, evaluate mental and motor milestones in the first year of life. (2+3+5=10)

2. Write briefly on:
   (a) Management of a one year old marasmic child with 6 kg weight
   (b) Immunisation schedule for a New born child
   (c) Complications of Measles

Section B

3. Write Short Notes on:
   (a) Neonatal hyperbilirubinemia
   (b) Acute Nephritis
   (c) Glucose Tolerance Test (GTT)

4. Write brief notes on:
   (a) Fallot’s tetralogy
   (b) C.S.F findings in Pyogenic Meningitis
   (c) Treatment of congenital hypothyroidism
   (d) RCH Programme
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*The students will be divided into four Batches. Practical examination will be conducted in Anatomy, Physiology and Biochemistry on rotation basis.
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*The students will be divided in to four Batches. Practical examination will be conducted in Anatomy, Physiology and Biochemistry on rotation basis.*
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<td>University Examination (Theory) begins</td>
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<tr>
<td>18 Jul</td>
<td>Wednesday</td>
<td>Anatomy, Physiology &amp; Biochemistry</td>
</tr>
<tr>
<td>19 Jul</td>
<td>Thursday</td>
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<tr>
<td>20 Jul</td>
<td>Friday</td>
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<tr>
<td>21 Jul</td>
<td>Saturday</td>
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<tr>
<td>22 Jul</td>
<td>Sunday</td>
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</tr>
<tr>
<td>23 Jul</td>
<td>Monday</td>
<td>University Practical Examination begins</td>
</tr>
<tr>
<td>24 Jul</td>
<td>Tuesday</td>
<td></td>
</tr>
<tr>
<td>25 Jul</td>
<td>Wednesday</td>
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</tr>
<tr>
<td>26 Jul</td>
<td>Thursday</td>
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<tr>
<td>27 Jul</td>
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<tr>
<td>28 Jul</td>
<td>Saturday</td>
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<tr>
<td>29 Jul</td>
<td>Sunday</td>
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</tr>
<tr>
<td>30 Jul</td>
<td>Monday</td>
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</tr>
<tr>
<td>31 Jul</td>
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