

**REGULATIONS,  
ORDINANCE & SYLLABUS**

**for**

**MBBS COURSE**

**in**

**INTEGRAL UNIVERSITY,**

**LUCKNOW**

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# Integral Institute of Medical Sciences & Research (IIMS&R)

## Integral University

### CHAPTER 1

**1.0.0. Vision:** Integral Institute of Medical Science and Research (IIMS&R) aspires; to achieve national and international recognition for its capability to produce physicians with essential knowledge, skills and professionalism for practicing their profession efficiently & ethically; to provide evidence based clinical care to the attending patients & public health services to the neighboring community and to undertake such research program which addresses the prevailing health problems and whose outcome can be translated to a functional service package & program benefiting individuals and the community at large.

**1.0.1. Mission:** The mission of IIMS&R is to produce “**Indian Medical Graduate**” who possesses essential knowledge, skills, and professionalism as prescribed by the Medical Council of India, and is capable of pursuing a lifelong continuing education to keep him updated about the newer evidence based care and cure and is capable of working in different community settings with high standard of professionalism & ethic and be the lynch pin of the health care system he serves and be able to contribute in meeting the health care needs of the population he serves.

**1.1.0. Institutional Objectives:** The undergraduate students coming out of IIMS&R should be:

- 1.1.1. A competent **clinician** to practice preventive, promotive, curative and rehabilitative medicine in respect to the commonly encountered health problems in an individual at the primary, secondary or tertiary levels using his/her clinical skills.
- 1.1.2. Be competent in diagnosis and management of common health problems of the community, commensurate with his/her position as a **Leader and member of the health team and the health system** he works in using his community diagnosis & management skills.
- 1.1.3. Be a competent **communicator** with patients, families, community and members of Health team and other service providers.
- 1.1.4. A **lifelong learner** committed to continually update his knowledge and skill.
- 1.1.5. A **professional**, with all the attributes of a good citizen and committed to provide his services maintaining high standard of professional ethics and also be responsive and accountable to the patient, community he serves and the profession.

**1.2.0. Competencies to be developed:** To fulfill the roles listed above, the Graduate at the end of his graduate course would have to obtain the following sets of competencies.

- 1.2.1. Clinician who understands and provides all levels of care (preventive, promotive, curative & rehabilitative) to an individual and the community.
- 1.2.2. Demonstrate knowledge of human biology including normal physical structural, functional & psychological profile, human behavior and its development influencing health.

- 1.2.3. Demonstrate knowledge of environmental determinants (Physical, Chemical, biological, social and cultural) and its effect on the state of health and causation of disease
- 1.2.4. Demonstrate the knowledge of the structural & functional changes caused by specific disease process at the molecular, cellular, organ and different system level and their manifestation as symptoms, signs and its impact on the health status of the diseased individual.
- 1.2.5. Demonstrate knowledge of the concept of Natural History of Disease and levels of prevention.
- 1.2.6. Demonstrate the ability to elicit and record from a patient and other relevant sources including relatives and caregivers a history that is contextual to epidemiological and ecological condition of the place and community he belongs to.
- 1.2.7. Demonstrate ability to perform a physical examination of all the systems contextual to the history, age gender, vulnerability, etc.
- 1.2.8. Demonstrate ability to select appropriate diagnostic tests (based on scientific validity, and cost, effectiveness) contextual to the clinical conditions and interpret the results of the tests and use it for proper management of the condition.
- 1.2.9. Demonstrate the ability to draw the natural history of the episode/disease of a patient by integrating and interpreting the data (history, physical examination, diagnostic tests) obtained from the patient.
- 1.2.10. Demonstrate the ability to select the most effective & appropriate level of prevention by applying clinical problem solving knowledge and judgment.
- 1.2.11. Demonstrate the knowledge of “Essential drug List” and the National or institutional “standard protocol of treatment” if any and the ability to prescribe and safely administer appropriate therapy, including nutritional therapy, pharmacotherapy and interventions based on the principles of “Rational Drug therapy”, scientific validity, evidence, and affordability of the patient.
- 1.2.12. Demonstrate the ability to choose the appropriate evidence based level of prevention (Health promotion, Specific protection, Early diagnosis & Treatment, Prevention of complication & Rehabilitation) and delivery strategy and or as approved under National and regional health program policies for an individual as well as for a community.
- 1.2.13. Demonstrate the ability to maintain accurate and appropriate record of patients in conformation with legal and administrative frame work. Demonstrate knowledge of medico level aspect of medical practice, patients, rights, professional norms, ethics as stipulated by the Medical Council of India and above all the humanitarian principles of health care.
- 1.2.14. Demonstrate the ability to provide domiciliary as well as institution based care (primary, secondary or tertiary level).
- 1.2.15. Be aware of his competence and limitations and always appreciate the need for referral/consultation of a patient to a specialist or higher centre for effective treatment.
- 1.2.16. Always respect and support rights, privacy and dignity of the patients in context to their sex and age.

- 1.2.17. Demonstrate familiarity with basic, clinical and translational research as it applies to the Health & Health care of individuals, patient and the community.
- 1.2.18. Leader and member of the Health team and system.
- 1.2.19. Possesses the attitude for continued self learning and to seek further expertise or to pursue research in any chosen area of medicine. Be familiar with basic requirements that are essential for the implementation of any National Health Programs and specially the guidelines for implementing the following public health programs;
  - I. Reproductive & child health Program.
  - II. NRHM program
  - III. Prevention and control of communicable and Non Communicable Disease.
  - IV. Health Promotion & Behavior changes in disease control..
  - V. Environmental sanitation and climate change.
  - VI. Health in different work places.
- 1.2.20. Acquire basic management skill in the area of human resources, materials and resource management aspects of health care delivery in public, private and other situations.
- 1.2.21. Be able to identify community health problems and learn to work to resolve these by designing instituting corrective interventions and evaluating the outcome of such measures
- 1.2.22. Be able to work as leading partner in health care teams and acquire proficiency in communication skills.
- 1.2.23. Be competent to work in a variety of health care settings.
- 1.2.24. Have personal characteristics and attitude required for professional life such as personal integrity, sense of responsibility, ethical consideration and dependability and ability to relate to or show concern for other individuals.
- 1.2.25. All efforts will be made to equip the medical graduates to acquire the detailed skills & competence as prescribed by Medical Council of India Regulation on Graduate Medical Education 2012.

**1.3.0. Good Communicator with patient's families, community & colleague.**

- 1.3.1. Demonstrate ability to communicate adequately, sensitively, effectively, and respectfully with patients in a language that the patient understands and in a manner that will improve patient satisfaction and health care outcome.
- 1.3.2. Demonstrate ability to establish professional relationship with patients and families that are positive, understanding, humane, ethical, empathetic and trustworthy.
- 1.3.4. Demonstrate ability to communicate with patients in a manner respectful of patients' preference, values, prior experience, beliefs, confidentiality and privacy
- 1.3.5. Demonstrate ability to communicate with patients, colleagues, families and community in a manner that encourages the participation and shared decision making.

**1.4.0. Lifelong learner committed to continuous improvement of skills & knowledge.**

- 1.4.1. Demonstrate ability to perform an objective self assessment of knowledge and skills, continue learning, refine existing skills and acquire new skills.
- 1.4.2. Demonstrate ability to apply newly gained knowledge or skills to the care of the patient.
- 1.4.3. Demonstrate ability to introspect and utilize experience, to enhance personal and professional growth and learning.
- 1.4.4. Demonstrate ability to search (including through electronic means) and critically evaluate the medical literature and apply the information in the care of the patient.
- 1.4.5. Be able to identify and select an appropriate career pathway that is personally rewarding and personally fulfilling.

**1.5.0. Professional, who is committed to excellence, is ethical, responsive and accountable to patients, patient's family and community and also to the profession.**

- 1.5.1. Practice selflessness, integrity, responsibility, accountability and respect.
- 1.5.2. Respect and maintain professional boundaries between patients, colleagues, and society,
- 1.5.3. Demonstrate ability to recognize and manage ethical and professional conflicts.
- 1.5.4. Abide by the prescribed ethical and legal codes of conduct and practice.
- 1.5.5. Demonstrate a commitment to the growth of the medical profession as a whole.

**1.6.0. The Learning Process:** The learning process will be based on the following principles:

- 1.6.1. Didactic lectures will not exceed one third of the time schedule; two third schedule will include practical, clinical or/and group discussions. Learning process should include living experiences, problem oriented approach, case studies and community health care activities.
- 1.6.2. Student should be able develop analytical abilities and prepare them for self-directed learning.
- 1.6.3. Student should be active and personally responsible for their learning process. Lectures will be minimal in number to allow active learning in small group settings.
- 1.6.4. Maximum emphasis will be given to integrate basic & clinical disciplines with a focus on key principles. Students will interact with patients early.
- 1.6.5. Teachers should develop a reasonable level of teaching skill and sufficient time to supervise and as well as function as mentors to individual students.
- 1.6.6. Teachers will be encouraged to increase the knowledge of other disciplines in order to assure an integrated curriculum.
- 1.6.7. Essential part of medical teaching should be given by teachers with a background as medical doctors.

**1.6.8.** Medical education will offer instruction in the use of information technology in scientific as well in clinical practice so that the student can learn to use bibliographic data bases, computer assisted decision making.

**1.6.9.** Exchange program or elective at different designated National/ foreign medical schools will be a part of the learning program.

**1.7.0. Pre Clinical & Para clinical:** To instill life-long learning attitude and skills, reduce students' passive learning while increasing assisted independent learning and improving their problem solving skills, and identify what students should learn and be able to do as per MCI and Integral university syllabus at the end of Pre & Para clinical years. The approach of teaching will be integrated teaching. The General topics of the pre & Para-clinical subjects will be integrated in such a way that repetition of teaching the same topic is minimal. Besides the above the following methods will be used to achieve the above goal:

- 1.7.1.** Define medical informatics to encompass a variety of computer learning experiences for medical students, including not only traditional computer-aided instruction (CAI) but also learning about computers and their applications, use of computer-based information resources, and use of computers as a tool and as a mechanism for information management, decision support, and communication.
- 1.7.2.** Specify that students become active information seekers, rather than passive information receptacles and information managers rather than information memorizers.
- 1.7.3** Provide independent study opportunities and requirements that develop and nurture students' ability to acquire, critically analyze, and synthesize basic science and clinical information and gain experience in the application of that information in the clinical setting.
- 1.7.4.** Provide throughout the first one year information to students in formats that require individual initiative and that are similar to those mechanisms which they will find it necessary to employ as life-long learners, most likely outside of an academic medical center.
- 1.7.5.** Teach students from day one the importance of reading and evaluating the primary biomedical literature and assist them in developing skills with which to do that.
- 1.7.6.** Select reading assignments carefully with respect to focus on concepts emphasized in the course, initially at a level appropriate to the students' current level of understanding but progressing to increasingly more advanced assignments.
- 1.7.7.** Develop a two-hour-per-week journal club involving both basic science and clinical faculty meeting with groups of 15 or fewer students to: (1) teach the basic science concepts and their clinical relevance, (2) teach skills in reading and analyzing the literature, including statistics and epidemiology, (3) facilitate reasoned discussion with classmates and faculty, and (4) teach computer searching skills.
- 1.7.8.** Provide assistance to students in their application of core knowledge and information retrieval through a variety of computerized clinical cases which can be reviewed and solved individually and in small groups and small-group case presentations such as a regular noontime clinical conference for basic science medical students that (1) emphasizes common (mostly primary care) medical problems and their epidemiology (often presented by primary care physicians), (2) models the thought process involved in medical decision-making, (3) demonstrates information-gathering and information-management techniques, and (4) models ethics, professionalism, health care teamwork, cost considerations, and an appropriate use of the health care delivery system.
- 1.7.9.** Assure that students become skilled at using computers as tools for decision-making and managing patient and professional information.

- 1.7.10 Assure a reward and reimbursement system that encourages faculty and departments to devote time and effort to instructional improvement, especially that which is labor intensive on the front end and which might lead immediately or eventually to reduced faculty/student contact time.
- 1.7.11 Inform students on day one that as future physicians they will be expected to become progressively more responsible for their own learning.
- 1.7.12 Identify and employ legitimate and effective means of allowing students to have access to information that requires their own initiative and hones their skills in acquiring that information.
- 1.7.13 Recognize that while the lecture may be the best teaching mechanism for *some* topics, it is not best for all topics and that it contributes to excessive levels of passive learning.
- 1.7.14 Target a set percentage (perhaps as much as 50%) of current lecture content that can be made available to students in non-lecture, independent learning formats.
- 1.7.15 Engage in a systematic review of each course to determine how more independent learning mechanisms can and should be employed.
- 1.7.16. Conduct (at least once a week throughout each course) a small-group session to discuss in detail aspects of the current topics of that particular course.
- 1.7.17. Provide the students with specific problems and/or questions that they must research and attempt to answer prior to the actual small group sessions.
- 1.7.18. Construct a bank of very general questions for use from year to year both to guide learning and to facilitate self-assessment by students of their own understanding.
- 1.7.19. Include epidemiological and disease prevention information in every discussion.
- 1.7.20. Allocate free time to carefully-selected reading assignments in texts and reviews, with guidance, preferably by a basic scientist and a clinician working together, to direct students in reflective thinking and further investigation.
- 1.7.21. Teach computer use to students via lectures, hands-on workshops, etc.
- 1.7.22. Make sufficient computers available for easy access or require all students to have their own computer and make all necessary arrangements to facilitate their use on campus and from students' homes.
- 1.7.23. Establish a computer resource center to handle the heavy use by students.
- 1.7.24. Provide personnel to assist faculty in reviewing software for possible purchase, adapting purchased software for local use, and developing software locally.
- 1.7.25. Implement interactive computer learning gradually as an alternative and as an enhancement to lecture material and integrate it seamlessly with other learning formats in each course.
- 1.7.26. Maintain e-mail contact between faculty and student.
- 1.7.27. Develop problem-solving exercises and interactive and "practical" exams to assess both the knowledge obtained via the computer and the skill of students in obtaining information via computer.
- 1.7.28. Develop a bank of computer-based self-assessment exercises, including multiple-choice questions and case problems for student self-assessment throughout their first two years of medical school.
- 1.7.29. Provide personnel to assist with the development and maintenance of these item banks.

- 1.7.30. Develop an overall plan for all four years that capitalizes on the current development of computer-based instructional activities at IIMS&R and that includes specific recommendations for the integration of informatics applications.
- 1.7.31. Develop a plan for making the technology easily accessible to students.
- 1.7.32. Specify a broad range of software that includes, but is not strictly limited to, instructional applications.
- 1.7.33. Develop an implementation strategy that explicitly focuses on methods of integrating the use of specific resources into specific parts of the curriculum.
- 1.7.33. Computer-assisted learning and problem-solving activities with the clinical learning opportunities made available currently through the Introduction to Clinical Medicine to Pre clinical students as soon as possible.
- 1.7.34. Require students to learn the basic science course knowledge that is necessary in order to understand the Pathophysiology of disease.
- 1.7.35. Base the components of this core knowledge on its clinical relevance.
- 1.7.36. Begin the process by predicting what the student will need to do as a practicing physician in changing health care environment.
- 1.7.37. Continue the process by working backwards from that prediction to identify what is being taught and what should be taught during each year to prepare students to meet their predicted needs.
- 1.7.38. Identify the specific goals and activities for each year by determining what students must be able to do at specific points in the curriculum and what experiences are prerequisite to enable them to accomplish these goals.
- 1.7.39. Begin identification of core knowledge by using the MCI/Integral University MBBS Syllabus.
- 1.7.40. Seek input from clinicians on the clinical relevance of each basic science concept.
- 1.7.41. Establish a mechanism for routine, course-related interaction between clinicians and basic scientists.
- 1.7.42. Review the sequence of courses.
- 1.7.43. Review the sequence of concepts within courses.
- 1.7.44. Move instructional content from the basic sciences to the most appropriate clinical clerkship if the concept is more appropriate in the junior year and if it is not listed in the syllabus.

**1.8.0. Clinical Period:**

- 1.8.1. To acquire the core knowledge, skills, and attitudes for practicing evidence based medicine, the following methods will be used.
- 1.8.2. Develop a composite set of competencies for each clinical discipline as per MCI and other professional bodies' guideline which each student should possess in order to graduate. Each student will be given the list of competencies and they along with their mentors will be responsible to acquire the same.
- 1.8.3. Review and revise the clinical training program in order to accommodate the instructional and time needs to develop the outlined competencies and needs. The setting of the training may be in primary health care set up or any other health institution he is posted. Hands on training during patient care under the supervision of the mentors will be the strategy.

- 1.8.4. Develop the OSCE to measure the required competencies and select a location and facility for use in providing systematic and ongoing evaluation of the product (students) and the process (instruction) via the OSCE.
- 1.9.0. **To achieve the elements of professionalism i.e.** commitment to the highest standards of excellence in the practice of medicine and in the generation and dissemination of knowledge, commitment to sustain the interests and welfare of patients, and commitment to be responsive to the health needs of society, The following methods will be used :
  - 1.9.1. Establish a faculty advisor program to provide role models of professionalism and perhaps career counseling, with the following possible features:
    - A. Assigned randomly or by student interest.
    - B. Perhaps both a basic scientist and a clinician mentor for each student.
    - C. freedom to change mentors when appropriate and desired
  - 1.9.2. Conduct small group discussions/workshops on issues in professionalism throughout all four years of the curriculum, possibly using the ICM course as the venue, with types of cases being tailored to the level of the students, and with one or two seminar days in each clerkships being devoted to a discussion of relevant issues of professionalism.
  - 1.9.3. Particularly in clerkships, evaluate students' professionalism along with other areas, with repeated problems by a student being referred to the Associate Dean for Students for review and action.
  - 1.9.5. Use the OSCE as another means of assessing components of professionalism by requiring the standardized patients to rate the professionalism of each student encountered in the OSCE and by developing specific OSCE stations to assess professionalism issues.
  - 1.9.6. Promote faculty and staff awareness of the importance of professionalism in theirs and their students' behavior by
    - A. Requiring all academic departments to devote specific conference time annually to issues of professionalism.
    - B. Developing an institution-wide system by which student can evaluate faculty's (including residents') professionalism. Establishing a system by which extremes of behavior by students and faculty (including residents) are routinely reported and addressed positively but authoritatively, with counseling and other forms of remediation being provided if needed.

## Chapter II

### ADMISSION, SELECTION, MIGRATION & TRAINING

#### Period & Time Distribution

##### 2.0. ADMISSION:

2.0.0. Applications for entry into the MBBS program will only be considered if applicants have completed the age of 17 years on or before 31st December of the year of admission to the MBBS Course.

2.0.1. **Academic Requirements:** He/She has passed **qualifying examination** as under:

- I. The higher secondary examination or the Indian School Certificate Examination which is equivalent to 10+2 Higher Secondary Examination after a period of 12 years study, the last two years of study comprising of **Physics, Chemistry, Biology/Bio-technology** and Mathematics or any other elective subjects with English at a level not less than core course of English as prescribed by the National Council of Educational Research and Training after the introduction of the 10+2+3 years educational structure as recommended by the National Committee on education.

**Note: Where the course content is not as prescribed for 10+2 education structure of the National Committee, the candidates will have to undergo a period of one year pre-professional training before admission to the Medical colleges;**

Or

- II. The intermediate examination in science of an Indian University/Board or other recognized examining body with **Physics, Chemistry and Biology/Biotechnology** which shall include a practical test in these subjects and also English as a compulsory subject;

Or

- III. The pre-professional/pre-medical examination with Physics, Chemistry and Biology/Bio-technology, after passing either the higher secondary school examination, or the pre-university or an equivalent Examination. The pre professional/ pre-medical examination shall include a practical test in **Physics, Chemistry and Biology/Bio-technology** and also English as a compulsory subject;

Or

- IV. The first year of the three years degree course of a recognized university, with **Physics, chemistry and Biology/Bio-technology** including a practical test in three subjects provided the examination is a "University Examination" and candidate has passed 10+2 with English at a level not less than a core course;

Or

- V. B.Sc. examination of an Indian University, provided that he/she has passed the B.Sc. examination with not less than two of the following subjects **Physics, Chemistry, Biology (Botany, Zoology)/Bio-technology** and further that he/she has passed the earlier qualifying examination with the following subjects – Physics, Chemistry, Biology and English.

Or

- VI. Any other examination which, in scope and standard is found to be equivalent to the intermediate science examination of an Indian University/Board, taking **Physics, Chemistry and Biology/Bio-technology** including practical test in each of these subjects and English.

## 2.1. Selection of Students:

The selection of students to medical college shall be based solely on merit of the candidate and for determination of merit. A competitive entrance examination should be held so as to achieve a uniform evaluation as there may be variation of standards at qualifying examinations conducted by different agencies.

**2.1.0. Procedure for selection to MBBS course:** It shall be as follows:

**2.1.1.** A candidate must have passed in the subjects of **Physics, Chemistry, Biology/Bio-technology** and English individually and must have obtained a minimum of 50% of marks taken together in **Physics Chemistry and Biology/Bio-technology** at the Qualifying examination as mentioned in the clause **2.0.1. Academic Requirements.**

**2.1.2.** In addition must have come in the merit list prepared as a result of a competitive entrance examination by securing not less than 50% marks in **Physics, Chemistry and Biology/Bio-technology** taken together in the competitive examination. In respect of candidates belonging to Schedule Caste, Schedule Tribes or other Backward Class the marks obtained in **Physics, Chemistry, and Biology/Bio-technology** taken together in qualifying examination and competitive entrance examination be 40% instead of 50% as stated above.

**2.1.3.** Provided that a candidate who has appeared in the qualifying examination the result of which has not been declared, he may be provisionally permitted to take up the competitive entrance examination and in case of selection for admission to the MBBS course, he shall not be admitted to that course until he fulfills the eligibility criteria of the **Qualifying examination** as under clause 2.0.1 **Academic Requirements.**

**2.1.4.** IIMS&R Entrance test is to be conducted under the supervision of Integral University. To conduct the IMS&R Entrance test and to declare the result, supervise and control the selection process an Admission Committee should be formed by the Integral University. The Committee will also be the grievance redressal authority who will take care of all complaints regarding the entrance test. The Chairman of the Committee will also be an appellate authority. Further the Committee will issue necessary executive instructions for implementation and provide relevant information to be published or communicated. The Committee shall consist of the Chairman and four members.

**2.1.5.** In case majority of students secure less than 50% marks in Physics, Chemistry, Biology together in the competitive examination conducted by the Examination Committee, the following options will be considered, but the pivotal consideration in preparation of the list for admission will be inter-se merit.

(i)- A cut-off mark will be fixed based on the inter-se merit. Those above the cut-off mark will be selected as per inter-se merit.

(ii)- The other option will be to prepare a merit list based on the students performance in the entrance test (100% weightage) combined with the performance in the qualifying examination (50% mark of PCB).

(iii)- The third option will be preparing the inter-se merit list by taking the 50<sup>th</sup> percentile as the cut off mark for selection.

**2.2.0. Training Period and Time Distribution:** Every student shall undergo a period of certified study extending over 4 ½ academic years divided into 9 semesters,(i.e. of 6 months each) from the date of commencement of his study for the subjects comprising the medical curriculum to the date of completion of the examination and followed by one year compulsory rotating internship. Each semester will consist of approximately 120 teaching days of 8 hours each college working time, including one hour of lunch.. The period of 4 ½ years is divided into three following phases.

**2.2.1. Phase-1**(two semesters) - consisting of Pre-clinical subjects (Human Anatomy, Physiology including Bio-Physics, Bio- chemistry and introduction to Community Medicine including Humanities). Besides 60 hours for introduction to Community Medicine including Humanities, rest of the time shall be somewhat equally divided between Anatomy and Physiology plus Biochemistry combined (Physiology 2/3 & Biochemistry 1/3).

**2.2.2. Phase-II** (3 semesters) - consisting of para-clinical/ clinical subjects. During this phase teaching of para-clinical and clinical subjects shall be done concurrently. The para-clinical subjects shall consist of Pathology, Pharmacology, Microbiology, Forensic Medicine including Toxicology and part of Community Medicine. The clinical subjects shall consist of all those detailed below in Phase III. Out of the time for Para-clinical teaching approximately equal time be allotted to Pathology, Pharmacology, Microbiology and Forensic Medicine and Community Medicine combined (1/3 Forensic Medicine & 2/3 Community Medicine).

**2.2.3. Phase-III** (Continuation of study of clinical subjects for seven semesters after passing Phase-I). The clinical subjects to be taught during Phase II & III are Medicine and its allied specialties, Surgery and its allied specialties, Obstetrics and Gynecology and Community Medicine. Besides clinical posting as per schedule mentioned herewith, rest of the teaching hours be divided for didactic lectures, demonstrations, seminars, group discussions etc. in various subjects.

I. The Medicine and its allied specialties training will include General Medicine, Pediatrics, Tuberculosis and Chest, Skin and Sexually Transmitted Diseases, Psychiatry, Radio-diagnosis, Infectious diseases etc. The Surgery and its allied specialties training will include General

II. Surgery, Orthopedic Surgery including Physical Medicine and Rehabilitation, Ophthalmology, Otorhinolaryngology ,Anesthesia, Dentistry, Radio-therapy etc.

III. The Obstetrics & Gynecology training will include family medicine, family welfare planning etc.

2.2.4. The first 2 semester (approximately 240 teaching days) shall be occupied in the Phase I (Pre-clinical) subjects and introduction to a broader understanding of the perspectives of medical education leading to delivery of health care.

2.2.5. No student shall be permitted to join the Phase II (Para-clinical/clinical) group of subjects until he has passed in all the Phase I (Pre-clinical subjects) for which he will be permitted not more than four chances (actual examination), provided four chances are completed in three years from the date of enrollment.

2.2.6. After passing pre-clinical subjects, 1 ½ year (3 semesters) shall be devoted to para-clinical subjects. Phase II will be devoted to para-clinical & clinical subjects, along with clinical postings. During clinical phase (Phase III) pre-clinical and para-clinical teaching will be integrated into the teaching of clinical subjects where relevant.

2.2.7. Admission timings and admission processes in such a way that teaching in first semester starts by 1st of August each year.

2.2.8. Supplementary examination will be conducted within 3 months so that the students who pass can join the main batch and the failed students will have to appear in the subsequent year.

### 2.3. Phase Distribution and Timing of Examinations:-

6 months      6 months      6 months

1

2

**1<sup>st</sup> Professional Examination  
(During 2<sup>nd</sup> Semester)**

3

4

5

**2<sup>nd</sup> Professional Examination  
(During 5<sup>th</sup> Semester)**

6

7

**3<sup>rd</sup> Professional part I  
(During 7<sup>th</sup> Semester)**

8

9

**3<sup>rd</sup> Professional part II  
(Final Professional)**

- 2.3.1. Passing in I<sup>st</sup> Professional is compulsory before proceeding to Phase II training for which he will be permitted not more than four chances. (actual examination provided four chances are completed in three years from the date of enrollment.)
- 2.3.2. A student who fails in the II<sup>nd</sup> professional examination should not be allowed to appear III<sup>rd</sup> Professional Part I examination unless he passes all subjects of II<sup>nd</sup> Professional examination.
- 2.3.3. Passing in III rd. Professional (Part I) examination is not compulsory before entering for 8th & 9th semester training, however passing of III rd. Professional (Part I) is compulsory for being eligible for III<sup>rd</sup> Professional (Part II) examination.
- 2.3.4. During third to ninth semesters, clinical postings of three hours duration daily as specified in the Table below is suggested for various departments, after Introductory Course in Clinical Methods in Medicine & Surgery of two weeks each for the whole class.
- 2.3.5. The supplementary examination for I<sup>st</sup> Professional Examination may be conducted within 6 months so that the students who pass can join the main batch and the failed students will have to appear in the subsequent year provided that the students who pass supplementary examination shall be allowed to appear in the second professional MBBS examination only after he/she completes the full course of study of three semesters (i.e. 18 months) for the second professional MBBS examination irrespective of the examination of the main batch.

**Note: Qualifications for Admission & Selection of Students is adopted from MCI Guidelines.**

## CHAPTER III

### SYLLABUS

**3.0.** The four and half year Bachelor of Medicine and Bachelor of Surgery (MBBS) curriculum is designed as an integrated structure incorporating four themes, within which units will be taught primarily in an integrated way in an interdisciplinary fashion by staff from across the faculty and in a wide range of clinical environments. The basic knowledge, skills and attitudes that form the curriculum is strictly based on *the MEDICAL COUNCIL OF INDIA REGULATIONS ON GRADUATE MEDICAL EDUCATION, 1997 as amended till 2013 and relates* to clinical and other problems or issues as depicted in it. Learning in an appropriate medical context is an overarching principle of the curriculum. 7.0.1 During the early years of the course, Pre and Para Clinical Course the basic medical (anatomy, Physiology including bio physics and Biochemistry and behavioral sciences, psychology and sociology, genetics, immunology, microbiology, pathology, pharmacology, Forensic & State medicine, Community Medicine) are introduced within interdisciplinary units. These units will all have a major focus on clinical issues through clinical case studies and family studies. The course features extended semester durations and requires approximately 30 formal contact hours per week, though in years three to five, it is expected that students will spend around 40 hours per week working in a clinical site. This provides students with time for self-directed study, and the time and opportunity to be in control of their own learning and to develop skills in problem-solving and the critical appraisal of information. The emphasis in this curriculum will be given to Patient & community centered learning activities. A patient & community based learning model will be used, where the knowledge, skills and attitudes that form the content of the curriculum are brought to life via formal patient-centered teaching exercises in the hospital as well as in the family. Most of the learning activities are designed to support students as they work with patient & family centered scenarios. To achieve the goal of producing an Indian Medical graduate as described in MCI Regulation on Graduate Medical Education 2012, the faculty of Medicine of the University has shortlisted a four basic themes for carrying out the training program and a foundation course. The areas will be covered throughout the course but with different weight-age at different phases.

**3.0.1. Theme 1: Personal and professional development:** It will focus on the doctor as an individual and will concentrate on the personal attributes and qualities needed by medical students and, ultimately, medical practitioners. It covers elements of health enhancement, professional responsibilities, communication skills, information technology, medical informatics and computing skills, ethics and legal issues, and clinical effectiveness.

**3.0.2. Theme 2: Population, society, health and illness:** It provides the structure to develop students' abilities to deal with broader society and population issues. Students will consider the social,

environmental and behavioral contexts of illness and the practice of medicine, including an emphasis on rural and remote areas. Other elements of this theme will be built around health promotion, epidemiology, public health, community diversity, population and global health, and a range of other societal issues. This will be covered from the 1<sup>st</sup> semester to the end semester under the community medicine, which will include sociology and other behavioral sciences.

**3.0.3. Theme 3: Scientific basis of clinical practice:** It includes much of the human systems-based teaching in the course. The knowledge and concepts that underpin medicine, both in the basic medical sciences and in the clinical sciences, will be delivered within this area. In the early semesters, (the basic sciences of anatomy, Physiology, biochemistry, genetics, microbiology, pathology, pharmacology and psychology of each system will be taught in an integrated manner and from a relevant clinical perspective. The history and philosophy of the scientific approach to medicine will also be included, extending this to approaches to knowledge and information, and an understanding of evidence-based medicine.

**3.0.4. Theme 4: The Clinical skills:** It encompasses the whole range of clinical skills, from the earliest to the later parts of the course. Practice in clinical skills (including procedural skills) is stressed early and often. The approach in clinical skills development will be to develop defined clinical competencies as prescribed in the **MCI Regulation on Graduate Medical Education 1997 (amended till 2013)**. This will begin with clinical aspects of communication skills and move through history taking and physical examinations to the more advanced clinical and procedural skills. The students will be allotted beds and they will have to observe the patient throughout the stay and will be included in the team of the doctors, nurses and other paramedical staff in the care of the allotted patients. This is to develop a team spirit and learn by doing things.. The rural health activities in the early years of the course will provide opportunities for our students to interact with a range of health care professionals while providing care to a patient in the hospital, in a family and in the community. The later years will include advanced elective experience in diverse medical work places, both within and outside the hospital environment.

**3.0.5. Community Based Family Health Practice Program:** The Community Based Family Health Practice Program (CBFHP) is an integral and innovative component of the MBBS course for second-year medical students. It provides a meaningful context for future medical practitioners to gain an understanding of issues that relate to family practice, social justice, equity and diversity in communities. The Department of community medicine in partnership with key clinical department will be responsible for the administration and coordination of CBFHP. Students must complete a community-based placement, attend orientation and integration lectures, and complete a report so that they understand the context and links between health and illness, medicine in the context of the family and also the health care delivery system. The curriculum encourages all students to spend considerable time in rural areas. A minimum of four weeks' experience in rural Practice area will be essential. Here the students will be given different clinical and public health projects.

**3.0.6. Foundation Course:** The aims of the course is an introduction to the perspective of Health Care, medical practice, working with patients and colleagues at the individual, family and community level and in the delivery of institutional as well as domiciliary service.. All the lectures relate to the practice of medicine and delivery of Health care services in India. The topics are driven by developing an awareness of what patients/ family really bring to the medical encounter - their expectations and thoughts about their health, and possibilities of health care to help them. These expectations are influenced by broader issues relating to gender, age, education, income and other social and cultural background, and what they can and cannot afford to do to help their health and comply to the medical/health advices.

**A. Knowledge Areas of Foundation Course:**

- i. **Science related to Health:** Students should have an introduction to the foundations of scientific knowledge related to health sciences which includes the concepts of health and disease, Natural History of Disease & Levels of Prevention.
- ii. **Social and Behavioral Sciences:** Students should have an introduction to the foundations of social, psychological and behavioral sciences influencing knowledge, attitude & practices related to health & diseases prevailing in the community.
- iii. **Math/Quantitative Reasoning:** Students should have an introduction to basic statistics which includes concept of measurements in biology/ health sciences and normal and abnormal values.
- iv. **Humanities:** Constitution of India relevant to health care, Governance pattern of public services including health. Health care delivery system, Organizational structure of health care and other ancillary service contributing to health, Health for All & Primary Health care concept. Existing system of governance and the responsibility and rights of the government, public and profession provided in the Constitution of India.

**B. Skill Areas:**

- I. **Communications:** Students should be able to communicate, in both oral and written forms and through a variety of media, to diverse audiences.
- II. **Language:** This will include English used for medical learning and spoken Hindi (for those who are from non- Hindi background)
- III. **Information Literacy:** Students should be able to locate, use, evaluate, and synthesize information.
- IV. **First Aid and CPR:** Student should be able to apply first aid in any medical emergencies including cardio pulmonary resuscitation.

**A. Details of Foundation Course:**

- I. **Concepts of health and disease, Natural History of Disease & Levels of Prevention: Lectures 01.** Directed self learning Exercise (suggested reading): 04 hrs. Small group problem solving discussion and presentation: 04 hrs.

- II. **What do people suffer from: health/illness, the sick role, medicine's relationship to society:**  
Lectures 01. Directed Self learning Exercise: 4 hours.
- III. From individual to population: health inequalities, public health, changing demographics

## **SUBJECT-WISE SYLLABUS**

### **3.1.0.0. ANATOMY**

**3.1.1.1** 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.

#### **Objectives:**

**3.1.1.2. Knowledge:** At the end of the course the student should be able to

- I. Comprehend the normal disposition, clinically relevant interrelationships, functional and cross sectional anatomy of the various structures in the body.
- II. Identify the microscopic structure and correlate elementary ultra-structure of various organs and tissues and correlate the structure with the functions as a prerequisite for understanding the altered state in various disease processes.
- III. Comprehend the basic structure and connections of the central nervous system to analyse the integrative and regulative functions of the organs and systems. He/She should be able to locate the site of gross lesions according to the deficits encountered.
- IV. Demonstrate knowledge of the basic principles and sequential development of the organs and systems, recognise the critical stages of development and the effects of common teratogens, genetic mutations and environmental hazards. He/She should be able to explain the developmental basis of the major variations and abnormalities.

#### **Skills:**

- I. Identify and locate all the structures of the body and mark the topography of the living anatomy.
- II. Identify the organs and tissues under the microscope.
- III. Understand the principles of karyotyping and identify the gross congenital anomalies.
- IV. Understand Principles of X-Ray and interpret the X ray images of normal human structures
- V. Understand principles of newer imaging techniques and interpretation of Computerized Tomography (CT) Scan, Sonogram of normal individual.
- VI. Understand clinical basis of some common clinical procedures i.e., intramuscular & intravenous injection, lumbar puncture and kidney biopsy etc.

## **Integration:**

From the integrated teaching of other basic sciences, student should 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 process.

### **3.1.2. Detailed Curriculum of Anatomy for the 1st. Professional MBBS Course**

**3.1.2.0. Introduction to Anatomy & Anatomical Terminology: (anatomical position, planes, tissues and movements)** In order to communicate effectively with colleagues, and understand the description of the anatomical structures and its relations to other structures of the body, the undergraduate must understand and able to use accepted anatomical terms, language so that he is capable of describing the normal structure of the body. ***At the end of the course the medical graduate should be able to:***

- I. Define and demonstrate the following terms relative to the anatomical position: medial, lateral, proximal, distal, superior, inferior, deep, superficial, palmar, plantar, anterior/ ventral, posterior/dorsal, rostral, caudal.
- II. Describe the following anatomical planes: axial/transverse/ horizontal, sagittal, and coronal.
- III. Define and demonstrate the terms used to describe the movements of the limbs and vertebral column: flexion, extension, lateral flexion, pronation, supination, abduction, adduction, medial and lateral rotation, inversion, eversion, plantar flexion, dorsiflexion, protraction, retraction and circumduction.
- IV. Define the terms somatic and visceral when used to describe parts and systems (e.g. somatic and visceral motor systems) of the body.

#### **3.1.2.1. Osteology**

- I. Names of the bones of the body and their position; classification of the bones with examples; general features of the bone and normal development; microscopic anatomy of bone; general pattern of blood supply; ossification of the bones of the limbs for age determination. X-rays of bones.
- II. Process of repair of bone.

#### **3.1.2.2. Muscular System**

- I. Classification and identification of the muscles of the body: main attachments, nerve supply and action(s), microscopic anatomy of muscles and the nerve terminations.
- II. Details of attachments of the muscles; ultrastructural features of muscle; mechanism of the movement caused by the muscle/muscles and various forces exerted by them and their detailed action(s).

### 3.1.2.3. Arthrology

(a). Definition and classification of joints, general features of different types of joints; detailed study of major joints of the limbs and movements performed at various joints in the body.

**3.1.2.4. Vertebral Column:** The knowledge about vertebral column is necessary as it forms the basis for the understanding of common spinal pathologies e.g. back pain, prolapsed of an inter vertebral disc, injuries to the spinal cord, nerve, and whiplash injuries and their consequences for the remainder of the body. In order to perform a basic neurological examination of the limbs and trunk, the student should have a working knowledge of dermatomes and peripheral nerve distributions, the function of major muscle groups and their innervations. It is also necessary for the safe performance of procedures such as lumbar puncture, regional and epidural anesthesia. As such the medical students should be able to: Recognize characteristics feature of vertebrae from the five regions of the vertebral column; Understand how the spine as a whole moves and how its normal curvature develops and is stabilized. And Interpret relevant clinical images to distinguish deviation from the normal. Understand the organization of contents of the vertebral canal i.e. the meninges, spinal cord, spinal nerve roots, spinal nerves and their particular relationships to the vertebral and inter-vertebral joints.

***Specific Objective: At the end of the course: A medical graduate should be able to:***

- I. Describe the main anatomical features of a typical vertebra. Identify the atlas, axis, typical cervical, thoracic, lumbar vertebra and sacrum and recognize their characteristic features.
- II. Describe the structures, regions, and functions of the vertebral column. Describe the range of movement of the entire vertebral column and its individual regions. Explain what makes spinal injuries stable and unstable.
- III. Describe the intervertebral facet joints and intervertebral discs. Explain the role of the discs in weight bearing by the vertebral column and give examples of common disc lesions and how they may impinge upon spinal nerve roots and/or spinal cord.
- IV. Describe the anatomy of spinal nerve (e.g. as exemplified by a thoracic spinal nerve, including its origin from dorsal and ventral spinal roots, its main motor and cutaneous branches and any autonomic component.
- V. Identify the principal muscle groups and ligaments of the vertebral column and surface features in order to able to perform an examination of the back, discuss their functional role in stability and movement of the vertebral column and describe the anatomical basis of back pain.
- VI. Describe the anatomical relationships of the meninges to the spinal cord and dorsal and ventral nerve roots, particularly in relation to root compression and the placement of epidural and spinal injections. Describe the anatomy of lumbar puncture.

**3.1.2.5. Upper Limb: General Objective:** Medical graduates are to be aware of the sites of common fractures (clavicle, humerus, distal radius and scaphoid and the complication that might result from them and also understand the nature and consequences of common injuries (e.g. shoulder, elbow and finger dislocation). As such the Medical graduate should be able to recognize the major palpable and imaging features of the bones of the upper limb and should be aware of the factors that influence the stability of the shoulder, elbow, wrist and inter-phalangeal joints. In order to perform clinical procedures safely and effectively Medical graduates should be able to demonstrate, the course, key relation and distribution of the neurovascular structures of the upper limb, major pulse points(e.g. sub-clavian, brachial, and radial) position of Major veins. (for venous access). Medical students should know the common sites of peripheral nerve injury and their likely functional effects (brachial plexus lesions, axillary, radial, ulnar, and median nerve lesions). The medical students should be able to explain the anatomical basis of common conditions of the upper limb (rotator cuff injuries, carpal tunnel syndrome) and how infection might spread in the limb. The student should be able to explain the significance of lymphatic distribution in relation to metastatic spread of Breast cancer and melanoma and, the medical student should also be able to describe the organization of the axillary lymph nodes and lymphatic drainage of the breast. **At the end of the course a medical graduate should be able to:**

- I. Describe and demonstrate the main anatomical landmarks of the clavicle, scapula, humerus, radius, and ulna. Recognize the bones of the wrist and hand and their relative positions. Identify those bones that are commonly damaged (scaphoid and lunate) and predict functional impairment following such damage.
- II. Describe the close relations of the bones and joints (e.g. bursae, blood vessels, nerves, ligaments, and tendons), which may be injured by fractures or dislocation and predict what the functional effects of such damage might be.
- III. Describe the fascial compartments delimiting the major muscle groups of the upper limb, explain the functional importance and their contents.
- IV. Describe the origin, course and distribution of the major arteries and their branches that supply the shoulder, arm, forearm, in relation to common sites of injury. Explain the importance of anastomoses between branches of these arteries at the shoulder and in upper limb.
- V. Describe the sites at which pulses in the brachial, radial, and ulnar arteries may be located.
- VI. Describe the courses of the main veins of the upper limb, classify and contrast the functions of the deep and superficial veins. Identify the common sites of venous access and describe their key anatomical relations. Explain the relationship between venous and lymphatic drainage channels.

**3.1.2.6 Lower Limb:** Medical graduates are to be aware of the sites of common fractures (neck and shaft of femur, tibia and fibula) and the complication that might result from them As such the Medical graduate should be able to recognize the major palpable and imaging features of the bones of lower limb. He

should be able to explain the factors that influence the stability of the hip, knee and ankle joints, the common ligamentous injury and able to test ligament integrity. In order to perform clinical procedures safely and effectively graduates graduate should be able to describe the course and distribution of the main neurovascular structures in the lower limb. (to avoid damage to sciatic nerve when making an intramuscular injection and be able to demonstrate major pulse points (e.g. femoral, for arterial blood sampling, popliteal, posterior tibial and dorsalis pedis), the major veins (for venepuncture, venous access by “cut down” and assessment of varicose veins). Student should be able to demonstrate common sites of peripheral nerve injury and the possible functional effects of such damage. (Sciatic and common peroneal nerve at neck of fibula). In order to perform basic neurological examination of the lower limb the medical students should have a working knowledge of surface anatomy, dermatomes, and peripheral nerve distribution, the function of major muscle groups and their innervations. The medical students should understand the organization of inguinal lymph nodes and how they relate to the lymphatic drainage of the limb, trunk skin and perineum. The students should also be aware of the organization of the deep fascia of the lower limb and its relevance to compartment syndromes, how blood is returned to the heart from the legs and how failure of this mechanism may cause the development of varicosities deep vein thrombosis and embolism. **Specific Objective: At the end of the course A medical Graduate should be able to:**

- I. Recognize the major features and surface landmarks of the pelvis, femur, tibia, fibula ankle and foot. Demonstrate their palpable and imaging landmarks. Appreciate which bones and joint are vulnerable to damage and what the consequences of such damage could be.
- II. Describe the close relation of these bones and joints (e.g.) bursae, blood vessels, nerves, ligaments and tendons), which may be injured in fractures or dislocations, and predict what the final effects of such damage would be.
- III. Describe the fascial compartments enclosing the major muscle groups and explain the functional importance of these compartments and their contents in relation to compartment syndromes.
- IV. Demonstrate the origin, course and branches of the major arteries that supply the hip gluteal region, thigh, leg ankle and foot. Explain the functional significance of anastomoses between branches of these arteries at the hip and knee. .
- V. Demonstrate the location at which the femoral, popliteal, dorsalis pedis and posterior tibial can be felt.
- VI. Demonstrate the course of the principal veins of the lower limb. Explain the role of perforator vein connection between the superficial and deep veins and the function of the “muscle pump” for venous return to the heart. Describe the sites of venous access that can be used for ‘cut down’ procedures in emergencies.
- VII. Outline the origin of the lumbosacral plexus and formation of its major branches.

- VIII.** Describe the origin, course and function of the sciatic, femoral, obturator, common peroneal and tibial nerves, sural and saphenous nerves and summaries the muscles and muscle groups that each supplies as well as sensory distribution.
- IX.** Describe the structure and the movements of the hip joint. Summaries the muscles responsible for these movements, their innervations and main attachments.
- X.** Describe the structure responsible for stability of the hip joint and their relative contribution to maintaining the lower limb in different positions.
- XI.** Describe the structures at risk from a fracture of the femoral neck or dislocation of the hip and explain the functional consequences of these injuries.
- XII.** Describe the boundaries of femoral triangle and the anatomical relationship of the femoral nerve, artery, vein, and lymph nodes to each other and to the inguinal ligament, with particular regard to arterial blood sampling and catheter placement.
- XIII.** Describe the anatomy of gluteal (buttock) region and course of the sciatic nerve within it. Explain how to avoid damage to the sciatic nerve when giving intramuscular injections.
- XIV.** Describe the structure and movements of the knee joint. Summaries the muscles responsible for these movements, their innervations and main attachments.
- XV.** Describe the close relations of the knee joint including major bursae and explain which structure may be injured by trauma (including fractures and dislocation) to the knee.
- XVI.** Identify the factors responsible maintaining the stability of the knee joint. Describe the menisci, ligaments and the locking mechanism close to full extension. Explain the anatomical basis of tests which assess the integrity of the cruciate ligaments.
- XVII.** Describe the boundaries and content of the popliteal fossa.
- XVIII.** Describe the anatomy of ankle joint. Explain the movements of flexion, extension, plantarflexion, dorsiflexion, inversion and eversion. Summaries the muscles responsible for these movements, their innervations and their main attachments.
- XIX.** Describe the factors responsible for stability of ankle joint, specially the lateral ligaments, and explain the anatomical basis of “sprain” injuries.
- XX.** Describe the arches of the foot and the bony, ligamentous and muscular factors that maintain them.
- XXI.** Describe the movements of inversion and eversion at the subtalar joint, the muscle responsible, and their innervations and main attachments.
- XXII.** Describe the anatomical basis (nerve root or peripheral nerve) for loss of movements and reflexes at the knee and ankle resulting from spinal injuries, disc lesions and common

peripheral nerve injuries. Describe the dermatomes of the lower limb and perineum used to assess spinal injuries.

- XXIII. Describe the structures at risk to a fracture of the femoral neck or dislocation of the hip and describe the functional consequences of these conditions.
- XXIV. Describe the lymphatic drainage of the lower limb and its relationship to tumor spread.
- XXV. Discuss the structure of the lower limb that be used for auto graft.
- XXVI. Interpret standard diagnostic images of the lower limb and able to recognize common abnormalities.

**3.1.2.7. Head & Neck:** Medical graduates should be able to recognize the major palpable and imaging features of the skull and cervical spine in order to be able to interpret relevant medical images. To perform clinical examination of the head and neck graduates should be familiar with the position, key relationships, neurovascular supply, venous and lymphatic drainage of the following major structures: course and distribution of the cranial nerves, ear and pharyngotympanic (Eustachian) tube, eye, eyelids and conjunctivae, nasal cavity and paranasal air sinuses, oral cavity and tongue, tonsils, soft palate, pharynx, salivary glands, larynx and trachea, thyroid and parathyroid glands and the contents of the carotid sheath. To describe the fascia and fascial spaces of the neck in relation to the spread of infection. This knowledge is necessary for understanding conductive and sensorineural deafness, otalgia and the likely sources of referred pain to the ear, facial nerve palsy, epistaxis, quinsy, dysphagia, upper airway obstruction, infantile stridor, sinusitis, vocal cord paralysis and hoarseness, cervical swellings, and salivary gland swellings. The Medical Graduates should have Sufficient anatomical knowledge to be able to manage the airway, insert an endotracheal or nasogastric tube, and perform a tracheostomy and laryngotomy.. Aworking knowledge of surface anatomy, cranial nerve distribution, the functions of major muscles of the head and neck and their innervations in order to perform a basic neurological examination. ***At the end of the course a Medical Graduate should be able to:***

- I. Demonstrate the position palpable and imaging landmarks of the major bones of the skull, including the frontal, parietal, occipital, temporal, maxilla, zygoma, mandible, sphenoid, nasal and ethmoid bones. Demonstrate the palpable position of the hyoid bone, thyroid and cricoid cartilages, lateral mass of the atlas and the spine of C7. Demonstrate the major sutural joints and describe the fontanelles of the fetal skull.
- II. Describe the boundaries, walls and floors of the cranial fossae.
- III. Identify the external and internal features of the cranial foraminae and list the structures that each transmits.
- IV. Demonstrate the position of the anterior and posterior triangles of the neck defined by the sternum, clavicle, mandible, mastoid process, trapezius and sternocleidomastoid.

- V.** In the posterior triangle, demonstrate the position of the spinal accessory nerve, the roots and trunks of the brachial plexus, the external jugular vein and subclavian vessels in relation to penetrating neck trauma.
- VI.** In the anterior triangle, demonstrate the position of the common, internal and external carotid arteries, the internal jugular vein and vagus nerve, the trachea, thyroid cartilage, larynx, thyroid and parathyroid glands. Explain their significance in relation to carotid insufficiency, central venous line insertion, emergency airway management and diagnosis of thyroid disease.
- VII.** Describe the location and anatomical relations of the thyroid and parathyroid glands, their blood supply and the significance of the courses of the laryngeal nerves.
- VIII.** Demonstrate the origin, course and major branches of the common, internal and external carotid arteries and locate the carotid pulse.
- IX.** Describe the courses of the accessory, vagus and phrenic nerves in the neck.
- X.** Identify the major structures passing between the neck and the thorax. Describe the courses and important relationships of the subclavian arteries and veins.
- XI.** Describe the anatomy of the scalp, naming its individual layers. Describe the blood supply of the scalp and its significance in laceration injuries.
- XII.** Demonstrate the extra cranial course of the branches of the facial nerve. Summarise the muscles of facial expression supplied by each branch and describe the consequences of injury to each branch.
- XIII.** Describe the intracranial and intrapetrous course of the facial nerve and the relationships of its major branches to the middle ear in relation to damage of the nerve within the facial canal.
- XIV.** Describe the anatomy of the temporomandibular joint. Explain the movements that occur during chewing and describe the muscles involved including their innervations. Explain what occurs in anterior joint dislocation and relocation.
- XV.** Describe the origin, function and major branches of the sensory and motor components of the trigeminal nerve.
- XVI.** Describe the origins and summaries the courses and major branches of the facial and maxillary arteries, including the course and intracranial relations of the middle meningeal artery and its significance in extradural hemorrhage.
- XVII.** Describe the relationship of the termination of the facial vein (draining into the internal jugular vein) and the mandibular branch of the retromandibular vein (supplying facial muscles controlling the angle of the mouth) to the submandibular gland and related upper jugular lymph nodes in relation to exploration of this area.

- XVIII.** Describe the key anatomical relations of the parotid, submandibular and sublingual salivary glands, the course of their ducts into the oral cavity and their autonomic secretomotor innervations. Appreciate the narrow points of the ducts in relation to salivary stone impaction.
- XIX.** Demonstrate the major features and boundaries of the oral cavity and summarize its sensory innervations.
- XX.** Describe the functional anatomy of the tongue, including its motor and sensory innervations and the role of the extrinsic and intrinsic muscles. Explain the deviation of the tongue after hypoglossal nerve injuries.
- XXI.** Describe the anatomical arrangement and functional significance of the lymphoid tissue in the tonsils, pharyngeal, and posterior nasal walls.
- XXII.** Describe the muscles that compose the pharyngeal walls and move the soft palate; summarize their functions and nerve supply. Describe the components of the gag reflex.
- XXIII.** Describe the hyoid bone and cartilages of the larynx. Explain how these structures are linked together by the thyrohyoid, cricothyroid, and quadrangular membranes.
- XXIV.** Describe the intrinsic and extrinsic laryngeal muscles responsible for closing the laryngeal inlet, controlling vocal cord position and tension. Explain how these muscles function during phonation, laryngeal closure, the cough reflex and regulation of intrathoracic pressure.
- XXV.** Describe the origin, course and functions of the motor and sensory nerve supply of the larynx and the functional consequences of injury to them.
- XXVI.** Describe the stages of swallowing and the functions of the muscles of the jaw, cheek, lips, tongue, soft palate, pharynx, larynx and esophagus during swallowing.
- XXVII.** Describe the location, actions and nerve supply of the intrinsic and extra-ocular muscles and apply this knowledge to explain the consequences of injury to the nerve supply of these muscles.
- XXVIII.** Describe the anatomy of the eyelids, conjunctiva and lachrymal glands. Explain their importance for the maintenance of corneal integrity.
- XXIX.** Describe the functional anatomy of the external auditory meatus, tympanic membrane, ear ossicles and auditory tube, together with their major anatomical relations.
- XXX.** Describe the bones of the nasal cavity and the major features of the lateral wall of the nasal cavity. Describe the major arteries that supply the lateral wall and nasal septum in relation to nosebleeds.
- XXXI.** Name the paranasal sinuses, describe their relationships to the nasal cavities and sites of drainage on its lateral wall and explain their innervations in relation to referred pain.

- XXXII. Describe the arrangement of the dura mater, and its main reflections within the cranial cavity and their relationship to the major venous sinuses and the brain itself.
- XXXIII. Describe the arrangement of the venous sinuses of the cranial cavity; explain the entrance of cerebral veins into the superior sagittal sinus in relation to subdural hemorrhage, and how connections between sinuses and extra cranial veins may permit intracranial infection
- XXXIV. Describe the relationships between the brain and the anterior, middle and posterior cranial fossae.
- XXXV. Describe the anatomy of the motor and sensory nerves to the head and neck and apply this to a basic neurological assessment of the cranial nerves and upper cervical spinal nerves.
- XXXVI. Describe the sympathetic innervations of the head and neck and the features and casual lesions in Horner's syndrome.
- XXXVII. Demonstrate the positions of the external and internal jugular veins and the surface landmarks that are used when inserting a central venous line.
- XXXVIII. Describe the arrangement of the lymphatic drainage of the head and neck, the major groups of lymph nodes and the potential routes for the spread of infection and malignant disease.
- XXXIX. Interpret standard diagnostic images of the head and neck and be able to recognize common abnormalities.

**3.1.2.8. Abdomen:** Medical graduates should be familiar with the anatomy of the anterior and posterior abdominal walls and the inguinal region, the extent of the peritoneal cavity and the anatomy and key relationships of the esophagus, stomach, small and large intestines including the appendix, liver, gall bladder pancreas, spleen, kidneys, ureters and adrenal and suprarenal glands. They should understand the arterial supply and venous drainage to the intestine in relation to arterial occlusion, strangulation, intestinal surgery, the portal circulation and the effects of portal hypertension, and the lymphatic drainage and innervations of the abdominal organs in relation to metastatic spread of cancer and abdominal pain. This knowledge forms the basis of understanding of surgical incisions, referred pain from the abdominal viscera (especially the gall bladder and appendix) and how the sub-hepatic and sub-phrenic spaces may be implicated in the spread of infection. They should have a working knowledge of surface anatomy and be able to undertake an examination of the abdomen and of the inguinal canal for hernias. They should be able to interpret standard diagnostic images of the alimentary, pancreato-biliary and urinary tracts. ***At the end of the course a medical Graduate should be able to:***

- I. Demonstrate the bony and cartilaginous landmarks visible or palpable on abdominal examination.
- II. Demonstrate the descriptive regions of the abdomen and common incision sites. Demonstrate the surface projections of the abdominal organs.

- III.** Describe the anatomy, innervation and functions of the muscles of the anterior and posterior abdominal walls. Discuss their functional relationship with the diaphragm and roles in posture, ventilation and voiding of abdominal / thoracic contents.
- IV.** In relation to direct and indirect inguinal hernias, demonstrate the anatomy of the attachments of the inguinal ligament; the anatomy of the superficial and deep inguinal rings and how the anterior abdominal wall muscles form the inguinal canal. Describe the contents of the inguinal canal in both males and females.
- V.** Describe the relationship between the femoral canal and the inguinal ligament and the anatomy of femoral hernias.
- VI.** Demonstrate the positions of the liver, pancreas spleen, kidneys, stomach, duodenum, jejunum and ileum of the small intestine, caecum, appendix, ascending, transverse, descending and sigmoid parts of the colon and the rectum.
- VII.** Describe the organisation of the parietal and visceral peritoneum; its lesser and greater sacs, mesenteries and peritoneal 'ligaments'. Explain the significance of the variable attachment of the ascending and descending colon to the posterior abdominal wall.
- VIII.** Summarise the functional anatomy of the small bowel mesentery; its structure, location and vascular, lymphatic and neural content.
- IX.** Explain the nerve supply of the parietal and visceral peritoneum and the role of the visceral peritoneum in referred pain.
- X.** Describe the functional anatomy of the stomach, its position, parts, sphincters, blood and nerve supply and key relations to other abdominal organs.
- XI.** Describe the duodenum, its parts, position, secondary retroperitoneal attachment, blood supply and key relations with other abdominal organs and their significance in relation to peptic ulcer disease.
- XII.** Describe the regions of the small and large intestine, including the anatomy of the appendix. Describe the anatomical variations in the position of the appendix and explain their significance in relation to appendicitis.
- XIII.** Describe the position and form of the pancreas and its relationships to other abdominal organs. Discuss the significance of these relationships in relation to pancreatitis and biliary stone disease.
- XIV.** Describe the position and form of the liver, the lobes of the liver and their key anatomical relations. Explain the peritoneal reflections of the liver and its movement during respiration. Summarise the functional anatomy of the portal vein, the portal venous system and portal-systemic anastomosis and their significance in portal hypertension.

- XV. Describe the position and form of the gall bladder and biliary tree; their relations in the abdomen and the significance of these relations in relation to gall bladder inflammation and biliary stones.
- XVI. Describe the position and form of the kidneys and ureters. Demonstrate their relationships to other abdominal and pelvic structures and discuss the significance of these relations in relation to urinary stones.
- XVII. Describe the relations of the suprarenal (adrenal) glands and their functional anatomy.
- XVIII. Describe the position (in relation to the ribs) and form of the spleen in relation to its palpation through the abdominal wall and its key anatomical relationships with other abdominal structures. Explain the significance of these relationships in relation to trauma, chronic infections and disorders of the haematopoetic system.
- XIX. Describe the origins, course and major branches of the abdominal aorta, coeliac axis, superior and inferior mesenteric arteries and their major branches, the renal and gonadal arteries. Explain the significance of the blood supply from the abdominal aorta to the spinal cord in relation to abdominal aneurysm repair. Demonstrate the origins, course and major tributaries of the inferior vena cava.
- XX. Describe the anatomy of the lymph nodes involved in lymph drainage of abdominal viscera and its significance in relation to spread of malignancy.
- XXI. Interpret standard diagnostic images of the abdomen and recognise common abnormalities.

**3.2.10: Pelvis:** Medical graduates should be familiar with the anatomy and positions of the ureters, bladder, urethra, rectum and anal canal, the structure of the pelvic floor, and the anatomy of continence, the anatomy of the external and internal genitalia in males (scrotum, testis, vas deferens, seminal vesicles, prostate, penis) and females (ovaries, uterine tubes, uterus, cervix, vagina, labia, clitoris). They should be able to describe the peritoneal relationships, and supports of the pelvic viscera to understand ectopic pregnancy, prolapse and suprapubic catheterization. They should understand the arterial supply, venous drainage and the lymphatic drainage and innervations of the pelvic organs in relation to metastatic spread of cancer. Graduates should be able to interpret relevant standard diagnostic images and have sufficient anatomical knowledge to be able to perform rectal and vaginal examinations, urinary catheterization in both males and females, and obtain a cervical smear in females. ***At the end of the course a Medical Graduate should be able to:***

- I. Describe the skeletal and ligamentous components of the pelvis, the anatomy of the pelvic inlet and outlet and recognize their normal orientation. Explain sex differences in pelvic skeletal anatomy and how these change during development.
- II. Demonstrate the palpable anatomical landmarks of the iliac, ischial and pubic bones in the living and on the bones and identify them on medical images.

- III.** Demonstrate the points of attachment of the muscles of the abdominal wall and those of levator ani.
- IV.** Describe the functional importance of the pelvic floor musculature, its midline raphé and the structures passing through it in males and females.
- V.** Describe the anatomy of the bladder, its base and ureteric openings. Explain how its position changes with filling and pregnancy and its relationship to the overlying peritoneum.
- VI.** Describe the anatomy of the urethra; explain the anatomy of its different part in males and females in relationship to continence and catheterization.
- VII.** Describe the innervations of the bladder and its sphincters and the mechanism of micturition
- VIII.** Describe the anatomy of the scrotum, testis, epididymis and their normal features on clinical examination. Explain the significance of their arterial supply in relation to torsion, their venous drainage in relation to varicocoele and their lymphatic drainage in relation to tumor spread.
- IX.** Describe the structure and course of the spermatic cord and vas deferens.
- X.** Describe the anatomy of the prostate gland, seminal vesicles and their anatomical relations. Describe the normal form of the prostate when examined per rectum and changes in relation to hypertrophy and malignancy.
- XI.** Describe the position and form of the ovary, uterine tubes, uterus, cervix and vagina and their anatomical relationships, including any peritoneal coverings. Describe the changes that occur in the uterus and cervix with pregnancy.
- XII.** Describe the origin, course and relations of the uterine, ovarian and testicular arteries
- XIII.** Describe the origin, course and branches of the pudendal nerves and the sites of nerve block during childbirth.
- XIV.** Describe the innervations and mechanisms involved in erection of cavernous tissue in male and female and emission and ejaculation in the male.
- XV.** Describe the anatomy of the sigmoid colon and rectum and their anatomical relationships including peritoneal. Explain the anatomy of the anal canal, the functional anatomy of the anal sphincters and their role in faecal continence.
- XVI.** Describe the blood supply and venous drainage of the distal bowel; the supply from the superior rectal (inferior mesenteric), middle rectal (internal iliac) and inferior rectal arteries (from pudendal to anal canal only), and portal-systemic venous anastomoses; describe the vascular anal cushions and explain their role in continence.
- XVII.** Describe the anatomy of the ischio-anal fossa and explain its potential involvement in abscesses, anal glands and fissures.

- XVIII.** Describe the structure of the penis, scrotum and its contents, the clitoris and vulva. Describe the arterial supply to and venous drainage from the penis. Explain the anatomy of the perineal membrane and superficial perineal pouch in relation to the accumulation of fluids in the male.
- XIX.** Describe the lymphatic drainage of the pelvis
- XX.** Interpret standard diagnostic images of the pelvis and be able to recognize common abnormalities.

**3.1.2.9. Neuroanatomy:** A medical graduate should be able to:

- I.** Define the terms rostral and caudal, anterior/ventral and posterior/dorsal in relation to the nervous system.
- II.** Define the terms grey and white matter, fasciculus, tract, commissure, pathway, chiasm, decussation, nucleus, ganglion, and cortex.
- III.** Identify the major divisions of the brain: the cerebral hemispheres, diencephalon (thalamus, hypothalamus and epithalamus), midbrain, pons, medulla oblongata and cerebellum.
- IV.** Identify the major sulci and gyri of the cerebral hemispheres (lateral central and post-calcarine) and summarize the position of the frontal, parietal, occipital and temporal lobes.
- V.** Describe the areas of cerebral cortex sub-serving major special functions; motor (including motor speech); sensory; visual; auditory (including sensory speech); memory and emotion (medial temporal –hippocampus, amygdale); decision making, social behavior (orbito-frontal). Explain the manifestations of related disorders.
- VI.** Summarise the position of the major commissure (corpus callosum) and ascending and descending tracts (internal capsule, cerebral peduncles, pyramids).
- VII.** Describe the blood supply to the brain and explain the functional deficits occurring after 'stroke' involving individual cerebral arteries.
- VIII.** Describe the anatomy of the arachnoid and pia mater and ventricular system. Explain the formation, circulation and drainage cerebrospinal fluid.
- IX.** Describe the origin, courses and functions of the cranial nerves.
- X.** Describe the neural pathways sub-serving the special senses.
- XI.** Summarise the structure of the cerebellum, the connections and functions of the principal cerebellar inputs and outputs.
- XII.** Summarise the locations, connections and functions of the basal ganglia (caudate, putamen, globus pallidus, subthalamic nucleus and substantia nigra). Explain the manifestations of the related disorders.

- XIII. Summarise the functions and connections of the thalamus.
- XIV. Describe the anatomy and major functions (endocrine, autonomic) of the hypothalamus and pituitary gland. Explain the manifestation of related disorders.
- XV. Describe the principal components of the limbic system, hippocampus, amygdale, prefrontal cortex, nucleus accumbens), the pathways connecting them and their function.
- XVI. Discuss the position and major functions of the ascending aminergic systems (noradrenalin, dopamine, and serotonin) and cholinergic systems.
- XVII. Describe the position within the spinal cord of the dorsal column, anterolateral (spinothalamic) and trigeminothalamic ascending tracts, the spinocerebellar and the corticospinal and extra pyramidal descending tracts. Describe the sites at which synapses occur in these pathways.
- XVIII. Explain the anatomical basis of neurological assessment.
- XIX. Identify the major features of the brain on coronal, horizontal and sagittal sections and standard diagnostic image and be able to recognize common abnormalities.

***(Neuroanatomy will be taught along with the department of Physiology)***

#### **3.1.3.0. Microanatomy**

Microscope and basic principles of microscopy, commonly used stains, basophilic and acidophilic staining reactions and their significance, commonly encountered artifacts. And brief principle of electron microscopy and interpretation of ultra-structural features.

#### **3.1.3.1.: GENERAL HISTOLOGY**

**3.1. 3.2. Cell:** detailed structure of cell and its components and their functional mechanisms.

#### **3.1.3.3. Four primary tissues**

- I. ***Epithelium:*** Microscopic characteristics, types, functions, distribution, basal lamina, cell junctions, specialization of the cell surface and their structural details and functions; metaplasia.
- II. ***Connective Tissue:*** Cells, fibers and their structural features and functions. Intercellular substances, amorphous ground substance, types of connective tissue (loose areolar tissue, dense connective tissue) and their distribution. *Specialized connective tissue:* different types of cartilages and their functions and distribution. *Bone:* Cells, bone matrix, structural features of compact and cancellous bone, their distribution and functions, ossification, blood supply of a long bone.
- III. ***Muscle :*** General features, detailed structure of : skeletal muscle, and molecular mechanisms of contraction, innervations of skeletal muscle, neuromuscular junction, morphological and histo-

chemical basis of classification into type I and type II muscle fibers and their significance, structural and functional characteristics of cardiac and smooth muscle; innervations of cardiac and smooth muscle.

- IV. **Nervous Tissue:** Structural characteristics of a neuron, axon and dendrites. Different types of neurons and their specific structural and functional features and distribution. Axonal transport, synapse, morphological and functional characteristics of different types of synapses.
- V. **Neuroglia:** Types, structure and functions, blood brain barrier. Brief cyto-architecture of the central nervous system, regeneration in CNS with particular emphasis on stem cells. Sensory and autonomic ganglia, peripheral nerves, myelin and myelination, degeneration and regeneration in peripheral nerves.

#### 3.3.4. Histology of various organs/organ systems

- I. **Exocrine glands:** Characteristics, simple and compound glands; types of secretions, modes of secretion, detailed structural features of a serous secreting cell and mucous secreting cell, serous and mucous acini, duct system, features of salivary glands, exocrine pancreas, sweat and sebaceous glands, mammary gland, bulbourethral gland etc.
- II. **Circulatory system:** Structural features of heart; conducting and distributing arteries and arterioles; types of capillaries, their structural features and distribution and microcirculation, detailed structure of endothelium; structural characteristics of large and small veins and venules arterio-venous shunts, lymphatics.
- III. **Respiratory system:** Structural features of nose, nasopharynx, larynx, trachea, principal bronchi, lung including intrapulmonary bronchi, bronchioles, alveolar ducts, atria, alveoli, blood-air-barrier. Functions of different parts of respiratory system.
- IV. **Skin and nerve-end-organs:** Thick, thin and hairy skin, cell renewal and pigmentation of skin, skin appendages, healing of skin wounds, sensory receptors of skin. Functions of skin.
- V. **Immune System and Lymphoid Organs:** Lymphocytes, their subtypes and functions. Humoral and cell mediated immunity. Thymus, lymph nodes, spleen, tonsils and other mucous associated lymphoid follicles.
- VI. **Digestive System (GIT):** General organization, oral cavity, lip, cheek, tongue, taste buds, associated salivary glands. Layers of tubular digestive tract, esophagus, stomach, small intestine, gastroesophageal junction, gastroduodenal junction, large intestine, anal canal and rectoanal junction. Liver, internal organization of liver, liver lobule, liver acinus, significance of zonation in liver acinus, liver sinusoids, detailed structure of hepatocyte, bile canaliculi, bile ducts, gall bladder, bile duct and pancreas.

- VII. **Endocrine glands** : Thyroid, parathyroid, Islets of Langerhan's gland, adrenal cortex and medulla, their structural details, functional mechanisms, hypophysis cerebri, cell types secretion and their functions, hypophyseal portal circulation, common endocrine disorders
- VIII. **Urinary System** : Detailed microscopic structure of kidney, cortex, medulla, pyramids, medullary rays, cortical columns, glomerulus, nephron, glomerular filtration juxtaglomerular apparatus, its structural features and functions, renal interstitium, collecting ducts, renal sinus, minor and major calyces, microcirculation of kidney, histophysiology of the kidney, renal pelvis and ureters, urinary bladder and urethra.
- IX. **Female Reproductive System** : Ovary, ovarian stroma, primary and secondary graafian follicles, functions of various constituents and structural details of graafian follicles, atretic follicles, corpus luteum and its functions, corpus albicans. Oviducts, uterus, arterial supply of uterus, cyclic changes in uterine endometrium, fertilization, vagina, female external genitalia and mammary glands.
- X. **Male Reproductive System** : Testes, spermatogenesis, spermatozoon, cycle of seminiferous epithelium, sertoli cells, interstitial tissue Leydig cells, histophysiology of testes, epididymus, vas deferens, prostate, seminal vesicles, penis.

#### 3.1.4.0. Embryology

##### 3.1.4.1. General Embryology

- I. **Definition** of embryology; gestation period: definition of gamete sperm, Ovum; gametogenesis, migration of primordial germ cells into gonadal ridge; spermatogenesis; structure of sperm, oogenesis; structure of ovum; growth of ovarian follicles, ovarian and uterine cycles.
- II. Sperm in the male genital tract; sperm in the female genital tract, activation and capacitation of sperm in the female genital tract.
- III. **First Week of Development:** Definition and normal site and process of fertilisation, formation of zygote, cleavage division; formation of morula and blastocyst.
- IV. **Second Week of Development:** Differentiation of embryoblast and trophoblast; changes in the embryoblast formation of bilaminar germ disc; changes in the trophoblast; formation of cytotrophoblast, syncytiotrophoblast, amniotic membrane, yolk sac, extra embryonic mesoderm and extra embryonic coelom and connecting stalk; formation of chorion, amniotic cavity, primary yolk sac cavity appearance of prochordal plate. Implantation; formation of decidua, types of implantation and abnormal sites of implantation
- V. **Third Week of Development:** Appearance of primitive streak and primitive node; formation of intraembryonic mesoderm resulting in trilaminar germ disc; gastrulation formation of notochord, buccopharyngeal and cloacal membranes, paraxial, intermediate and lateral plate mesoderm, secondary yolk sac, intraembryonic coelom and allantoic diverticulum; derivatives of ectoderm, mesoderm and endoderm.

**VI. Fourth To Eighth week of Development (Embryonic period)** Formation of somites, neural tube, cephalocaudal folding, lateral foldings, body form, stomodeum, proctodeum, gut and vitelline duct; subdivisions of gut into foregut, midgut and hindgut.

**VII. Development from third month to birth (Fetal period)**(g) Maturation of tissues and organs and rapid growth of body.(h) Estimation of age.

**3.1.4.2. Placenta:** (i) Formation of placenta and chorionic villi, decidua basalis; features and functions of placenta; placental circulation; abnormalities; placental barrier; placentome, types of placenta.

**3.1.4.4. Umbilical Cord:** Formation of umbilical cord; features of umbilical cord.

**3.1.4.4 Amniotic Cavity:** Amniotic cavity and membrane; amniotic fluid – functions, expansions of amniotic cavity and fusion with chorion; chorion laeve with decidua capsularis; decidua capsularis with parietalis; obliteration of chorionic and uterine cavities; function of fused foetal membranes to dilate cervical canal.

**3.1.4.5.** Abnormalities, obliteration of chorionic and uterine cavities; abnormalities of chorion. (Formation of twins and types of twins. (n) Arrangement of foetal membranes, Conjoined twins.

#### **3.1.5.0. Teratology**

- I. Genetically and environmental factors as causative factors for congenital malformations.
- II. Mode of actions of teratogenes and critical periods.

#### **3.1.6.0. Systemic Embryology**

- I. Development of the individual organs of digestive system, genital system, urinary system,, respiratory system, cardiovascular system. Nervous system, special sensory organs, endocrine glands and mammary gland.
- II. Developmental abnormalities of individual organs/systems, pathogenesis of the anomalies.
- III. Histogenesis of various organs.
- IV. Development of skeletal system, muscular system and derivatives of coelomic cavities
- V. Development of face and the pharyngeal arches and the associated congenital anomalies.

#### **3.1.4.7. Human Genetics**

- I. Cell, cell division, mitosis and meiosis, nucleus, DNA, chromosomes, classification, karyotype, chromosomal aberrations (Klinefelter, Turner and Down's Syndrome) Prenatal diagnosis for congenital abnormalities, sex determination.
- II. Pedigree chart, pathogenesis of chromosomal aberrations and their effects, recombinant DNA, genetic inheritance, genetic counselling, inborn errors of metabolism.

**3.1.5.0. PRACTICALS:** Learning objectives are given to students before each session. Dissection : is done by students on the cadavers and is being assisted/supervised by a team of teachers. Some prosected specimen/dissection are shown on Ultrascope which is telecasted on TV monitors fitted in dissection

Hall. Video tapes of some dissections are also shown on TV after the completion of dissection of the part/ region to recapitulate the details of the part/region dissected. Cross sections of whole body and brain are shown to correlate with MRI. X-rays are shown after dissection of each region. Self assessment MCQs are given at the end of dissection of each region and discussed with teachers in-charge. Handouts are given at the end of completion of part/region to the students to recapitulate and remember the Gross anatomy, Neuroanatomy, Embryology and Histology. In microanatomy, a preview of the slides is given on TV monitor in small groups to understand the structural details of tissue/structure/organ. In embryology, the serial sections of early chick embryos and pig embryos are demonstrated to understand the sequence of events involved in development of various systems and to understand the developmental basis of occurrence of various congenital abnormalities. Computer assisted programs for understanding the normal development of organ/systems is also demonstrated. Specimen and models depicting normal development of system are shown. In genetics, the phenotype photographs, karyotypes and pictures of various banding techniques are shown to understand the chromosomal abnormalities and various syndromes. In Neuroanatomy, the stained sections at various levels of brain and spinal cord are shown on slides and computers to localize the cranial nerve nuclei and trace the origin, course and termination of ascending and descending tracts in order to understand the effects produced as a result of lesions. Case studies of neural lesions are discussed to understand the location and level of lesions.. Demonstrations: Mainly the bones of the entire body, few dissected specimen are taught in small groups.

By a combination of the above teaching-Learning tools and modalities the student is able to understand the development, gross and microscopic structure of the organ systems and gain an insight into the structure-function correlation. This combined with the knowledge of applied/clinical anatomy provides an understanding of the anatomical basis of health and disease.

#### **3.1.5.1. Gross Anatomy**

- I.** Upper Limb: Dissection: Pectoral and scapular, axillary and shoulder region, arm, forearm.
- II.** Prosected parts: Joints, Palm and dorsum of hand.
- III.** Thorax : Dissection: Chest wall, mediastinum, pleura, lungs, heart.
- IV.** Abdomen: Dissection: Anterior abdominal wall and inguinal region, external genitalia.
- V.** Viscera and Posterior Abdominal wall and nerve plexus.
- VI.** Pelvis: Dissection : Pelvic viscera, blood vessels and nerves.
- VII.** Prosected Parts: Perineum including ischio-rectal fossa.
- VIII.** Lower Limb: Dissection: Gluteal region, front and back of thigh popliteal fossa, front back and lateral side of leg and dorsum of foot.
- IX.** Prosected Parts: Sole of the foot and joints.

- X. Head & Neck: Dissection: Superficial and deep dissection of face and neck, orbit and eye ball.
- XI. Submandibular region temporal and infratemporal fossa, cranial cavity, naso and oropharyngeal regions.
- XII. Ear, Larynx and pharynx.

**3.1.5.2. Neuro Anatomy:** Gross specimen of full brain, meninges, spinal cord, prosected specimens to demonstrate visual system, auditory and vestibular pathways and major functional areas. Stained sections of brain and spinal cord at various levels to demonstrate cranial nerve nuclei, ascending and descending tracts, thalamic nuclei and important functional areas.

#### **3.1.5.3. Demonstrations**

- I. Bones of skull and vertebral column
- II. Brain and spinal cord
- III. Cross-sectional anatomy
- IV. Radiological anatomy
- V. CT and MRI scan

#### **3.1.5.4. Microscopic Anatomy**

- I. Routine and special stained slides of all the tissues and organs of body.
- II. Electron micrographs to demonstrate filtration barrier of kidney, alveolar septum, tight junctions of capillaries and such relevant areas.

#### **3.1.5.6. Developmental Anatomy**

- I. Models to demonstrate various stages of early foetus and different organ development.
- II. Slides of ovary and testis to show follicles and stages of maturation of spermatozoa:
- III. Early chick and pig embryos to understand the development of tissues and organs from conception till term.

#### **3.1.5.7. Genetics**

- I. Demonstration of normal karyotype and common abnormal conditions including banding; Pedigree chart, syndromes and their clinical phenotype. Demonstration of various new techniques such as FISH.

#### **3.1.6.0. Skills**

- 1. Demonstrate surface markings of important organs.
- 2. Localise important pulsation and the structures against which pressure can be applied in case of bleeding from a particular artery.
- 3. Demonstrate muscle testing and movements at joints.

4. Locate sites for : Lumbar puncture, sternal puncture, pericardial tapping, liver biopsy.
5. Locate veins for venae puncture.
6. Locate the site for emergency tracheostomy.
7. Locate the subcutaneous positions of large veins.

### **3.1.7.0. TEACHING AND LEARNING METHODOLOGY**

Departmental Faculty and Staff emphasizes on teaching basic fundamentals of Gross anatomy, Microscopic anatomy and its correlation with function, developmental anatomy and anatomical basis of occurrence of congenital defects, nerve lesions and its anatomical basis and the applied aspects of relevant clinical conditions.

All divisions of Anatomy i.e. Gross, Histology, Embryology, Genetics and Neuroanatomy are taught with the help of didactic lectures on specific topics followed by dissection / practicals. The general pattern of teaching methodology followed by all the faculty members and teaching staff in the department is :

Didactic Lectures: discussing the topic in detail in one hour lecture time and small group tutorials.

Didactic Lectures will be to give the conceptual context of the topic and to introduce the methods of small group learning.

### **3.1.8.0. LIST OF BOOKS RECOMMENDED**

#### **I. Gross Anatomy**

1. Cunningham's Manual of Practical Anatomy G.L.Romanes Vols.I, II & III Oxford University Press, 15th edition (1996).
2. Clinical Anatomy for Medical Student, 6th Edition R.S. Snell (2000) Little, Brown & Co.
3. Text book of Human Osteology, Jaypee Brothers, I.B.Singh, Medical Publishers.

#### **II. Histology**

1. Histology : A text & atlas, 3rd edition (1995), M.H. Ross, E.& L.J Williams & Wilkins Romell, G.I. Kaye.
2. Atlas of Histology with functional correlation. Di Fiore's. International Edition 9th (2000).
3. Textbook of Human Histology (4th Edition) Inderbir Singh. Jaypee Brother, 2002.

#### **III. Developmental Anatomy**

1. Medical Embryology, 8th Edition Williams & Wilkins Jan Langman.

#### **IV. Neuroanatomy**

1. The Human Nervous System : An Anatomical Murray L Barr & Keirman. View Point, 7th Edition, 1998. Harper & Row.
2. Neuroanatomy : An Illustrated Color Text, AR Crossman and 2nd Edition, 2000 D Neary Churchill Livingstone.

V. 1. Surface and Radiological Anatomy, 1st Edition, A.Halim, 1998, CBS Publishers.

#### VI. Genetics

1. Thomson and Thomson, Genetics in Medicine, 6th Edition, 2001 Robert L.Nussbaum. W.B.Saunders Company Roderick R.Mc.Innes. Huntington. E.Willard.

### 3.1.9.0 PLAN OF FIRST PROFESSIONAL MBBS EXAMINATION IN ANATOMY

**WRITTEN PAPERS : 100 Marks**

	i. Paper I :	50 Marks
	ii. Paper II :	50 Marks
1.	Viva voce :	20 Marks
2.	Practical :	40 Marks
3.	Internal Assessment	40 Marks (Theory 20 & Practical 20)
	<b>Grand Total:</b>	<b>200 Marks</b>

#### 3.1.9.1. Written Papers:

**Paper 1:** Gross anatomy of upper limb, thorax, head & neck including related embryology and microanatomy of important structures, important muscles, nerves, blood vessels and their clinical anatomy to be included.

**Paper II:** Gross anatomy of lower limb, abdomen and pelvis and brain with related embryology and micro anatomy of important structures.

#### Distribution of Marks (Paper I & Paper II)

#### Each Paper contains:

1. One modified essay Question (MEQ) = 15 Marks.
2. One constructive Response Question (CRQ) = 15 Marks,
3. Short Notes : 3 X 5 = 15 marks
4. Short Answer Type; (MCQ, Match the following, Fill up the blanks, etc.) : 1 X 5 = 5 marks

***N.B.:*** Embryology and microanatomy of related structures should be included as part question. 20% or more questions should be on clinical anatomy, structures and organs having more weight age in clinical fields must be emphasized.

**3.1.9.2. Practical Total:** 40 Marks (Gross Spotters + OSPE + Histology Spotters)

**1. Gross spotters: 10 X2 = 20 marks**

**Gross spotters should include: :**

Upper Limb	2 Questions.
Lower Limb	2 Question.
Thorax	1 Questions.
Abdomen	2 Questions.
Pelvis :	1 Question.
Head & Neck	1 Question
Brain:	1 Question.

**2. OSPE:** Includes embryology chart, models, bones, X-rays, Charts on genetics, etc.

5 stations: 5x2 = 10 marks

**3. Histology Spotters: 5x2 = 10 Marks**

**(Two slides from General histology & Three slides from Systemic Histology)**

**3.1.9.3. VIVA (Structured): 4x5 = 20 Marks**

**Table 1:** Dissected specimens of paper I topics with related bones

**Table 2:** Dissected specimens of paper II topics with related bones

**Table-3:** Embryology – includes available models, plates & charts

**Table: 4:** Surface marking of whole body

**3.1.9.4. Pass:**

**A candidate must obtain 50% in aggregate with a minimum of 50% in theory including orals and minimum of 50% in practicals.**

## **3.2.0.0. PHYSIOLOGY**

**3.2.1.0. Goal:** The broad goal of teaching of undergraduate students in Physiology aims at providing the students comprehensive knowledge of the normal functions of the organ systems of the body to facilitate an understanding of the physiological basis of the health and disease.

### **3.2.2.0. OBJECTIVES**

**3.2.2.1. Knowledge:** At the end of the course the student will be able to:

1. Explain the normal functioning of all the organ systems of the body and their interactions.
2. Narrate the contribution of each organ system to the maintenance of homeostasis.
3. Elucidate the physiological aspects of normal growth and development.
4. Describe the physiological response and adaptations to environmental stresses.
5. List the physiological principles underlying pathogenesis and treatment of disease.

**3.2.2.2. Skills:** At the end of the course the student will be able to:

1. Perform experiments designed either primarily for the study of physiological phenomena or for assessment of function.
2. Analyze and interpret experimental/investigative data critically.
3. Distinguish between normal and abnormal data derived as a result of tests which he/she has performed and observed in the laboratory.

**3.2.2.3. Integration:** At the end of the integrated teaching the students should acquire an integrated knowledge of organ, structure and function and its regulatory mechanism.

### **3.2.3.0. Course Content:**

#### **3.2.3.1. Didactic Lectures**

##### **3.2.3.1. A. Introduction**

1. Mutual introduction of dramatis personae in the teaching learning process
2. Know thy institute
4. Physiology: what and why? Homeostasis: an evolutionary point of view
5. Characteristics of control systems
6. Looking back & forth
7. Reading efficiently

### **3.2.3.2. B. Nerve–Muscle**

1. Physicochemical properties of cell membrane
2. Cell membrane: permeability & transport
3. Principles of bioelectricity
4. Genesis of resting membrane potential
5. Action potential
6. Properties of nerve-fibres
8. Functional anatomy of neuromuscular junction
9. Neuromuscular transmission
10. Muscle proteins – (Biochemistry)
11. Excitation – contraction coupling
12. Contraction kinetics of skeletal muscles
13. Smooth muscle
14. Injury & repair of nerves and muscles
15. Energetics of nerve & muscle
16. Work Physiology

### **3.2.3.2. C. Blood**

1. Functions of plasma proteins
2. Principles of hemopoiesis
3. Regulation of erythropoiesis
4. Destruction of red cells: Jaundice
5. Anemia
6. Regulation of WBC production
7. Functions of WBC
8. Functions of platelets
9. Hemostasis
10. Blood groups
11. Physiological basis of transfusion medicine

### **3.2.3.2. D. Respiratory System**

1. Introduction to respiratory system
2. Lung volumes and capacities
3. Mechanics of respiration – I
4. Mechanics of respiration – II
5. Composition of respired air: pulmonary ventilation

6. Exchange of gases in the lungs
7. Ventilation – perfusion ratio
8. O<sub>2</sub> carriage, O<sub>2</sub>–dissociation curve
9. CO<sub>2</sub> carriage, CO<sub>2</sub>–dissociation curve
10. Neural regulation of respiration
11. Chemical regulation of respiration
12. Hypoxia, cyanosis and dyspnoea
13. Special features of pulmonary circulation
14. Artificial respiration Artificial respiration
15. Therapeutic use of oxygen .

### **3.2.3.2. E. Cardiovascular System**

1. Introduction to CVS
2. Properties of cardiac muscle
3. Action potential and spread of impulse in the heart
4. E-C coupling in the myocardium
5. ECG
6. Pressure changes in the heart. Cardiac cycle
7. Functional basis of heart sounds and murmurs
8. Neural regulation of cardiac activity
9. Regulation of heart rate
10. Intrinsic regulation of heart's action. Cardiac output
11. Cardiac output: measurement and regulation
12. Nutrition and metabolism of heart
13. Exercise physiology
14. General principles of hemodynamics
15. Cardiovascular reflexes
16. Neural control of circulation
17. Special features of cerebral circulation
18. Special features of circulation in skeletal muscles and skin

### **3.2.3.2. F. Gastrointestinal System**

1. Introduction to G.I. Physiology: general organization of G.I. tract
2. Mastication and deglutition
3. Gastric secretion
4. Regulation of gastric secretion
5. Pathophysiology of peptic ulcer
6. Biliary and pancreatic secretions
7. Physiology of colon
8. Pathophysiology of diarrheal disease

### **3.2.3.2. G. Environmental Physiology**

1. Introduction to environmental physiology
2. Body temperature regulation
3. Man in cold environment
4. Man in hot environment
5. Hypothermia and its clinical applications
6. Physiological responses to high altitude
7. Physiological responses to high atmospheric pressure

### **3.2.3.2. H. Reproduction**

1. Introduction to reproductive system
2. Male reproductive physiology
3. Female reproductive physiology
4. Hypothalamic – pituitary – gonadal axis
5. Puberty
6. Pregnancy
7. Parturition and lactation
8. Reproductive ageing

### **3.2.3.2. I. Kidney**

1. Renal hemodynamics and glomerular filtration
2. Renal tubular function – I
3. Renal tubular function – II
4. Regulation of renal function
5. Physiological basis of renal function tests
6. Micturition

### **3.2.3.2. J. Neurophysiology**

#### **a). General**

1. Introduction to neurophysiology I
2. Introduction to neurophysiology II
3. CSF
4. Neuroglial cells
5. Synaptic transmission
6. Properties of synaptic transmission
7. Neurotransmitters

#### **b). Sensory system**

1. Coding of sensory information
2. Functional organization of ascending sensory pathways
3. Thalamus
4. Sensory cortex

5. Perception of sensory stimuli

6. Physiology of pain

**c). Motor system**

1. Characteristics and properties of reflexes

2. Functional organization of motor system – I

3. Functional organization of motor system – II

4. Brain stem reflexes, stretch reflexes and tendon reflexes

5. Basal ganglia

6. Cerebellum

7. Vestibular neck reflexes: maintenance of equilibrium

8. Localizing the level of lesion in neurological disease

**d). Visceral and motivational system**

1. Autonomic nervous system

2. Hypothalamus

3. Limbic system and emotions

**e). EEG, sleep and higher nervous functions**

1. Electroencephalography

2. Sleep and wakefulness

3. Learning and memory – I

4. Learning and memory – II

5. Speech

**f). Special Senses**

1. Functional anatomy of eye

2. Functions of retina: photoreception

3. Functions of retina: colour vision and electroretinography

4. Central mechanisms of vision and visual perception

5. Functional anatomy of ear: impedance matching

6. Organ of Corti: peripheral auditory mechanism

7. Auditory pathway

8. Central auditory mechanism and auditory perception

9. Olfaction

10. Physiology of taste

**3.2.4.0. Practical**

**3.2.4.1. Blood**

1. Preparation and examination of peripheral blood smear and determination of differential leucocyte count

2. Determination of total red blood cell count

3. Determination of total leucocyte count

4. Determination of platelet count
5. Determination of reticulocyte count
6. Determination of eosinophil count
7. Determination of osmotic fragility of erythrocytes
8. Determination of erythrocyte sedimentation rate, packed cell volume and calculation of the absolute values
9. Determination of hemoglobin concentration of blood
10. Determination of ABO and Rh blood groups
11. Determination of bleeding time, clotting time and plasma prothrombin time
12. Examination of bone marrow smears
13. Estimation of blood volume by dye dilution technique

#### **3.2.4.2. Nerve and Muscle**

1. Study of salient features of electromyography
2. Estimation of conduction velocity of human ulnar nerve and calculation of conduction velocity
3. Study of phenomenon of human fatigue : (i) Mosso's ergograph , and (ii) Handgrip dynamometer/ ergograph for isometric work
4. To measure the mechanical efficiency at different grades of exercise
5. Study of excitable and contractile properties of a nerve-muscle preparation. Demonstration of (i)effect of sub-threshold, threshold, and supra-threshold stimuli, (ii) Isotonic contraction, (iii) Effect of two or more stimuli, (iv) Isometric contraction, (v) Length-tension relationship
6. Demonstration of work performed by skeletal muscle in vitro under (i)After loaded conditions, and (ii) Free loaded conditions
7. Demonstration of muscle fatigue and neuromuscular transmission in an amphibian model
8. Demonstration of compound action potential in a frog's sciatic nerve
9. Determination of strength-duration curve in frog's nerve and muscle

#### **3.2.4.3. Cardiovascular System**

1. Recording and analysis of 12 lead electrocardiogram and to measure the mean electrical axis of heart
2. Determination of the effect of posture on blood pressure
3. Determination of physical fitness of a subject using screening tests
4. Measurement of blood flow in the forearm by venous occlusion plethysmography and to demonstrate the effect of (a) Exercise, (b) Arterial occlusion, and (c) Temperature
5. Clinical examination of the human cardiovascular system (CVS)
6. Demonstration of the properties of cardiac muscle in the frog
7. Study of the factors controlling inotropic and chronotropic functions in isolated per fused frog's heart
8. Demonstration of exercise stress test

#### **3.2.4.4. Respiration**

1. Determination of various lung volumes and lung capacities and calculation of maximum voluntary ventilation (MVV) and forced expiratory volume (FEV) by spirometry.
2. Recording of chest movements by a Stethography and to study the effects of Speech, swallowing, coughing, breath-holding and hyperventilation.
3. Examination of human respiratory system.
4. Measurement of respiratory dead space.

#### **3.2.4.5. G.I.T. and Metabolism**

1. Determination of resting metabolic rate in human
2. Clinical examination of the abdomen
3. Study of the movements of isolated segment of mammalian small intestine and the effects of: (i) ions, (ii) neurotransmitters, and (iii) cold in vitro

#### **3.2.4.6. Reproduction**

1. Changes in vaginal exfoliation cytology and cervical secretion during different phases of reproductive cycles in human and in rat.
2. Pregnancy tests.
3. Determination of sperm count, motility and morphology in a human Sample.

#### **3.2.4.7. Environmental physiology**

Study of the effects of exposure to hot and cold environment on human Subject.

#### **3.2.4.8. Neurophysiology**

1. Examination of nervous system including cranial nerves.
2. Human electroencephalography: Methods of recording and identification of different types of EEG waves.
3. Ingestive behavior and its nervous control.
4. To determine the reaction time in a human subject.
5. Demonstration of non-invasive assessment of autonomic nervous functions.

#### **3.2.4.9. Special senses**

1. Determination of visual acuity.
2. Clinical assessment of colour vision.
3. Perimetry: Mapping of visual field.
4. Blind spot in the field of vision.
5. Demonstration of the principles of optics in the eye using a model of eye .

6. Demonstration of audiometry.
7. Demonstration of vestibulo-ocular reflex (V.O.R.) by caloric stimulation.

#### **3.2.5.0. Teaching Learning Methodology.**

1. Lectures.
2. Tutorial and Seminars on selected topics.
3. Practical demonstrations and individual practical.
4. Audiovisual presentations (e.g. video films) on selected topics.
5. Problem based Learning on selected topics.

#### **3.2.6.0 Text Book Recommended:**

1. Understanding Medical Physiology by R.L. Bijlani.
2. Review of Medical Physiology by W.F. Ganong.
3. Textbook of Medical Physiology by A.C. Guyton.

### 3.2.6.0. Plan of First Professional MBBS Examination in Physiology.

**3.2.6.1 WRITTEN PAPERS : 100 Marks**

- 1. Paper I : 50 Marks**
- 2. Paper II : 50 Marks**

**2.2.6.2. Viva voce : 20 Marks**

**2.2.6.3. Practical : 40 Marks**

**2.2.6.4. Internal Assessment 40 Marks (Theory 20 & Practical 20)**

**Grand Total: 200 Marks**

#### **3.2.6.1. Written Paper**

**A. Paper I:** General Physiology, Nerve-Muscle Physiology, Blood, Gastrointestinal System, Respiratory System, Cardiovascular System.

**B. Paper II:** Excretory System, Endocrine System, Reproductive System, Nervous System & Special Senses.

(The contents of each units are present in the syllabus)

#### **C. The Questions for the theory papers will consist of:**

- modified essay type Question 15 marks
- modified response Question 15 marks
- Short Notes 5 x3=15 marks
- Short Answer 5 marks ( The Questions will be in the form of MCQ's, matching , True/False, Fill in the blank.

**3.2.6.2. Practical Examination Total marks - 40**

The distribution of total marks is as follows

**A. Hematology Practical - 15 marks (one)**

**B. Experimental lab - 10 marks (one);** (The examination will be based on interpretation of experimental Records taken with the help of experimental cards which will be given to students)

**C. Clinical Lab - 10 marks (One)**

**D. Spotting: - 5 marks**

**3.2.6.3. Viva (Structured):** -20 marks Oral viva voce will be taken at 4 Stations

**3.2.6.4. Pass: A candidate must obtain 50% in aggregate with a minimum of 50% in theory including orals and minimum of 50% in practical.**

### **3.3.0.0. BIOCHEMISTRY**

**3.3.1.0. Goal:** The broad goal of teaching of 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 knowledge acquired for solving the clinical problems.

#### **3.3.2.0. OBJECTIVES**

**3.3.2.1 Knowledge:** At the end of the course, the student should be able to demonstrate his knowledge and understanding on the:

- I. Molecular and functional organization of a cell, and sub- cellular components;
- II. Structure, function and interrelationship of bio-molecules and consequences of deviation from normal;
- III. Basic and clinical aspects of enzymology and regulation of enzymatic activity;
- IV. Digestion and assimilation of nutrients and consequences of malnutrition;
- V. Integration of the various aspects of metabolism, and their regulatory pathways;
- VI. Biochemical basis of inherited disorders and their associated sequelae;
- VII. Mechanisms involved in maintenance of body fluid and pH homeostasis;
- VIII. Molecular mechanisms of gene expression and regulation, the principles of genetic engineering and their application in medicine;
- IX. Molecular concepts of body defence and their application in medicine;
- X. Biochemical basis of environmental health hazards; and biochemical basis of cancer and carcinogenesis, principles of metabolism, and detoxication of xenobiotics.
- XI. Principles of various conventional and specialized laboratory investigations and instrumentation analysis and interpretation of a given data; the ability to suggest experiments to support theoretical concepts and clinical diagnosis.

**3.3.2.2. Skills:** At the end of the course, the student should be able to

- I. make use of conventional techniques/ instruments to perform biochemical analysis relevant to clinical screening and diagnosis Biochemistry
- II. analyze and interpret investigative data
- III. Demonstrate the skills of solving clinical problems and decision making.

**3.3.2.3. Integration:** The knowledge acquired in biochemistry should help the students to integrate molecular events with structure and function of human body in health and disease.

### **3.3.3.0. COURSE CONTENT**

#### **3.3.3.1. Theory**

##### **I. Biological cell**

- (a) Architecture, compartmentation, cell membrane structure and functions; structure- function relationships.
- (b) Membrane transport.

##### **II. Biomolecules**

- (a) Function and classification of carbohydrates, lipids, protein and amino acids.
- (b) Stereoisomerism and chemistry of monosaccharide, amino acids, and fatty acids.
- (c) Structural organization and structure-function relationships of proteins. Hemoglobin and myoglobin molecular mechanism of O<sub>2</sub> transport and storage. Molecular basis of sickle cell anemia and thalasseмииs.
- (d) Molecular mechanism of muscle contraction.
- (e) Plasma proteins, their functions and clinical significance.

##### **III. Enzymes**

- (a) Nomenclature, classification,
- (b) Kinetics, mechanism of enzymatic catalysis.
- (c) Factors influencing enzymatic catalyses, enzyme activators and inhibitors.
- (d) Regulation of enzyme activity,
- (e) Clinical enzymology, isoenzymes.

##### **IV. Metabolic pathways, their regulation and metabolic interrelationships Metabolism: general concepts and characteristics of metabolic pathways.**

##### **V. Carbohydrate metabolism**

- (a) Pathways of glucose metabolism: glycolysis
- (b) HMP shunt
- (c) Gluconeogenesis
- (d) Glycogenolysis, glycogenesis
- (e) Galactose and fructose metabolism
- (f) Glycogen storage disease
- (g) Inborn errors of glucose metabolism
- (h) Regulation of glucose metabolism.

## **VI. Amino acid metabolism**

- I. General reactions, transamination, its metabolic and diagnostic significance
- II. Disposal of amino acid nitrogen and detoxication of urea
- III. Metabolic fate of amino acid carbon skeleton
- IV. Sulphur containing amino acids
- V. In born errors of branched chain and aromatic amino acids
- VI. Important amino acid derivatives.

## **VII. Lipid metabolism**

- (a) Biosynthesis and degradation of fatty acids, phospholipids and triacylglycerols
  - (b) Biosynthesis of cholesterol, chemistry and metabolism of lipoproteins.
  - (c) Hyperlipoproteinemias
  - (d) Lipid storage disease.
  - (e) Ketone bodies: their synthesis, utilization and conditions leading to ketoacidosis, prostaglandin.
- TCA cycle** and biological oxidation, prostanoids.

## **VIII. Regulation of the metabolic pathways**

- (a) Carbohydrate, lipid and amino acid metabolism
- (b) Interlinks between these pathways.
- (c) Organ interrelationships in metabolism,
- (d) Blood glucose regulation, and its impairment in diabetes mellitus.
- (e) Metabolic adaptation in the fed state, fasting and prolonged starvation.
- (f) Metabolic derangements and adaptations in diabetes mellitus.

## **IX. Food assimilation and nutrition**

- (a) Digestive enzymes, their action on dietary carbohydrates, fats and proteins.
- (b) Absorption of glucose, amino acids and lipids.
- (c) Gastric, pancreatic and intestinal function tests, liver function tests.
- (d) Functions of dietary ingredients, the macro and micronutrients.
- (e) Fat soluble and water soluble vitamins
- (f) Malnutrition
- (g) Iron metabolism and heme synthesis.

## **X. Hormones**

- (a) Molecular basis of hormonal action, signal transduction mechanisms.
- (b) Chemistry, functions and mechanism of action of hormones of the pituitary, thyroid, parathyroid, adrenals, pancreas, and gonads.
- (c) Biosynthesis of steroid hormones their functions and mechanism of action.
- (d) Pineal body
- (e) Endorphins and enkephalins,
- (f) Calcium homeostasis.
- (g) Hormonal interplay in the regulation of metabolism.

## **XI. Molecular Biology**

- (a) Nucleic acids: DNA and RNA structure
- (b) DNA Replication,
- (c) DNA Transcription
- (d) Post-transcriptional processing.
- (e) Translation of genetic code
- (f) Regulation of gene expression and protein synthesis inhibitors of protein synthesis.
- (g) DNA repair mechanisms,
- (h) Applied aspects of purine and pyrimidine metabolism
- (i) Genetic Engineering: Recombinant DNA technology
- (j) DNA and diagnostics
- (k) DNA repair mechanisms and related disorders
- (l) Telomeres, telomerases
- (m) Inhibitors of DNA replication, apoptosis

## **XII. pH, Buffer, physiological buffer systems**

- (a) Regulation of blood pH, acidosis, alkalosis,
- (b) Renal functions tests.

## **XIII. Immunology**

- (a) Reticuloendothelial system, components and functions of the innate and adaptive immunity.
- (b) Role of T and B lymphocytes, antigen presentation

- (c) Induction of immune response
- (d) Cell mediated immune response
- (e) Immunoglobulin structure and functions
- (f) Humoral immune response
- (g) Fate of antigen antibody complex,
- (h) Complement system
- (i) Generation of antibody diversity,
- (j) Hypersensitivities
- (k) Immunoregulation, autoimmunity, tolerance
- (l) HLA, disease association & transplantation
- (m) Immunological techniques, application in medicine (vaccines, immunotherapy, immunoassays and immunodiagnostics).

**XIV. Environmental biochemistry, cancer and cancer makers**

- (a) Xenobiotics, interaction with biomolecules, effects, metabolism, detoxication,
- (b) Biochemical characteristics of cancer
- (c) Environmental pollutants and carcinogenesis.

**3.3.3.2 PRACTICALS**

1. Laboratory Instrumentation.
2. Protein fractionation, denaturation, separation of proteins and amino acids.
3. Colour reactions of amino acids and proteins.
4. Estimation of blood analytes: glucose, total cholesterol and HDL cholesterol, uric acid, electrolytes, urea.
5. Cerebrospinal fluid analyses.
6. Gastric juice analyses.
7. Urine analyses.
8. Amniotic fluid analyses.
9. Enzymes: amylase, lactate dehydrogenase and alkaline phosphatase
10. Liver function tests

11. Renal function tests.
12. Gel electrophoresis of DNA.
13. Immunodiffusion techniques, RIA and ELISA
14. Case-oriented discussions (enzymes, metabolites, function tests)

### **3.3.4.0 TEXT-BOOKS RECOMMENDED**

1. Biochemistry Ed. Lubert Stryer. W.H. Freeman and Company, New York.
2. Principles of Biochemistry. Ed. Lehinger, Nelson and Cox. CBS Publishers and distributors.
3. Harper's Biochemistry, Ed. R.K. Murray, D.K. Granner, P.A. Mayes and V.W. Rodwell. Appleton and Lange, Stamford, Connecticut.
4. Textbook of Biochemistry with Clinical Correlations. Ed. Thomas M. Devlin, Wiley-Liss Publishers.
5. Tietz Textbook of Clinical Chemistry. Ed. Burtis and Ashwood. W.B. Saunders Company.
6. Biochemistry. Ed. Donald Voet and Judith G. Voet. John Wiley & Sons, Inc.

### **3.3.5.0. Plan for First Professional MBBS Examination in Biochemistry:**

Examination will consist of two written papers: Viva voce and practical examination having following break up figure marks.

#### **3.3.5.1. WRITTEN PAPERS : 100 Marks**

- 1. Paper I : 50 Marks**
- 2. Paper II: 50 Marks**

#### **3.3.5.2. Viva voce 20 Marks**

#### **3.3.5.3. Practical : 40 Marks**

#### **3.3.5.4. Internal Assessment 40 Marks (Theory 20 & Practical 20)**

**Grand Total: 200 Marks**

#### **WRITTEN PAPERS:**

**Paper I:** Cell and sub cellular organelle, plasma membrane: signal transduction mechanism, carbohydrate, lipid, protein nuclei acid, enzymes, acid base and buffer (including maintenance of acid base balance in the body), Enzyme, Digestion and absorption of carbohydrate, Protein and lipid, Biological oxidation, Functional proteins

e.g. hemoglobin, myoglobin, collagen, alpha keratin, fibrin and elastin, molecular concept of body defense and their application in medicine.

**Paper II:** Metabolism of carbohydrates, lipids, protein, Purine, pyrimidine and minerals.

Vitamins; Nucleic acid and protein biosynthesis. Regulation of gene expression. Oncogenes and Oncogenesis. Recombinant DNA technology, Xenobiotics and its metabolism, Molecular basis of endocrinology. Heme synthesis and degradation. Organ Functional Tests.

**Each paper contains**

- I. One modified essay question (MEQ) = 15 marks
- II. One constructive response question (CRQ) = 15 marks
- III. Short questions = 3 X 5 = 15 marks
- IV. Short answer type = 5 X 1 = 5 marks ((MCQ, Matching, Fill in the blanks, etc.)

**2. Viva Voce Examination (OSCE type)**

20 Marks

**Station/ Table.1- (5- Marks)** Concept of measurement in medicine, Cell, Structure, function and interrelationship of Biomolecules and consequences of deviation from normal, pH, Buffers-Henderson Hassalbalch equation, Body buffers, Regulation of blood pH. Definition, classification, Mechanism of action of enzymes, Coenzyme and Co-factors, Factors affecting enzyme activity, Regulation of enzyme activity, Isoenzymes, Clinical enzymology, Bioenergetics & redox potential, Electron transport chain & oxidative phosphorylation (chemiosmotic theory & rotational catalysis) Inhibitors of ETC,

**Station/ Table.2- (5- Marks, ) Carbohydrate** metabolism:- Major and minor metabolic pathways of glucose: Glycolysis, TCA cycle, Gluconeogenesis, glycogen metabolism, Hexose monophosphate shunt & its significance, Uronic acid pathway, galactose, mannose and fructose metabolism.

Lipid Metabolism:- oxidation of fatty acids ( $\alpha$ ,  $\beta$  &  $\omega$ ), ketone body metabolism, biosynthesis of fatty acids & formation of triglyceride, metabolism of compound lipid, cholesterol metabolism, lipid transport, metabolism of arachidonic acids.

Amino acids metabolism:- General reactions of amino acid metabolism & Formation and disposal of  $\text{NH}_3$  urea cycle, metabolism of essential & non-essential amino acids & their specialized products.

Purine and pyrimidine nucleotides metabolism.

**Station/ Table.3- (5- Marks, )** Molecular basis of hormonal action, signal transduction mechanisms. Chemistry, classification, functions and mechanism of action of hormones, Biosynthesis of steroid hormones & their functions. Inherited disorder of carbohydrate, lipid, amino acid, Purine and pyrimidine nucleotide metabolism, Vitamins & minerals & diseases associated with deficiency or excess, Energy metabolism & nutrition, Protein Energy Malnutrition (PEM)

**Station/ Table.4- (5- Marks, Paper- II)** Immunoglobulin structure and functions, complement system, generation of antibody diversity, Environmental biochemistry: biochemical basis of cancer and Xenobiotics metabolism. Organ function test: - Liver function test (LFT), Renal function test (RFT), Thyroid function test,

Pancreatic & gastric function test. Digestion & absorption of carbohydrates, Digestion & absorption of lipids, Digestion & absorption of proteins, peptides & amino acids, Digestion & absorption of nucleic acids

<b><u>PRACTICAL EXAMINATION:</u></b>	40 Marks
Qualitative tests:	10 Marks
Quantitative tests:	10 Marks
Clinical material analysis:	10 Marks
Interpretation of charts:	10 Marks

**3.3.6.0. Pass: A candidate must obtain 50% in aggregate with a minimum of 50% in theory and minimum of 50% in practical.**

### 3.4.0.0. SYLLABUS for PATHOLOGY

The Syllabus for the 2<sup>nd</sup> Professional MBBS Course in Pathology is based on the Curriculum prescribed by the Medical Council of India

**3.4.1.0. GOAL:** The broad goal of the teaching of undergraduate student in Pathology is to provide the students with a comprehensive knowledge of the mechanisms and causes of disease, in order to enable him/her to achieve complete understanding of the natural history and clinical manifestations of disease.

#### 3.4.2.0. OBJECTIVES

**3.4.2.1. Knowledge:** At the end of the course, the student should be able to :-

- I. Describe the structure and ultra structure of a sick cell, mechanisms of cell degeneration, cell death and repair and be able to correlate structural and functional alterations.
- II. Explain the patho-physiological processes which govern the maintenance of homeostasis, mechanisms of their disturbance and the morphological and clinical manifestations associated with it.
- III. Describe the mechanisms and patterns to tissue response to injury such that she/he can appreciate the pathophysiology of disease processes and their clinical manifestations.
- IV. Correlate normal and altered morphology (gross and microscopic) of different organ systems in common diseases to the extent needed for understanding of disease processes and their clinical significance.

**3.4.2.2. Skills:** At the end of the course, the student should be able to:-

- I. Describe the rationale and principles of technical procedures of the diagnostic laboratory tests and interpretation of the results;
- II. Perform the simple bed-side tests on blood, urine and other biological fluid samples;
- III. Draw a rational scheme of investigations aimed at diagnosing and managing the cases of common disorders;
- IV. Understand biochemical/physiological disturbances that occur as a result of disease in collaboration with pre clinical departments.

#### 3.4.2.3. Integration:

At the end of training he/she should be able to integrate the causes of disease and relationship of different etiological factors (social, economic and environmental) that contribute to the natural history of diseases most prevalent in India.

### 3.4.3.0. DIDACTIC LECTURES :

100 hours

Each Lecture class will be of one hour duration. The important aspects of each topic are given below

#### 3.4.3.1. General Pathology:

##### 1. Cell injury and adaptations-

- Causes & Mechanism of cell injury
- Macroscopic and microscopic features of reversible & irreversible cell injury
- Definition and types of necrosis - characteristics of each type of necrosis with example
- Apoptosis - definition, examples, its mechanism, morphological changes and its difference from necrosis
- Definition of gangrene - different types with morphology and examples

##### 2. Acute Inflammation-

- Definition of acute inflammation and its causes
- Vascular phenomenon of inflammation
- Cellular phenomenon - chemotaxis, phagocytosis and formation of exudate
- Chemical mediators of inflammation - list, histamine, complement, arachidonic acid metabolites, brief mention of coagulation cascade
- Morphological types of acute inflammation with examples
- Clinical & hematological manifestations and outcome of acute inflammation

##### 3. Chronic Inflammation and granuloma -

- Chronic inflammation - definition, examples, morphology, cells of chronic inflammation with emphasis on epithelioid cells & giant cells
- Granuloma- definition pathogenesis & description of a granuloma with special emphasis on tuberculous granuloma
- Other types of granuloma - Syphilis, Sarcoidosis, Leprosy
- Giant cells - different types, morphology & examples

##### 4. Tissue repair, regeneration and fibrosis -

- Cell cycle and different types of cells
- Normal cell growth
- Regeneration - role of growth factors and extracellular matrix
- Repair - role of collagen, granulation tissue, angiogenesis and fibrosis
- Wound healing - first and second intention
- Factors affecting wound healing

- Complications of wound healing
- Healing in bone and specialized tissue

#### **5. Hemodynamic disorders, thrombosis and shock -**

- Hyperemia and congestion - definition and morphology
- Normal hemostasis - mechanism and pathways
- Thrombosis - definition, pathogenesis, causes, morphology and fate
- Differences between Thrombophlebitis and Phlebothrombosis
- Differences between Thrombus and Clot
- Embolism & Infarction
- Oedema - definition, types, pathogenesis with examples
- Differences between Transudate and Exudate
- Shock - definition, types, pathogenesis, clinical manifestations and examples

#### **6. Storage disorders and Amyloidosis -**

- Classification of storage diseases
- Familial hypercholesterolemia, Lysosomal storage disease, Glycogen storage disease - an overview
- Amyloidosis - definition, classification, pathogenesis, staining, clinical manifestations

#### **7. Disorders of Growth -**

- Definitions of Hyperplasia, Hypertrophy, Atrophy, Metaplasia, Dysplasia, Hypoplasia with examples.
- Differences between - Hypertrophy and Hyperplasia, Atrophy and Hypoplasia

#### **8. Neoplasia -**

- Definition (Willis') and classification
- Characteristics of a malignant neoplasm
- Differences between - Benign and Malignant neoplasm, Carcinoma and Sarcoma
- Spread of a malignant tumor - Routes with example, Mechanism of spread
- Carcinogenesis - what is a carcinogen? Why carcinogenesis is a genetic event?
- Different types of carcinogens and their mechanism of action
- Molecular biology and genetics of carcinogenesis
- Systemic changes due to neoplasia - paraneoplastic syndrome
- Diagnosis of neoplasia

## **9. Metabolic disorders-**

- Jaundice - definition, bilirubin metabolism, classification, lab. Diagnosis,
- Diabetes Mellitus - Definition, Classification, Physiology of insulin metabolism, Pathophysiology, Complications, Diagnosis
- Gout - definition, classification, pathophysiology, diagnosis

## **0. Others -**

- Genetics and chromosomal disorders - DNA structure, mutations, Mendelian disorders, chromosomal structural alterations, karyotype, cytogenetic disorders, diagnosis of genetic diseases
- Immune diseases - Hypersensitivity reactions, graft rejection,
- Autoimmune disorders - mechanism, SLE, Rheumatoid arthritis
- Immunodeficiency conditions - overview
- AIDS - pathophysiology, clinical manifestations, diagnosis
- Environmental pathology - tobacco, alcohol, air pollution
- Radiation pathology -

### **3.4.3.2. Hematology:**

#### **1. Red Cell disorders -**

- Definition, Classification of anemia- morphological & etiological
- Iron deficiency anemia - causes, pathogenesis, clinical manifestations and lab diagnosis
- Megaloblastic anemia - causes, pathogenesis, clinical manifestations and lab diagnosis
- Aplastic anemia - causes, pathogenesis, clinical manifestations and lab diagnosis
- Hemolytic anemia - causes, pathogenesis, clinical manifestations and lab diagnosis
- Thalassemia- types, pathogenesis, genetics, clinical features, lab diagnosis
- Structural hemoglobinopathies - Sickle cell disease, G6PD deficiency
- Other red cell disorders - polycythemia

#### **2. Leukocyte disorders -**

- Definition, Classification of Leukemia(FAB & WHO)
- Acute leukemia - causes, morphology, diagnosis
- Chronic leukemia - causes, morphology, diagnosis
- Leukemoid reaction - types, morphology, differentiation from leukemia
- Myelodysplastic syndrome - definition, classification and morphology
- Benign disorders - leucocytosis, leucopenia etc.

#### **3. Bleeding disorders -**

- Thrombocytopenia - causes, common types, approach for lab diagnosis
- ITP - causes, types, lab diagnosis
- Coagulation disorders - causes, approach for lab diagnosis
- Hemophilia - cause, types, lab diagnosis
- DIC - causes, pathogenesis, features

#### **4. Other hematological diseases -**

- Plasma cell disorders
- Hematological manifestations of some important diseases

#### **5. Blood groups and Blood Transfusion -**

- Different blood groups and their Clinical significance
- Determination of blood groups
- Significance of reverse grouping and cross-matching
- Blood donation - collection, preservation, tests performed
- Indications of Blood Transfusion
- Transfusion reactions - diagnosis
- Rational use of blood - including component therapy

#### **3.4.4.0. Practical classes – 80 hours**

Each practical class will be of 2 hours duration. The procedures to be demonstrated and practiced are:-

##### **3.4.4.1.Hematology**

- i. How to draw blood – demonstration
- ii. Anticoagulants and their use
- iii. Drawing of blood film – practice
- iv. Staining (Leishman) – practice
- v. Focussing the slide under microscope and identification of cells – practice
- vi. ESR by Westergreen pipette – practice
- vii. Total count of WBC by Neubauer chamber – practice
- viii. Packed cell volume by Wintrobe's tube – demonstration
- ix. Hemoglobin estimation by acid hematin method – practice
- x. Hemoglobin estimation by Drabkin's method – demonstration
- xi. Bleeding time and Clotting time – demonstration
- xii. Prothrombin time – demonstration
- xiii. Bone marrow – demonstration of stained slides – normal, ITP , Megaloblastic anemia
- xiv. Blood grouping – ABO & Rh – practice

### 3.4.4.2. Clinical Pathology

- i. Urine – noting the physical characters, how to measure specific gravity – practice
- ii. Urine – chemical tests for Protein, Reducing substances and Ketone bodies- practice
- iii. Use of different stix and their interpretation - demonstration
- iv. Microscopic examination of urine – practice
- v. CSF – demonstration of cell type in a normal CSF sample and a case of pyogenic meningitis

### 3.4.4.3. Histopathology & Cytopathology

- i. Techniques of histopathology & Cytopathology (including FNAC) – demonstration
- ii. H & E staining and other special staining – demonstration
- iii. Demonstration of HP & Cytology slides – along with tutorial classes in systemic pathology

**3.4.5.0. Tutorial classes** – 120 hours: Entire systemic pathology will be learned in tutorial classes along with demonstration of HP slides and problem-based learning with the help of problem cards

<b>System</b>	<b>Topics</b>	<b>Specimens</b>	<b>HP slides</b>
Cardio-Vascular	Heart failure Rheumatic heart disease Valvular heart disease Atherosclerosis Myocardial infarction Hypertensive heart dis. Infective endocarditis Pericarditis	Mitral stenosis Atheroma aorta Lt. ventricular hypertro. Fibrinous pericarditis	
Renal	Glomerulonephritis – an overview with nephritic & nephrotic syndrome, Pyelonephritis Renal arteriosclerosis Hydronephrosis Renal cell carcinoma	Granular contracted kid. Large white kidney Hydronephrosis Renal cell carcinoma Adult polycystic kidney	Clear cell carcinoma
Respiratory	Pneumonia, Pulm. Tuberculosis COPD – Bronchial asthma, Bronchiectasis, Emphysema, Chr. Bronchitis Bronchogenic carcinoma	Lobar pneumonia, Bronchiectasis Emphysema Pulm. Tuberculosis – fibrocaceous & miliary Bronchogenic carcinoma	Tuberculosis of lung Emphysema
Gastro-Intestinal	Salivary tumors- PSA Esophageal carcinoma Peptic ulcer Gastric carcinoma Intestinal ulcers Chron's disease & Ulcerative colitis Colorectal cancer	Peptic ulcer Gastric carcinoma Typhoid ulcer of S.I. Tubercular ulcer of S.I. Colorectal cancer	Pleomorphic sal. adenoma Adenocarcinoma TB intestine Acute appendicitis
Hepato-Biliary	Viral hepatitis Fatty liver Portal cirrhosis Hepatic failure Hepatocellular carcinoma Metastatic deposit in liver Gall stones	Micro-nodular cirrhosis Fatty liver Metastatic liver Gall stones	Portal cirrhosis Fatty liver Chr. Cholecystitis

Bone	Pyogenic Osteomyelitis Tubercul. Osteomyelitis Classification of bone tumors Osteogenic Sarcoma, Ewing's Sarcoma Giant cell tumor Osteoporosis & Rickets	Osteomyelitis-sequestrum  TB spine Osteogenic sarcoma Giant cell tumor	Osteogenic sarcoma  Giant cell tumor
Female Genital	Endometrium in health and disease – TB, Menorrhagia, Hormone Uterine leiomyoma Cervical carcinoma Ovarian tumors - overview	Fibroid uterus Carcinoma cervix Dermoid tumor of ovary	Proliferative endo. Secretory endo. Leiomyoma Mucinous cystadenoma
Female Breast	Non-neoplastic diseases – an overview Fibroadenoma Carcinoma breast	Carcinoma breast	Fibroadenoma Duct carcinoma
Male Genital	Carcinoma penis Testicular tumors – classification, Seminoma BHP Prostatic carcinoma – an overview	Carcinoma Penis Seminoma of testis Benign hyperplasia of Prostate	Seminoma Benign hyperplasia of Prostate
Lymph Node	hyperplasia- an overview TB lymph node Metastatic lymph node Hodgkin's disease NHL – an overview		Metastatic deposit TB lymph node
Endocrine	Thyroid – Goitre Hashimoto's thyroiditis Addison's disease		Colloid goiter
Skin	Melanoma Basal cell carcinoma		Papilloma Melanoma Basal cell carcinoma
Soft Tissue	Soft tissue tumors – an overview		Lipoma Capillary hemangioma Cavernous hemangioma
Central Nervous System	Meningitis – pyogenic & Tuberculous CNS tumors–an overview Meningioma		

### 3.4.5.0. SCHEME FOR SECOND PROFESSIONAL MBBS EXAMINATION IN PATHOLOGY

3.4.5.1.	Written Papers	:	80 Marks
	i. Paper I	:	40 Marks
	ii. Paper II	:	40 Marks
3.4.5.2.	Practical	:	25 Marks
3.4.5.3.	Viva Voce	:	15 Marks
3.4.5.4.	Internal Assessment:		<u>30 Marks (15 Theory &amp; 15 Practical)</u>

**Grand Total: 150 Marks**

#### 3.4.5.1 A. Written Paper syllabus:

**Paper I** – General Pathology & Hematology

**Paper II** – Systemic Pathology & Clinical Pathology

#### 3.4.5.4. B: Scheme of Theoretical Examination in Pathology

##### Model Questions:

##### Paper-I

**Total : 40 Marks**

Q1. Problem solving questions (without alternative)		10
Q2. Comment on any two out of three; There shall be conceptual questions on general Pathology/ Hematology.	2 X 5 = 10	
Q3. Pathogenesis / Differentiation / Blood or Bone marrow picture etc. (Any two out of three)	2 X 5 = 10	
Q4. Short notes (any two out of four)	2 X 5 = 10	

##### Paper : II

- Q1. Same as above
- Q2. Same as above
- Q3. Pathogenesis / investigations/ interpretations etc.
- Q4. Short notes as above

**3.4.5.3. Oral/Viva:** There will be two tables with 7 ½ marks in each table Marks will be 15 (7 ½ x 2)

##### 3.4.5.2. Practical:

**Total 25 marks**

##### 3.4.5.2. A. Scheme of Practical Examination in Pathology

Q1. Exercise on Peripheral Blood Smear	4
Q2. Exercise on Urine (2 Tests at least)	4
Q3. Exercise on Blood group / ESR / TLC / Hb estimation	4
Q4. Exercise on Histopathology slide (identification of description of the Changes therein)	4
Q5. Exercise on Problem based card (interpretation Questions therein)	4
Q6. Exercise on Spotting 6 items (1/2 marks each) (2 specimens + 2 slides + 2 instruments)	3
Q7. Practical Exercise book (Should be properly signed by appropriate teachers)	2

**3.4.6.0: Pass: A candidate must obtain 50% in aggregate with a minimum of 50% in theory and minimum of 50% in practical.**

### 3.5.0.0. Syllabus for Microbiology

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

#### 3.5.2.0. OBJECTIVES

**3.5.2.1. KNOWLEDGE:** At the end of the course, the student should be able to:

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

**3.5.2.2. SKILLS:** At the end of the course, the student should be able to:

1. Plan and interpret laboratory investigations for the diagnosis of infectious diseases and to correlate the clinical manifestations with the etiological agent.
2. Identify the common infectious agents with the help of laboratory procedures and use antimicrobial sensitivity tests to select suitable antimicrobial agents.
3. Perform commonly employed bed-side tests for detection of infectious agents such as blood film for malaria, filaria, gram staining and AFB staining and stool sample for ova cyst.
4. Use the correct method of collection, storage and transport of clinical material for microbiological investigations.
- 5.

**3.5.2.3. INTEGRATION:** The student should understand infectious diseases of national importance in relation to the clinical, therapeutic and preventive aspects.

**3.5.3.0. Duration Total Hours of teaching during 1.5 yrs. 3<sup>rd</sup>, 4<sup>th</sup> & 5<sup>th</sup> Semester: 250 Hrs.**

**3.5.3.1 Lecture + Lecture demonstration =** 100 x 1 hr = 100 hrs

**3.5.3.2. Practical class** 50 x 2 hrs = 100 hrs

**3.5.3.3. Tutorials** 25 x 2 hrs. = 50 hrs.

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**TOTAL = 250 hrs**

#### 3.5.4.0. Topic for theoretical Class

<u>S. No</u>	<u>Topic</u>	<u>Class Hours</u>
1	Introduction to Microbiology. History and Classification.	1
<b>3.5.4.1. General Bacteriology</b>		
2	Morphology of Bacteria & Methods of study of Morphology	2
3	Physiology of Bacteria, Metabolism & products thereof	1
4	Growth requirements of Bacteria, Growth Curve/measurement of growth	1
5	Sterilization & disinfection	1
6	Host-parasite relationship	1
7	Bacterial genetics with variation	1
8	Antimicrobial agents, mechanism of action, Mechanisms of bacterial drug resistance and Sensitivity Testing.	1
<b>3.5.4.2. Immunology</b>		
1	Introduction to Immunology. Natural & Non-specific Immune Mechanisms	1
2	Antigen, Hapten, Adjuvants	1
3	Antibody	1
4	Complement System	1
5	Structure & Function of Immune System	2
6	Immune response with T -B Cell Co-operation	1
7	Cytokines with its role in cell mediated Immune response	1

8	Hypersensitivity and related disorders	2
9	Antigen -antibody reactions methodology of testing.	2
10	Immune deficiency disorders and autoimmune Diseases	1
11	Vaccine and scope of Immunotherapy	1
<b>3.5.4.3. Systemic Bacteriology</b>		
1	Methods of study of bacteria	1
2	Staphylococcus: Diseases produced, modes of transmission, pathogenesis & diagnosis.	1
3	Streptococcus: diseases, transmission, pathogenesis, diagnosis Strepto pneumoniae: epidemiology.	1
4	Neisseria: Important species, diseases etiology Pathogenesis, diagnosis, Epidemiology	1
5	Corynebacterium diphtherae: pathogenesis, transmission, diagnosis, Vaccine	1
6	Listeria, Erysepalothrix, Legionella, etc.etiology pathogenesis & diagnosis.	1
7	Mycobacterium tuberculosis -Transmission, Pathogenesis, types, Immunity Hypersensitivity, interpretation of Results of Mantoux test diagnosis, Vaccine-	2
8	Leprosy—transmission, features, types diagnosis etc., Role of vaccine Atypical Mycobacteria.Classification, diseases, diagnosis	2
9	Actinomyces & Disease caused, mode of transmission, Nocardia                      Diagnosis ; Aerobic Spore-Bearers: Bacillus. Important species, disease caused. Pathogenesis. diagnosis, epidemiology of Anthrax.	1
10	Nonsporing Anaerobes- Bacteroides Sp. etc.: Diseases produced, anaerobes features, diagnosis.	1
11	Anaerobic            Clostridia- Tetanus, Gas-gangrene, Food poisoning, Spore bearers Botulism : Pathogenesis, infection, transmission,Diagnosis, treatment and prophylaxis.	3

12	Enterobacteriaceae: Diseases caused by E.coli, Klebsiella, Enterobacter etc.	2
13	Enteric fever and Salmonella sp: Food poisoning, Pathogenesis, Diagnosis.	2
14	Shigellosis & Acute Bacillary dysentery	1
15	UTI and other diseases of proteus sp. Providencia etc.	1
16	Yersinia sp.- Plague – Pathogenesis Types, diagnosis,	1
17	Food poisoning Epidemiology	1
18	Vibrios -Important species, Cholera -pathogenesis, transmission	1
19	Campylobacter & Helicobacter -Diseases caused, pathogenesis, diagnosis.	1
20	Pseudomonadaceae Importance, pathogenesis, diagnosis	1
21	Haemophilus: Disease, pathogenesis diagnosis	1
22	Bordetella sp : Disease caused, transmission, pathogenesis, diagnosis	1
23	Brucella sp.: Disease caused, transmission, pathogenesis. diagnosis.	1
24	Miscellaneous bacteria like Pasteurella, Francisella, Disease caused Streptobacillus, spirillum etc. epidemiology	1
25	Spirochetes: Nonpathogenic spirochetes syphilis, yaws, pintas, bejel, leptospirosis, Relapsing fevers & lyme disease	4
26	Rickettsial disease Epidemiology & diagnosis	2
27	Mycoplasma and Chlamydia: diseases including diagnosis.	2
28	Normal flora of Human body.	1

#### 3.5.4.4. VIROLOGY ( one hour each)

1. Introduction to virology, general properties of viruses and Classification of viruses.
2. Replication of viruses, Antiviral agents.
3. Principles of viral diseases.
4. Principles of diagnosis of viral infections.
5. Common viral vaccines.
6. Bacteriophage.
7. Diseases caused by Herpes viruses, Varicella zoster virus, CMV EBV etc.
8. Hepatitis viruses, A,B,C,D,E; Hepatitis A & B properties laboratory diagnosis.
9. Pico rna viruses -and diseases produced with special mention to Pathogenesis of polio diagnosis and prevention.
10. Viral gastroenteritis –agents, pathogenesis, diagnosis.
11. Rhabdo viruses -General character of Rabies virus, pathogenesis of disease diagnosis prophylaxis.
12. Orthomyxo and paramyxo viral diseases (Influenza, Mumps, Measles Rubella) including vaccines.
13. (a) Retrovirus -HIV infection & AIDS & other retrovirus; (b) Oncoviruses -examples & properties & mechanisms of viral etiology of tumor scope of immunotherapy.
14. (a) Arboviruses and arboviral diseases prevalent in India: epidemiology & diagnosis.  
(b) Slow viral diseases –etiology, diagnosis.

#### 3.5.4.5. MYCOLOGY

- |    |  |     |
|----|--|-----|
| 1. | Introduction, Classification, principles of laboratory diagnosis | One |
| 2. | Superficial mycosis  | One |
| 3. | Subcutaneous mycosis   | One |
| 4. | Deep mycosis   | One |
| 5. | Opportunistic mycosis  | One |

#### 3.5.4.6. PARASITOLOGY

- |    |   |     |
|----|---|-----|
| 1. | Introduction, Classification, definition and types of hosts.                                      |     |
|    | Definition and types of parasites   | One |
| 2. | Intestinal amoebiasis and complications -mode of infection<br>pathogenesis, laboratory diagnosis. | One |
| 3. | Flagellated protozoa -intestinal & genitourinary  | One |
| 4. | Haemoflagellates -diseases, life cycle, vector for transmission,                                  |     |

	laboratory diagnosis (Trypanosomes, leishmania).	One
5.	Malaria -types, parasite -Morph., life cycle, vector, laboratory diagnosis.	Two
6.	Toxoplasmosis and other opportunistic protozoa infections.	One
7.	Classification of helminthes and general characters of nematodes, introduction to intestinal nematodes, strongyloides stercoralis, Ascaris lumbricoides, Hook worm, Trichinella spiralis, Enterobius Vermicularis trichiurae life cycle, disease, laboratory. Diagnosis, epidemiology	Three
8.	Filariasis -diseases, vector, life cycle of parasite Pathogenesis of disease, laboratory diagnosis.	Two
9.	Dracunculosis -life cycle of parasite, mode of infection, epidemiology, laboratory diagnosis.	One
10.	General characters of cestodes, Taeniasis -hosts, mode of infection, life cycle of parasite infection, laboratory diagnosis.	One
11.	Echinococcus granulosus-Morphology, life cycle of parasite, mode of infection, prevention ,laboratory diagnosis.	One
12.	D.latum and other cestode infections	One
13.	Trematodes -classification, diseases caused,. Life cycle of schistosomes and general principles of laboratory diagnosis	One

#### 3.5.5.0. PRACTICALS

1.	Parts and use of microscope and microscopy	1
2.	Instruments and glass wares used in Microbiology	1
3.	Universal presence of microbes	1
4.	Commonly used media and culture techniques (Media -simple basal media -liquid, solid, enriched media, selective media, enrichment media, Indicator Media) Transport Media, Blood culture media, sugar media, Anaerobic media Name, type, composition, sterilization and use.	2
5.	Sterilization methods used for different purpose- basic principles, instruments/chemical agents used	1
6.	Study of morphology of bacteria : a) Gram staining	2

	b) Albert staining	1
	c) Ziehl-Neelsen staining	2
7.	Study of motility of bacteria by	2
	a) Hanging drop method                      d) Capillary tube method.	
	b) Cragie's tube method                      e) Dark-ground microscopy	
	c) Straight loop inoculation method	
8.	Methods of antimicrobial sensitivity testing	1
	a) Disk diffusion                      (b) Tube dilution	
9.	Study of Staphylococcus aureus and staph. epidermidis.	2
	Colony morphology. Pigment production. Gram stain.	
	Motility, Coagulase and other confirmatory tests including	
	Catalase test.	
10.	Study of -Gram + cocci	1
	a) Haemolytic properties of Staph., Strepto., Pneumococci	
	b) Gram staining, Morphology, Study of Strepto, Staphylo	
	Neisseria, Pneumococcus, Clostridia.	
11.	Corynaebacterium -      Albert Stain	2
	Media used	
12.	Mycobacterium -      Z -N Stain	3
	Study of charts	
	Confirmatory diagnosis of Tuberculosis & Leprosy	
	D/D Myco. tuberculosis & M. leprae in smear.	
13.	Study of spores -Gram stain, Spore-Stain (Carbol Fuchsin)	1
14.	Study of Stained Smear, Capsule –India Ink staining (Negative -	
	Stain) Carbol Fuchsin (Positive stain), Methods of Anarobiasis.	
15.	Enterobacteriace                      (a) E.coli	1
	(Use of media)	
	Colony character	
	Biochemical reactions for	
	Identification of the bact. & Final jdentificajon with antibiogram)	
	(b ) Klebsiella sp.	1
	(c) Proteus sp.	1
	(d) Salmonella sp.	1
	(e) Shigella sp	1
16.	Vibrio -Gram Stain, Motility test, Oxidase test and Biochemical Reactions.	1
17.	Pseudomonas sp. -Gram Stain. Motility test, Oxidase test	1
18.	Serological Tests: VDRL Test RPR	3
	Agglutination -Widal, Latex Agglutination test, ELISA -any common test done.	
19.	Introduction to Parasitology - Types of clinical	2

materials different types of tests done.

Steps of exam. of Stool Smear

Steps of exam. of Blood Smear

Steps of exam. of marrow Smear.

20.	Blood Parasites -	Malaria Parasite	1
		L.D. Bodies	1
		Microfilaria	1
21.	Adult Parasites -	Nematodes	2
		Cestodes	2
		Trematodes	1
22.	Examination of Stool for ova, parasite & Cyst		3
	Saline and Iodine preparations.		
23.	Demonstration of fungus by KOH prepn./ lactophenol cotton		1
	blue staining.		
24.	Demonstration of yeast cells in Gram stains & culture		1

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50

**3.5.6.0. Tutorials – 25 x2 hrs =50 hrs**

3.5.6.1. Interpretation of laboratory investigation for diagnosis of Infectious disease and correlation between clinical features with aetiological agents to be taken up in the form of charts on diseases of national importance e.g. 14 x 2 Hrs. = 28

- a) Tuberculosis
- b) Leprosy
- c) Cholera
- d) Enteric fever
- e) Diphtheria
- f).Whooping coughs
- g) Tetanus
- h) Malaria
- i) Kala-azar
- j) Filaria
- k) Dengue
- t) Hepatitis B
- m) AIDS
- n) Hookworm anaemia

### **3.5.6.2.Clinical Microbiology:**

**11 x 2 hrs.= 22 hrs**

1. Upper respiratory tract. Infections with lab diagnosis
2. Lower respiratory tract infections with lab diag.
- 3 Bacterial food poisoning with lab. diag.
- 4 Terminology: gastroenteritis, diarrhoea, dysentery, pseudo membranous colitis diarrhoea and its lab. diag.
5. Dysentery and its lab. diag.
6. Meningitis -types, agents and its lab. diag
- 7 Terminology of Bacteraemia, Septicaemia, pyaemia and its lab. Diagnosis/ PUO (Blood culture)
- 8 Urinary tract Infection, organism and its lab. diag.
9. Sexually transmitted diseases list and lab. diag.
- 10 Hospital acquired infection and its control
11. Bacteriology of milk, water air.

### **3.5.6.0. Recommended Textbooks:**

1. Ananthnarayan & Paniker's Textbook of Microbiology, 9<sup>th</sup> edition. Universities Press; 2013
2. S. C. Parija Textbook of Microbiology & Immunology, 2<sup>nd</sup> Edition. Elsevier India; 2012.
3. Textbook of Protozoology & Helminthology, K. D. Chatterjee, 12<sup>th</sup> edition
4. Jawetz, Melnick & Adelberg's Medical Microbiology, Lange, 26th.edition
5. Greenwood, Barer, Slack & Irving Medical Microbiology, 18<sup>th</sup> edition, Elsevier India, 2012.

### 3.5.8.0. SCHEME FOR 2<sup>ND</sup> PROFESSIONAL MBBS EXAMINATION MICROBIOLOGY

#### 3.5.8.1. Written Paper: Two Papers, (40+40=80 marks ).

**Paper I** - General Bacteriology, Systemic Bacteriology, Immunology.

**Paper II** –Virology, Mycology, Parasitology.

The four questions in each theory paper will preferably have the following distribution of mark.

**Q.1.** One (out of two) Clinical problem oriented question consisting of 2-4 small segments. Marks for each segment will be indicated separately. =10 marks

**Q.2.** Three short note type questions (out of four) 4x3=12 marks

**Q.3.** Three (out of four) short answer type/explanation of statement/difference between/mechanism of action/comment on 4x3=12 marks

**Q 4.** Three short answer type questions 2x3=6 marks

Answer to each question should be given by the candidates in a separate answer book. Only one examiner will examine all the answer scripts to the same question in that center.

#### 3.5.8.2. Oral /Viva

**15 Marks**

- i) General Bacteriology, Immunology, Systemic Bacteriology - 9 marks
- ii) Virology, Mycology, Parasitology - 6 marks

#### 3.5.8.3. Practical-

**25 marks**

- Identification of unknown bacterial culture - 8
- Ziehl-Neelsen Staining of Sputum smear supplied - 3
- Microscopical examination of supplied stool smear - 3
- A serological test by common slide agglutination method - 3
- Laboratory Note Book - 3
- Spotting - 5

**3.5.8.4. Internal Assessment: 30 Marks (15 Theory & 15 Practical)**

**3.5.6.0. Pass: A candidate must obtain 50% in aggregate with a minimum of 50% in theory and minimum of 50% in practical.**

### 3.6.0.0. SYLLABUS FOR PHARMACOLOGY

**3.6.1.0. GOAL:** The broad goal of the teaching of undergraduate students in Pharmacology is to inculcate a rational and scientific basis of therapeutics.

#### 3.6.2.0. OBJECTIVES

**3.6.2.1. Knowledge:** At the end of the course, the student should be able to:

1. describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs.
2. list the indications, contraindications, interactions and adverse reactions of commonly used drugs.
3. indicate the use of appropriate drug in a particular disease with consideration to its cost, efficacy and safety for
  - i) individual needs.
  - ii) mass therapy under national health program.
4. describe the pharmacokinetic basis, clinical presentation, diagnosis and management of common poisonings.
5. list the drugs of addiction and recommend the management.
6. classify environmental and occupational pollutants and state the management issues.
7. indicate causations in prescription of drugs in special medical situations such as pregnancy, lactation, infancy and old age.
8. integrate the concept of rational drug therapy in clinical pharmacology.
9. state the principles underlying the concept of 'Essential Drugs'
10. evaluate the ethics and modalities involved in the development and introduction of new drugs.

**3.6.2.2. Skills:** At the end of the course, the student should be able to:

1. prescribe drugs for common ailments.
2. recognize adverse reactions and interactions of commonly used drugs.
3. observe experiments designed for study of effects of drugs, bioassay and interpretation of the experimental data.
4. scan information on common pharmaceutical preparations and critically evaluate drug formulations.

**3.6.2.3. Integration:** Practical knowledge of use of drugs in clinical practice will be acquired through integrated teaching with clinical departments and pre clinical departments.

### 3.6.3.0. Didactic Lectures 3<sup>rd</sup>. Semester

**3.6.3.1. General Consideration & Basic Principles** : (Introduction, Historical perspective, Pharmacokinetic principles, Pharmacodynamics, Issues relating to pharmacotherapeutics, Essential Drugs concept, Steps in New Drug Development: Ethics and Regulation).

**3.6.3.2. Autonomic Pharmacology** : (Introduction, Historical Perspectives, classification of drugs affecting ANS, Muscarinic receptor agonists and antagonists, Adrenergic receptor agonists and antagonists).

**3.6.3.4. Autacoids & Related Pharmacology** : (Introduction, Eicosanoids & NSAIDs, Histamine & Antihistaminics, Bradykinin & its antagonists, 5HT & its antagonists).

**3.6.3.5. Neuropharmacology** : (Benzodiazepines, Barbiturates, Anticonvulsants, Antiparkinsonian drugs, Neuroleptics, Anxiolytics, Lithium, Antidepressants, General Anaesthetics, Skeletal Muscle Relaxants, Local Anaesthetics, Opioid & Non-Opioid analgesics, Pharmacotherapy of pain & Gout).

**3.6.4.0. Group Dynamics**: (This includes continuous assessment of each student through Item Cards).

**3.6.4.1. Problem based Learning/Tutorials** : In these small group sessions (comprising of 25 students and one teacher facilitator in each group) the students will be required to resolve specific problems that would be designed by the faculty members of the department addressing issues covered in the didactic lectures in this semester.

#### 3.6.4.2. Student's seminar

**3.6.5.0. Practical / Demonstration**: All practical hours must be small group sessions. Students are required to maintain record books, which will be continuously assessed by teacher.

- I. **Prescription writing**: A list of such specific problem-led prescriptions is given in **Annexure**. These may be revised as per the need of the day
  - Principles & format
  - Abbreviations used, Weights & Measures
  - Rational Selection of a Drug while prescribing
  - (WHO P-drug concept)
  - Writing specific problem-led prescriptions for common ailments.
- II. **Therapeutic problem-solving** addressing the issues of clinically relevant adverse drug reactions (ADR's) and adverse drug interactions (DI's). (Coloured photographs of some typical ADR's may be used additionally).(A list of such therapeutic problems are given in **Annexure**).

**III. Pharmacy** : Compounding & dispensing of some common dosage forms eg. Mixture, Lotion/ ointment, Powder, etc.

- Alkali mixture/S.S. of Magsulph
- Carminative mixture.
- ORS Powder
- Calamine lotion
- Atropine sulphate ointment(1%)
- Gamma-benzene hexachloride ointment(1%).

**3.6.6.0. Didactic Lectures (Fourth Semester)**

**3.6.6.1. Renal Pharmacology.**

- Diuretics & Anti Diuretics
- Drugs for acid –base & Electrolyte balance.

**3.6.6.2. Cardiovascular Pharmacology;** Renin-angiotensin system, Angina pectoris, Myocardial infraction ,Cardiac arrhythmias, Hyperlipidemias, Hypertension, Heart failure.

**3.6.6.3. Gastrointestinal Pharmacology:** Laxatives & Non–specific antidiarrhoeals Pharmcotherapy of Peptic ulcer, Drugs for portal hypertension, Pancreatitis, Gall stones, Inflammatory bowel disease.

**3.6.6.4. Haemato-pharmacology:** Haematinics, Coagulants & Anticoagulants, Antithrombotics, Fibrinolytic, Antiplatelet agents.

**3.6.6.5. Endocrine Pharmacology:** Insulin & Oral hypoglycemic agents, Thyroid and anti thyroid drugs, Corticosteroids, Estrogen, Progestin and Oral contraceptives, Vitamin D, Parathormone, Calcium homeostasis.

**3.6.7.0. Group Dynamics;** Topics like Anaemia, Hypertension, Angina pectoris, Peptic ulcer, Oral contraceptives, Rickets, Diabetes mellitus etc. should be dealt in integrated sessions involving other para-clinical (and clinical) disciplines like pathology, Microbiology, Community Medicine etc. In such seminars students will take active part and teachers of different disciplines will act as facilitators. The seminars hours will be treated as common credit hours for the para –clinical disciplines that are directly involved in the concerned topic of discussion .For the logistic convenience, these sessions will not be required to attend at a time. Each session will be of 2 hours duration. They may be scheduled to be held on the last Saturday of each month. The minimum number of such integrated sessions will be 5 in this semester.

- Problem-based learning / Tutorials similar to 3<sup>rd</sup> Semester.
- Integrated teaching –learning / Student’s seminar.

### 3.6.8.0. Practical /Demonstrations

**I. Prescription writing.**

Writing specific problem led prescriptions (for common ailments).

**II. Therapeutic problem solving**

Similar to 3<sup>rd</sup> Semester

**III. Demonstration of different dosage forms, formulations and delivery systems.**

Tablets, Scored tablets, Capsules, Coated tablets, Drug suspensions, Suppositories, Enema, Eyedrops, Injectables(Ampoules & Vials), Transdermal systems(NTC Patch), Fluid transfusion bottles (Glass vs plastics), Blood Transfusion sets & Donor sets syringes (Tuberculin, Insulin, 2 ml, 5 ml, 10 ml, 50ml,) (Glass vs Disposable)

Needles –different sizes.

Butterfly canula

Scalp vein sets

Inhalers, Spacer devices, Nebulizers.

Different types of packaging: Blister packs, Coloured bottles.

**IV. Experimentals**

Demonstration of drug effects

**a. Animal experiments / Computerized animal experiments programme**

1. Effects of mydriatics & miotics in Rabbit's eye.
2. Demonstration of drug effect in amphibian heart /cat blood pressure preparation.
3. Guinea pig ileum

**b. Actual patient situation**

Visit to the indoor/ in patient's deptt.

(General medicine, Pediatrics, or Maternity ward.) to oversee the drug prescribing and utilization.

### 3.6.9.0. DIDACTIC LECTURES ( Fifth Semester)

**I . Respiratory System Pharmacology**

Pharmacotherapy of Cough

Drug therapy of Bronchial Asthma.

**II. Chemotherapy & Anti-infectives**

General consideration ,Antiseptics and disinfectants

B-lactam antibiotic, Aminoglycosides, Tetracyclines, Chloromphenicol, Macrolides, Quinolones & Sulphenamides, Antiamoebic, Anti tubercular, Anti fungal and Antiviral drugs with pharmacotherapy of AIDS.

**III . Cancer Chemotherapy**

Principles & general consideration

Treatment approach in some common malignancies.

#### **IV. Immunopharmacology**

Immuno suppressants & Immunostimulants .

Vaccines & Sera.

#### **V. Toxicology**

Drug overdose & poisoning

Heavy metals & Metal antagonist

Environmental toxicants & Drug dependence, Drug abuse, Adr monitoring

#### **VI. Miscellaneous**

Vitamins & minerals

Dental Pharmacology

Dermatopharmacology

Ocular pharmacology

Drugs & uterine motility

Drugs used in medical emergencies

Rational use of drugs/Rational therapy

Gene therapy

Drug prescribing in Pregnancy, Infants and Children, Geriatric patients and Hepato-renal insufficiency.

#### **3.6.10.1. Group Dynamics**

- I. Problem-based learning / Tutorials
- II. Integrated learning / Students seminar  
Similar to that in 4<sup>th</sup> Semester.

#### **3.6.10.2. Seminar topics:**

Bronchial asthma, Rational use of antibiotics, Tuberculosis, Malaria, Worm infestations, Management of poisons, Vaccine preventable diseases, Acute Respiratory Infection and Diarrhoeal Disorders in Children.

#### **3.6.10.3. Practical/Demonstrations**

**I. Prescription writing** : Writing specific problem related prescription ( for common ailments )

**II. Therapeutic problem solving**

**III. Pharmacy**

- a) Criticism of prescription
- b) Developing critical appraisal skill in scanning information from
  - i) Pharmaceuticals Promotional Literature
  - ii) Package Inserts/ Patient Information Leaflets
  - iii) Published Documents in Independent Medical Journals

#### IV. Experimental

Actual Patient Situation

- a. Visit to the General Emergency to oversee the management of any one Medical/Surgical Emergency.
- b. Visit to the surgical Operation Theatre to over see the effects of drugs used anaesthetic practice.

##### 3.6.10.4. Annexure: A. List of problem-led prescriptions

- A drug for "Typhoid fever".
- A drug for "Bacillary Dysentery".
- A drug for "Duodenal Ulcer."
- A drug for "Amoebic Dysentery."
- A drug for "Tonic clonic seizures".
- Purgative for Radiological Investigation.
- A drug for "Multi bacillary Leprosy".
- A drug for "Tineaasis".
- A drug for "Urinary Tract Infection".
- A drug for "Acute Bacterial Conjunctivitis"
- A drug for "Filariasis"
- A drug for "Acute Gout".
- A drug for "Nausea and Vomiting".
- A drug for "Un complicated Pulmonary TB"
- A drug for "Mixed worm Infestation".
- A drug for "Migraine".
- A drug for "Syphilis".
- A drug for "Gonorrhoea".
- A drug for "Acute attack of Angina pectoris".

##### B. List of Drug Interaction

- Amoxicilin & Clavulanic Acid.
- Metronidazole & Ethylalcohol .
- Ciprofloxacin & Theophylline.
- Aspirin & Warfarin.
- Rifampicin & Cobined OCP.
- Chloroquine & Alkali mixture
- Sucralfate & Antacid
- L-dopa & Pyridoxine
- Propranolol & Verapamil
- Digoxin & Hydrochlorothiazide
- Chlorpropamide & Dicoumerol
- Gentamycin & gallamine.
- Lithium & Thiazide.
- Propranolol & Insulin.
- Enalapril & Spironolactone.

### C. List of Therapeutic Problems

1. A 10 year old school girl suffering from mild exercise induced bronchial asthma has been treated with a metered dose inhaler containing 500µg of Terbutaline per inhalation as and when required, which effectively controls the individual attack. However, she has attacks of wheezing every 3 to 4 weeks occurring during exercise even after above treatment schedule.

What treatment should now be given to reduce the frequency of attacks?

2. A 16 years old girl has admitted to the emergency department with severe short of breath. She is diagnosed as acute bronchial asthma. She has been using metered dose inhalation of Salbutamol, Ipratropium and Beclomethasone. In spite of the above treatment, the present attack is not controlled.

What will be her immediate treatment?

3. A 69 year old woman suffering from congestive heart failure has been treated with 0.25 mg Digoxin tablet daily for last 3 months. But the heart failure is not controlled adequately.

What will be the treatment to control the heart failure adequately?

4. A 45 year old male patient with history of smoking presented with exertional retrosternal compressing pain radiating to the left arm and lasts for 2-5 minutes. The pain is relieved after taking rest. After proper investigation, he has been diagnosed as a case of stable angina pectoris.

What will be the treatment to control the attack?

5. A 45 old patient suffering from angina pectoris was on treatment with isosorbide dinitrate. He is admitted to the hospital with severe chest pain and sweating and diagnosed to be a case of acute myocardial infarction.

What will be the management of this patient?

6. An overweight middle aged man is found to be hypertensive while attending a clinic for medical check up. His B.P. is 170/105 mm of Hg on two successive observations.

What will be the treatment for this patient?

7. A 58 year old man with history of severe hypertension for 20 years, which was well controlled with medication. He stopped taking drugs for a prolonged period. His blood pressure is found to be 240/135 mm of Hg with papilloedema.

What will be the management of this case?

**8.** A 25 year old lady is brought to emergency unit by her family members. She is unconscious with constricted pupils and froth coming out of her mouth. She is reported to consume an organo-phosphorus insecticide. How will you manage the case

**9.** A middle aged person was watching T.V. in dark, suddenly develops pain in right eye, vomiting and blurring of vision. On examination, right pupil is dilated, sluggishly reacting to light with raised intra-ocular pressure. The condition is diagnosed as a case of acute congestive glaucoma.

What will be the medical management of this clinical condition?

**10.** A 20 year old diabetic man on insulin therapy suddenly developed fever and Missed his usual doses of insulin and became unconscious.

What measures will you take to manage this condition?

**11.** A middle aged diabetic patient with oral anti-diabetic agent (Tolbutamide) underwent prolonged exercise and missed his usual breakfast. He developed unconsciousness, respiratory distress and profuse sweating with tachycardia.

How will you manage the case?

**12.** A person is willing to travel an endemic area of malaria. What chemoprophylaxis has to be given to him?

Subsequently, he developed chloroquine-resistant malaria. How will you manage the case?

**13.** A male patient develops fever with chill and rigor. P. vivax is found in his blood smear.

What will be the management of this case?

**14.** A woman in 2<sup>nd</sup> trimester pregnancy is found to be moderately anemic on routine antenatal check-up.

What will be the management of this case ?

**15.** A 6 year old boy while playing in a village ground was beaten by a snake. The snake was identified as a poisonous one.

How will you manage this case?

**16.** A patient with chronic psychiatric illness was treated with largactil (chlorpromazine) for a prolonged period. He developed tremor, bradykinesia and rigidity

What treatment should be given to the patient without stopping the drug ?

#### **D. List for Tutorials:**

- Merits & demerits of route of administration
- Factors influencing absorption & bioavailability
- Clinical relevance of enzyme induction
- Clinical relevance of enzyme inhibitors
- Clinical relevance of kinetics of elimination
- Dosing schedule
- Fixed dose drug combination
- Mechanism of drug action
- Drug potency and efficacy
- Therapeutic index / therapeutic window
- Drug interactions
- Rational use of drugs
- P-drug concept
- Pharmacological effect of anticholinergic drugs
- Pharmacological effect of adrenergic drugs
- Pharmacological effect of histamine
- Pharmacological effect of 5-HT
- Pharmacological effect of dopamine
- MAO inhibitors
- COMT inhibitors
- COX inhibitors
- Pharmacological effect of morphine
- Analgesics
- ACE inhibitors
- Drug acting on sodium channel
- Drug acting on calcium channel
- Drug acting on potassium channel
- Phosphodiesterase inhibitors
- Drug acting on endothelin receptors
- Antiemetics

#### **3.6.11.0. Text Books Recommended**

- Essentials of Medical Pharmacology: KD Tripathi
- Principles of Pharmacology : HL Sharma & KK Sharma
- The Pharmacological Basis of Therapeutics : Goodman & Gillman
- Pharmacology : Rang & Dale
- Basic & Clinical Pharmacology : B.G. Katzung

### 3.6.12.0. Scheme for Second Professional MBBS University Examination in Pharmacology

<b>3.6.12.1. Written Papers</b>	<b>:</b>	<b>80 Marks</b>
i. Paper I	:	40 Marks
ii. Paper II	:	40 Marks
iii.		
<b>3.6.12.2. Viva Voce</b>	<b>:</b>	<b>15 Marks</b>
<b>3.6.12.3. Practical</b>	<b>:</b>	<b>25 Marks</b>
<b>3.6.12.4. Internal Assessment</b>	<b>:</b>	<b>30 Marks (Theory – 15, Practical - 15)</b>

**3.6.12.1.A. Written Paper syllabus:** **Paper I:** General Pharmacology, Autonomic Pharmacology, Cardiovascular Pharmacology, Renal Pharmacology including Acid-base and fluid-electrolyte balance, Respiratory Pharmacology, Haemato pharmacology, Vitamins and micronutrients, Toxicology including Heavy metals antagonist  
**Paper II:** Pharmacology of Central nervous system, Endocrine Pharmacology, Autacoids and immuno-pharmacology, Skeletal muscle relaxants and local anesthetics, Gastrointestinal Pharmacology, Drugs acting on uterus, Anti infective and cancer chemotherapy, Antiseptics, Disinfectants and ecto –parasiticides, Dermat mucosal agents.

**B. Module of Questions:**

**Paper-I** **Total: 40 Marks**

Q. 1 Applied part of Pharmacology (Therapeutics) 10 marks  
 Q. 2 + Q. 3 + Q. 4 (9+9+12) 30 marks  
 (Explain why? Short note; Mechanism of action, Compare and Contrast; Effects of etc; Short questions of above types may be set for the examination. No question shall carry more than three marks).

**Paper-II** **Total : 40 Marks**

Q. 1. Applied part of Pharmacology (Therapeutics.) 10 marks  
**Q.2 + Q.3 + Q.4** 30 marks  
 (Shall be of Explain Why? Short Notes; Mechanism of action, Compare and Contrast; Effects of etc; Short questions of above types may be set for the examination. No question shall carry more than 3 marks.)

**3.6.12.2. Oral/Viva: There will be two tables with 7 ½ marks in each table. Marks will be 15.**

**3.6.12.3. Practical examination in Pharmacology: Marks will be 25.**

<b>Q1. Prescription-one</b>		<b>Total marks: 4</b>
Format-	1	
Writing-	1	
Oral Crossing-	2	
<hr/>		
<b>Q2. Pharmacy- one item</b>		<b>Total Marks 4</b>
Preparation & Labeling-	2	
Oral Crossing-	2	
<hr/>		
<b>Q3. Therapeutic Problem – One</b>		<b>Total Marks 4</b>
Correct interpretation of Therapeutic Situation In writing	2	
Oral Crossing	2	
<hr/>		

**Q.4. Drug interaction-one**

**Total Marks 4**

Interpretation in writing-	2
Oral Crossing-	2

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**Q5. Experimental Pharmacology**

**Total Marks 4**

Chart and diagram on Experiments demonstrated: Identification -2  
In Practical classes & charts on pharmacokinetics: Interpretation-2

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**Q6. Sample based Knowledge testing:** Two samples per question in writing - **2**

**Q7. Criticism of prescription -** **3 (Oral table)**

**Practical Notebooks: Two numbers. one-Therapeutics Record Book-Containing patterns utilization of drugs in emergency and in-patient departments.**

**One-Pharmacy,**

Practical Note-books must be submitted in practical Examination- without which students are **NOT ALLOWED** to appear

**3.6.13.0. Pass: A candidate must obtain 50% in aggregate with a minimum of 50% in theory and minimum of 50% in practical.**

### **3.7.0.0. Syllabus for Forensic Medicine & Toxicology**

**3.7.1.0. GOAL;** The broad goal of the teaching of undergraduate students in Forensic Medicine is to produce a physician who is well informed about medicolegal responsibilities in practice of medicine. He/She will also 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. He/She acquires knowledge of law in relation to medical practice, medical negligence and respect for codes of medical ethics.

#### **3.7.2.0. OBJECTIVES**

**3.7.2.1 KNOWLEDGE:** At the end of the course, the student should be able to:

1. identify the basic medico legal aspects of hospital and general practice.
2. define the medico legal responsibilities of a general physician while rendering community service either in a rural primary health centre or an urban health centre.
3. appreciate the physician's responsibilities in criminal matters and respect for the codes of medical ethics.
4. diagnose, manage and identify also legal aspects of common acute and chronic poisonings.
5. describe the medicolegal aspects and findings of post-mortem examination in case of death due to common unnatural conditions & poisonings.
6. detect occupational and environmental poisoning, prevention and epidemiology of common poisoning and their legal aspects particularly pertaining to Workmen's Compensation Act.
7. Describe the general principles of analytical toxicology.

**3.7.2.2. SKILLS:** At the end of the course, the student should be able to :-

1. Make observations and logical inferences in order to initiate enquiries in criminal matters and medico legal problems.
2. Diagnose and treat common emergencies in poisoning and manage chronic toxicity.
3. Make observations and interpret findings at postmortem examination.
4. Observe the principles of medical ethics in the practice of his profession.

**3.7.2.3. INTEGRATION:** Department shall provide an integrated approach towards allied disciplines like Pathology, Radiology, Forensic Sciences, Hospital Administration etc. to impart training regarding medico legal responsibilities of physicians at all levels of health care. Integration with relevant disciplines will provide scientific basis of clinical toxicology e.g. medicine, pharmacology etc.

**3.7.3.0. Theoretical/ Didactic Lecture. 3rd semester** Total Lecture class in 3rd semester: 26(twenty-six)

**3.7.3.1. INTRODUCTION**

- 1., History of Forensic Medicine in India. 1(one)
2. Definition of Forensic Medicine. Medical Ethics & Etiquette etc.
3. Role of General duties doctor in elementary criminal Investigation in India and reporting of Medico-legal Cases- general over view about duties of doctors in Medico-legal cases.

**3.7.3.2. LEGAL PROCEDURE**

1. Inquests & its type & difference between them. 1(one) Criminals courts of India & their powers.
2. Procedures of of giving Medical evidences in criminal courts type of evidence, Medical Certificates P.M Reports. Dying declaration & deposition and other documents not subjected to oral evidence ordinarily. 1(one)

**3.7.3.3. IDENTIFICATION**

1. Definition , Medicolegal Importance, enumeration & over view of datas for identification of subjects, 3(three) with special mention of determination of age & sex in living and dead (Discussion of individual datas which will dealt in Practicle/Tutorial Classes i.e. from Bones, X-ray films etc.)
2. Out line of Dactylography, Hair, Blood, Advances in 3(three) Identification techniques namely blood grouping DNA Finger Prints super-imposition photography etc.
3. Medicolegal importance of hair & teeth Examination and different stains e.g. blood, seminal stains, and hazards 2(two) of Blood transfusion. (Writing of report on Blood and Seminal fluid examination will be dealt with in Practical Tutorial)

**3.7.3.4. DEATH & ITS MEDICOLEGAL IMPORTANCE**

1. Definition, types & modes of death, suspended animation & its medico-legal importance, moment of death with special 2(two) reference to brain death & outline of Organ Transplantation Act, Certification of death clinically and donation of dead Bodies.
2. Signs of death (1) immediate , (2)Early, (3)Late e.g. eye changes, P.M. staining Rigor mortis and condition stimulating putrefaction adipoceros mummification & their Medico-logical importance; General procedure of determination time passed since death from post mortem examination. 4(four)

**3.7.3.5. . INJURY & ITS MEDICOLEGAL IMPORTANCE**

1. Definition , classification, medico-legal considerations and Relevant section of I.P.C. & P.C. 1(one)
2. General over view of different over views (1) Abrasion,(2)Bruise, (3)Laceration, (4)Incised wounds and stab injuries and their Medico-legal importance. Difference between (1) P.M. staining and

bruise (2) Lacerated and incised wound, (3) wound of entrance and exit of stab wound Individual injuries to be discussed in practical/tutorial) 5(five)

3. GUN SHOT INJURIES - With elementary ballistics. 3(three) Types of firearms & categories- Rifled & Smooth bored weapons & related definition; study of gun shot injuries at different ranges including Involuntary tattooing & Tandem bullet & cartridge etc. & wound (Terminal) Ballistics. Difference between wound of entrance and exit caused by bullet.

#### **3.7.4.0. Didactic Lecture**

**A. 4<sup>th</sup>. Semester:** Total lecture class in 4th Semester: 32(thirty-two)

#### **3.7.4.1. Regional injuries**

1. Head injuries Different types of skull Fractures Intracranial Hemorrhages Hol bourn's Mechanism of brain injuries, concussion, Lucid interval, Automatism, difference from alcohol intoxication, Duties of a doctor in case of Head injury. 2(two)

2. Spinal Thoracic and abdominal injuries, Limb injuries including Railway injuries. Traffic & other vehicular injuries, Aviation injuries, and its medicolegal importance 1(one)

#### **3.7.4.2. Thermal injuries & Starvation**

1. Effects of Cold Heat Burn, Scald, Lightning Electricity, Xray Burns etc. Causes of death from burn, Classification of burn, difference between antemortem & Postmortem Burn, Death from starvation, causes, signs & symptoms. 2(two)

2. Medico-legal aspects of wound, relevant section of I.P.C./Cr.P.C. Difference between Antemortem and Postmortem Wound, Grievous Hurt, Criteria of Homicidal & Suicidal wound, determination of age of wound, causes of death from wound (Writing of Injury Report will be dealt with in Practical/Tutorial). 2(two)

**3.7.4.3. Violent Asphyxial death-** Definition, salient feature of Hanging, strangulation (Different types), suffocation (smothering, overlaying), Choking, Burking, etc. Drowning, Traumatic Asphyxia, sexual Asphyxia; Modes & Manners of death, fatal period, Postmortem findings, Medico-legal consideration of each. 5(five)

**3.7.4.4. Impotence, Sterility, Sterilization, Artificial Insemination,** Test Tube Baby Surrogate mother, Medicolegal importance of each them. 1(one)

**3.7.4.5. Virginity, defloration-signs;** Difference between true & false Virgin - Medicolegal importance. 1(one)

**3.7.4.6. Classification of sex offence** including definition & examples Procedure of examination of accused victim of rape and other sex offences different relevant section of I.P.C. & relevant consideration of sex preservations (Writing of Report on Sex offence will be dealt with Practical/ Tutorial classes). 3(three)

**3.7.4.7. Medico legal aspects of pregnancies,** Delivery, recent & remote Signs of Delivery, Medicolegal problems of during of pregnancy, Superfoetation Superfoecundation, posthumus child, etc.Paternity determination, Irgitimacy. 2(two)

**3.7.4.8. Abortion & its classification,** MTP Act'71; Methods to procure abortion , its complication & medico legal importance.1(one)

**3.7.4.9. Infanticide,** Viability, still and dead born, signs of live And still birth and dead born; various tests & signs, Cot death, Battered baby syndrome. 2(two)

**3.7.4.10. Forensic Psychiatry** including various definition Difference between true and feigned insanity, Restraining a lunatic, Civil & Criminal responsibilities of Insane, Somnambulism, Somnolemtia, hypnotism & out line of Mental Health Act. 2(two)

**3.7.4.11. Medical Law & Ethics** Indian Medical Council & State Medical Council Function & Power, Professional conduct privilege & duties of Medical – Practitioner & Malpractices E.S.I. Act, Workman compensation Act, Medical Indemnity Insurance, C.P. Act, Medical Records & Certificationj Consents, including informed consent, vicarious Liability, Medical negligence, Human experimentation, Euthanasia & Medicolegal aspects of AIDS, Torture/Atrocities on Human being 5(five)

**3.7.4.12. Toxicology,** General consideration of a poison, Classification, Diagnosis, General Management Antidotes, Medicolegal importance, factors dodifying action of positions. 2(two)

**3.7.4.13. Diagnosis of poisoning** in living & dead, Duties of a Doctor in a case of poisoning. (Writing of Report on Poisoning will be dealt with in Practical Classes), Corrosive acids and Alkalies. 1(one)

## **B. Didactic Lectures 5th Semester 12 Classes**

**3.7.5.1.** Acute and chronic poisoning by Heavy Metallic Salts of Arsenic, Mercury, Copper, Zing, Lead, Aluminum, Phosphide Toxicity, Alcohol, Barbiturates, Aspirin. 5(five)

**3.7.5.2.** Dhatura, Opium, Cannabis, Kunch, Yellow olender,Aconite,Kuchila, Seal kanta, M.L.aspect of food poisoning. 3(three)

**3.7.5.3.** Industrial poisons, common agricultural & environmental poison, Aniline, M.C. 2(classes)

**3.7.5.6.** Death from Anaesthetic agents- use and abuse Drug Abuse And recent considerations. 1(one)

**3.7.5.7.** Medicolegal Autopsies, Protocol Procedure, preservation including embalming, Examination of mutilated bodies & bones (P.M. Demonstration and writing of P.M. reports will be dealt with in Practical). 1(one)

## **3.7.6.0. Demonstration/ Practical classes. 3<sup>rd</sup> Semester (10 classes)**

**.3.7.6.1. Identification:** Examination of skeletal remains (namely skull, mandible Pelvis, Femur, Sternum, Ribs etc.) For determination of (A)Age, (B)Sex,(C)Race, (D)Stature. 3(three)

**3.7.6.2. Determination of Age from X-Ray. 1(one)**

### **3.7.6.3. Injuries**

- Examination of weapons including fire arms & its correlation with injuries & Medico legal Importance. 4(four)
- Demonstration of injuries in emergency room and report Writing. 1(one)

**3.7.6.4.** . Demonstration of Medico legal Autopsies and writing of Reports 1(one)

### **3.7.7.0 Demonstration/ practical classes, 4<sup>th</sup> semester (9 classes).**

**3.7.7.1.** Study of Medicolegal (M.L.) Photographs relating to Identification/Injury/Death from different causes. 2(two)

**3.7.7.2.** Study of models showing different medico-legal problems 2(two)

**3.7.7.3.** Practical demonstration for various, Chemical Tests for Blood and semen and examination of a suspected stain and Writing of report. 3(three)

**3.7.7.4.** Examination of blood for testing blood group & Rh Factor. 1(one)

**3.7.7.5.** Demonstration of Medico-legal autopsies and writing of Reports. 1(one)

### **3.7.8.0. Practical/ Demonstration 5th Semester. (11 classes)**

**3.7.8.1.** Demonstration of general management of poisoning case Including procedure of giving stomach wash . 1(one) Corrosive mineral acids, Carbolic Acid, Oxalic Acid and Corrosive alkalis.

**3.7.8.2.** Non metallic Irritants Phosphorus, Chlorine, Organo-phosphorus Chlorinated compounds. 1(one)

**3.7.8.3.** Metallic Irritants Arsenic Mercury, Copper and Lead, Zinc and Aluminum salts. 3(three)

**3.7.8.4.** Vegetable Irritants and other vegetable poisons Animal Irritants e.g. Snake and other bites, Cantharides 1(one).

**3.7.8.5.** Opium, Morphine 1(one).

**3.7.8.6.** Dhatura, Cannabis 1(one).

**3.7.8.7.** Strychnine Oleander, Aconite, HCN/KCN 1(one).

**3.7.8.8.** CO, CO 2 Tear gas War gas & other Industrial Methyl Isocyanate (MIC) gas. 1(one)Environmental and other Agriculture poisons .

**3.7.8.9.** Demonstration of Medico legal autopsies and writing of Reports. 1(one)

### **Recommended Text Books**

1. Modi Text books of Forensic Medicine
2. Text Book of Forensic Medicine – Parikh
3. Text book of Forensic Medicine - Reddy
4. Text book of Forensic Medicine – Krishna & Vicz.

### 3.7.9.0. SCHEME FOR SECOND PROFESSIONAL MBBS EXAMINATION IN FSM

3.7.9.1. Written paper I : Marks 40 marks

3.7.9.2 Oral : Marks 10

3.7.9.3. Practical : Marks 30

3.7.9.4. Internal assessment: - Marks 20 marks (Theory: 10 marks; Practical:- 10) marks)

**Grand Total: 100 marks**

#### **Practical Examination: - Total Marks 40)**

- Bone-----1
- Weapon-----1
- Poison-----1
- X- Ray-----1
- Model/Wet-Specimen/Photograph-----1

(7 minutes x 5 items = 35 minutes )

- Blood Grouping )\_\_\_\_\_one sample  
ABO Rh ) (10 minutes )

For each item-----5 marks

(Total :- 6 items x 5 =30 marks )

A. Theoretical+ Internal Assessment + Oral

Full Marks : 40 +10 +10 =60 Pass Marks : 30

B. Practical + Internal Assessment

Full Marks : 30 + 10 =40 Pass Marks : 20

C. Internal Assessment:

**Minimum marks to be obtained in Internal Assessment for appearing in University Examination is 7 (3.5 Theory + 3.5 Practical).**

#### **Model Question:**

Question No. 1 (Group – A)

Two questions

Marks – 2 x 5

Question No. 2 (Group – B)

a) Two medico legal importance out of three

Marks – 2 x 2½

b) Two short notes out of three Marks – 2 x 2½

Question No. 3 (Group – C)

a) Two Differentiate between (Total question three) Marks – 2 x 2½

b) Two Explanation (Total question three) Marks – 2 x 2½

Question No. 4 (Group – D) From Toxicology chapter

a) One long question Marks – 5

b) Two short questions Marks – 2 x 2½

Model question for question No. 4 (Group – D)

Q.4. a) What is antidote? Mention briefly different types of antidotes with examples. 1+4=5

b) i) Write minimum fatal dose of the following poisons (**any two**): 2 x 1=2

1. Arsenious Oxide.
2. Organophosphorus Compound
3. Mercuric Chloride.

ii) Mention the preservation to be used for chemical examination for poisoning (any three) 3 x 1=3

1. Hydrocyanic acid.
2. Copper Sulphate.
3. Carbolic acid.
4. Aconite root.

**3.7.10.3.0. Pass: A candidate must obtain 50% in aggregate with a minimum of 50% in theory and minimum of 50% in practical.**

## **3.8.0.0. SYLLABUS FOR COMMUNITY MEDICINE**

**3.8.1.0. Goal:** The broad goal of teaching in Community Medicine is to prepare the student to function effectively as a Community physician.

**3.8.2.0. OBJECTIVES:** At the end of the course, the student should be able to:

- 3.8.2.1. Understand & describe the concepts of Health & Disease, Natural History of Disease &, Levels of Prevention.
- 3.8.2.2. Understand and describe the determinants of health and the role of individuals, family and the community on the health status of the individual/ s family and community.
- 3.8.2.3. Understand and describe the evolution of different types of health care services like Personal Care, Public health and community health/ Community Medicine to cater to the health care needs of the community effectively.
- 3.8.2.4. Understand & describe the concept of Health for All and Primary Health care in health care.
- 3.8.2.5. Understand & describe the demographic pattern of the country and its relation to health.
- 3.8.2.6. Understand & describe basic bio-statistical methods in the study of Individual and community health problem
- 3.8.2.7. Understand & describe the epidemiological methods in the study of Health & Disease and its intervention at the individual & community level..
- .
- 3.8.2.8. Describe the role of environment (Physical: Hot, Cold, Humidity, Air, Noise, Light, Radiation, Physical & chemical) - inside the home, at the workplace and in the community) on the health status of individuals and the community.
- 3.8.2.9. Describe and analyze the importance of water and sanitation on human health.
- 3.8.2.10. Suggest feasible methods of environmental control at household and community levels.
- 3.8.2.11. Describe common occupational hazards in industries, agriculture, and the services available to the industrial workers and feasible methods of control of occupational hazards.
- 3.8.2.12. Describe the important/common health problems (Communicable, Non communicable Diseases, Special health needs and health problems of groups like neonates, preschool, school going, juvenile, women in the reproductive age group, pregnant and lactating woman. Geriatric as group) in the Rural and urban area and the existing Health programs available in India.

3.8.2.13. Describe the health care delivery system in India and its component. (Organization and functions of the health care team at Primary Health Centre, Community Health Centre and District levels. HIMS, Human Resources, health care financing)

3.8.2.14. Describe the National Health Programs of India.

**3.9.9.0. Skills: At the end of the course a student should be able to:**

**3.9.9.1** Draw natural history of a health problem in an individual suffering from disease & select the appropriate service package using the levels of prevention paradigm.

**3.9.9.2** Apply suitable bio-statistical methods and interpret the results in the study of health problems of individuals and the community.

**3.9.9.3** Use various methods available to collect vital statistics of the community.

**3.9.9.4** Apply appropriate epidemiological methods & tools in the study of health problems (communicable, Non Communicable diseases, health system) at individual and community level.

**3.9.9.5** Plan, collect, analyze, interpret and present data from a hospital/community survey on specific health problems.(Children Growth & development, Nutrition, Maternal health, and other child health)

**3.9.9.6.** Diagnose and manage common health problems and emergencies at the individual, family and community levels keeping in mind the existing health care resources, prevailing socio-cultural beliefs and family resources.

**3.9.9.7.** Diagnose and manage maternal and child health problems and advise couples and the community on the family planning methods available.

**3.9.9.8.** Diagnose and manage common nutritional problems at the individual and community levels.

**3.9.9.9.** Plan and implement, using simple audiovisual aids, a health educational programme and carry out its evaluation.

**3.9.9.10** Plan and implement an intervention program with community participation

**3.9.9.11** Evaluate the Major ongoing Health programs.

**3.9.9.12** Plan and implement a disaster management program

**3.9.10.0 COURSE CONTENTS:**

**3.9.10.1. Concepts of Health & Disease**

- I. Introduction to community medicine, Medicine in antiquity, evolution of community medicine.
- II. Definition of health Dimensions of Health, holistic concepts of health. Individual's Health, Community's Health.

- III. Determinants of health, Characteristics of agent, host and environmental factors in health and disease and the multi factorial etiology of disease.
- IV. Understanding the concept of natural history of disease and levels of prevention.
- V. Measurements in Health.
- VI. Constitutional provision for Health & Welfare for the population of India.
- VII. Health profile of India and outline of Health care delivery system.

**Practical & Health Visits:**

- I. Rural Health Institutions (Sub Centre, PHC, CHC, Secondary & Tertiary Hospital)
- II. Computing: Major Health Indicators

**3.9.10.2. Behavioral Sciences.**

**A. Objectives: At the end of the course the student should be able to:**

- 1. Define social & behavioral sciences and discuss their role in Community Medicine.
- 2. Describe the role of the family/community in health and disease.
- 3. Measure the socio-economic status of a family and describe its importance in health and disease.
- 4. Construct, pre-test and validate questionnaire/interview schedule for the study of family and community.
- 5. Understand the term attitudes and describe the process of attitudinal development and methods to change.

**C. Didactic Lecture Topics:**

- 1. Culture, Society and Health
- 2. Role of Family in health and disease
- 3. Socio-cultural factors related to health and disease in the context of urban and rural societies.
- 4. Social Organization and Community Participation
- 5. Socioeconomic Status and its importance in relation to health and disease.
- 6. Attitudes: nature, development, methods to change & Measurement of attitudes.
- 7. Social psychology, Community behavior and community relationship, patient behavior in the Hospital.

#### **D. Practical:**

1. Study of Family (Type, Structure, socio economic status, Health beliefs, practices).
2. Measurement of Socio economic indicators and Health
3. Construction and pre-testing of questionnaire/ interview schedule
4. Questionnaire design to test attitudes.

#### **3.9.10.3. ENVIRONMENT AND HEALTH:**

##### **A. Objectives: At the end of the course the student should be able to:**

1. Describe the physical environment inside the home, at the workplace and in the community, and its impact on health and disease.
2. Suggest appropriate methods for improving the internal/external environment.
3. Define safe water. Describe the sources of water (tap, hand pump, well).
4. State the criteria (national and WHO) for safe water.
5. Describe appropriate methods for making water safe at the domiciliary level.
6. Describe sources of waste and methods of waste control at individual and community levels.
7. Define air pollution, causes of air pollution and describe appropriate measures of control.
8. Describe the effects of noise and radiation on health.
9. Describe the common vectors of diseases and methods of vector control.
10. Describe the various insecticides that are used for vector control.
11. Describe insecticide resistance.
12. Describe the correct method of Bio medical waste disposal.

##### **B. Didactic Lecture Topics**

1. Environment: physical environment inside and outside the home and its effect on Health/
2. Concepts of safe and wholesome water, sanitary sources of water, water related diseases, water purification processes, water quality standards. Physical and chemical standards of drinking water quality and tests for assessing bacteriological quality of water. Concepts of water conservation and rainwater harvesting.
3. Sanitary disposal of Wastes (solid waste ,human excreta and sewage disposal.
4. Air pollution, green house effect, ozone layer Health hazards of air, noise, radiation pollution
5. Noise and radiation pollution.

6. Describe the common vectors of diseases and methods of vector control.
7. Describe the various insecticides that are used for vector control.
8. Insecticidal Resistance.
9. BIO-MEDICAL WASTE AND ITS DISPOSAL: Classification/ Category, sources, health hazards and treatment of Bio-Medical, Waste.

**C. Practical Exercise:**

1. Assessment of environmental status of a Household/ community and its effect on the health of the members of the household.
2. Identification of different types of vectors, how to study its density and habitat.
3. Identification of Various methods of using insecticide for vector control.
4. Visit to Hospital to observe the Bio medical waste disposal.

**3.9.10.4. Health Promotion:**

**A. Objective: At the end of the course the student should be able to:**

1. Understand & describe the concepts of Health promotion, Health Education, Information Education and Communication ( IEC) Behavioral change communication (BCC).
2. Understand & describe the principles of Communication and existing barriers to effective communication and methods to overcome them.
3. Able to communicate effectively with the individual, family and community.
4. Design different health promotion packages for individual, family and community.

**B. Didactic Lecture Topics**

1. Health Promotion as the key to primary prevention.
2. Communication- Art & Skill.
3. Definition and principles of health education
4. Health educational methods/ Audiovisual aids & Use of other aids in health education
5. Methods of overcoming resistance in the individual, family and community.
6. Planning a health educational program.
7. Information Education Communication & Behavior Change communication Strategies

**C. Practical exercise:**

1. Preparing and delivering a health educational talk on simple issues:
  - Personal hygiene
  - Clean water
  - Clean domestic environment
  - Clean external environment
  - Dental hygiene
  - Any other topic.
2. Organizing a IEC camp
3. Evaluation of health educational activities

**3.9.10.5. Nutrition & Health.****A. Objectives: At the end of the course the student should be able to:**

1. Describe common nutrition related health disorders viz. Protein energy malnutrition, Obesity, micro nutrient deficiencies) and their control and management.
2. Undertake nutritional assessment of individual, families and the community by using appropriate method such as: anthropometrics, clinical examination etc.
3. Plan and recommend a suitable diet for the individuals and families as per local availability of foods and economic status, etc.
4. Nutritional surveillance, education and rehabilitation.
5. Food fortification, additives, adulteration, and food hygiene
6. National Nutrition policy, Important National Nutritional Programs..

**B. Didactic Lecture Topics**

1. Role of nutrition in health and disease
2. Nutritional requirements and sources, Balanced Diet
3. Major Nutritional Programs, viz. Micronutrient deficiency, Protein energy malnutrition, Obesity
4. National Nutrition Policy and National Nutritional programs.

**C. Practical:**

1. Nutritional status assessment of Individuals, Community.
2. Evaluation Nutritional program

### **3.9.10.6. Biostatistics**

#### **A. Objectives: At the end of the course the student should be able to:**

1. Define, calculate and interpret commonly used statistical methods.
2. Select and use appropriate diagrammatic representations of statistical data.
3. Define probability.
4. Define normal distribution.
5. Define bias, random error.
6. Describe methods of sampling and calculate sample size.
7. Carry out random and cluster sampling.
8. Describe the demographic cycle and define the pattern of population inat different phases of the demographic cycle.
9. Test of significance
10. Define vital statistics, describe their method of collection.
11. Describe the sources of data and their merits for use and census in India.

#### **B. Didactic Lecture Topics**

1. Need of Bio-statistics in Medicine.
2. Frequency Distribution
3. Measures of Central Tendency & Measures of dispersion..
4. Tabular & diagrammatic presentation of data probability
5. Normal Distribution.
6. Probability
7. Standard error estimation
8. Alpha, Beta error
9. Confidence Interval
10. Bias/Random errors
11. Tests of Significance
12. Sample size calculation& Sampling methods

**C. Practical:**

1. Graphical Presentation of Data.
2. Random sampling - cluster sampling (EPI)
3. Calculation of Vital & fertility rates.
4. Test of significance.
5. Demography

**3.9.10.7. Basic Epidemiology.**

**A. Objectives: At the end of the course, student should be able to:**

1. Epidemiology: definition, concepts, uses and its role in health and disease.
2. Describe the Natural History of Disease (Definition of the terms used in describing disease transmission and control, Modes of transmission and measures for prevention and control of communicable and non-communicable diseases.
3. Describe the levels of prevention and its relationship with the Natural History of Disease, General principles of prevention and control of communicable, non communicable diseases and other health conditions of public health importance.
4. Principal sources of epidemiological data.
5. Definition, calculation and interpretation of morbidity and mortality indicators
6. Incidence, Prevalence, Rates & Ratios.
7. . Concept of association, causation and biases.
8. Describe the various types of epidemiological study designs, their application, biases, statistical analyses, relative merits and demerits.
9. Describe the need and uses of screening tests, Differentiate between screening and diagnostic tests.
10. Calculate the sensitivity, specificity, positive predictive value of tests given a set of data.
11. Define surveillance and its role in the study of epidemiology and disease control.

**B. Didactic Lecture Topics**

1. Epidemiology; Introduction (Definitions, scope in hospital, community, planning)
2. Measures of Morbidity/Mortality Rates.
3. Incidence, Prevalence.
4. Rates, Ratios, Proportions, Crude rates/standardized
5. Fertility Rates

6. Sources of epidemiological data.
7. Measurements in Health & Disease.
8. Screening Tests vs Diagnostic Tests.
9. Descriptive, Analytical & Experimental methods in epidemiology- Different types of Epidemiological studies, Case Control, Cohort, cross sectional & Randomized Control Trials.
10. Surveillance

**C. Practical:**

1. Clinico-psycho-social case review ( Individual)
2. Family study.
3. Drawing the Natural History of Disease (Communicable 5 ), Non Communicable(5)
4. Application of the levels of prevention in the Communicable & Non communicable Diseases.
5. Use of basic epidemiological tools to make a community diagnosis of the health situation, in orders to formulate appropriate intervention measures.
6. Investigation of an epidemic of communicable disease and to understand the principals of control measures.

**3.9.10.8. Epidemiology of Communicable & Non communicable Diseases.**

**A. Objective; At the end of the course the student should be able to:**

1. Describe the epidemiology of common communicable diseases. (Food borne Disease, Respiratory disease- TB, ARI, Vector borne diseases- Malaria, Kalazar, Zoonotic Infection, Person to person infection like, STD, HIV, Blood borne infection, Vaccine preventable Diseases.
2. Describe the epidemiology of non communicable diseases Non-communicable Diseases, Coronary heart disease, Hypertension, stroke Rheumatic heart disease, Cancers, Obesity, Diabetes, Blindness, Injury and Accidents.
3. Describe the steps involved in investigating an epidemic.

**B. Didactic Lecture Topics:**

**I. Communicable Diseases:**

1. Malaria
2. STDs / HIV/AIDS
3. Pulmonary Tuberculosis
4. Leprosy
5. Diphtheria, Pertussis, Tetanus

6. Poliomyelitis
7. Measles, Mumps & Rubella
8. Chicken, A.R.I.
9. Diarrhoeal Diseases
10. Infective Hepatitis
11. Kala azar
12. Arbo viral diseases
13. Filaria
14. Plague
15. Intestinal infestations

## **II. Non Communicable Diseases**

1. Nutritional Disorders
2. RHD /CHD / Hypertension
3. Cancers
4. Blindness
5. Road Traffic Accidents
6. Diabetes mellitus
7. Obesity

### **C. Practical:**

1. Plan and investigate an epidemic of a communicable disease in a hospital/ community setting, and institute control measures.

### **3.9.10.9. Demography & Family Planning.**

#### **A. Objectives: At the end of the course the student should be able to:**

1. Define Demography & Describe demographic cycle and its importance on Health of Country.
2. Describe the role of population dynamics of India including Population explosion, Declining sex ratio, Demographic transition and its effect on Health of the Nation.
3. Calculate and interpret the demographic indices like birth rate, death rate, fertility rates.
4. National Population Policy
- 5.

## **B. Didactic Lecture Topics**

1. Demography Definition, Cycle, Demographic transition, and its role on Health.
2. Population Dynamics & Health effect of Demographic transition and declining sex ratio on health. .
3. National Population Policy of India.

## **C. Practical:**

1. How to calculate & interpret the different Demographic indices.

### **3.9.10.10. Maternal & Child Health.**

#### **A. Objectives: At the end of the course the student should be able to:**

1. Describe the major maternal and child health problems in India.
2. Describe the local customs and practices during pregnancy, childbirth and lactation, child Feeding practices and its effect on Mother & Child Health..
3. Describe the specific Health intervention packages for Maternal Health problems during Pregnancy & Lactation.
4. Describe the specific Health intervention packages available for Neonates, Infants, Preschool child
5. Describe the role of Family welfare on Maternal & Child Health
6. Describe the various family planning methods. Describe the indications, contraindications, side effects and complications of the methods.
7. Describe the Salient features of the existing National programs related to Reproductive child health (RCH), its' components, including child survival and safe motherhood, Janani Suksha Yogona Universal Immunization Program, Integrated Child Development Services Scheme (ICDS), Integrated Management of Neonatal and Childhood Illness(IMNCI).
8. Organization, implementation and evaluation of reproductive and child health program components,

#### **B. Didactic Lecture Topics**

1. Major Maternal Health Indicators and its determinants & available intervention packages. (Pre pregnancy, pregnancy, delivery, Puerperium, lactation.)
2. Major Child Health indicators and its determinants & available intervention packages (Neonatal, perinatal, Post neonatal, infancy, pre- school)
3. Salient features of the National Health programs, Objective, components, organization & implementation, monitoring mechanism..

**C. Practical:**

1. Advise a mother on the importance of breast feeding and weaning at appropriate time and addition of weaning foods.
2. Identify and manage high risk mothers and children.
3. Define an eligible couple. Calculate eligible couple protection rate.
4. Advise a couple on spacing and terminal methods.
5. Evaluate state of reproductive and child health in a community and also the existing programs.

**3.9.10.11. Occupational Health.**

**A. Objectives; At the end of the course the student should be able to:**

1. Describe the common industrial and occupational diseases.
2. Describe the feasible methods of control of occupational diseases.
3. Describe the important features of the Workman Compensation Act and Employees State Insurance program. provision of health services

**B. Didactic Lecture Topics**

1. Working environment, health hazards of industrial and agricultural workers
2. Common occupational lung diseases & its prevention
3. Common occupational skin diseases and cancers & its prevention
4. Principles of prevention of Occupational diseases
5. Legal status in relation to Workman Compensation Act
6. Employees' State Insurance Act

**C. Practical**

1. Visit to a factory.
2. Case study of an local Industry.

**3.9.10.12. Health of Special Groups: Geriatrics, Adolescent, Handicaps.**

**A. Objectives**

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

1. Describe the Health needs of the Geriatrics, Adolescents and Physically & Mentally challenged people.

2. Describe the special health, welfare and other statutory intervention package available to meet the needs.
3. Describe the available Health & welfare programs being implemented in the community and its effect on the health needs.

**B. Didactic Lecture Topics.**

1. Geriatric groups special physiological & social needs, common Health problems and its primary care.
2. Adolescent groups' special physiological & social needs, common Health problems and its primary care.
3. Physically and mentally challenged people's health problems.
4. Rehabilitation.

**C. Practical:** Case study.

**3.9.10.13. Health Care delivery system.**

**A. Objectives:** At the end of the course, the student should be able to:

1. Describe the components & nature of personal & public Health services.
2. Describe the strategy of Primary Health care in organizing Health care delivery system.
3. Describe the different models of existing health care delivery system.
4. Describe the existing health delivery system in India.
5. Describe the state owned Health infrastructure available in Rural & Urban area in India.(primary, secondary and tertiary level)
6. Describe the Health manpower available in the peripheral Health Institution of India.
7. Describe the Health services organizational chart at the central and state level.
8. Describe the role of Private health Institutions in health care in India.
9. Describe the role of Voluntary health organization in health care delivery.
10. Describe the Health care financing specially Health insurance in India.
11. Describe the National Health Missions of India and its role in Health care delivery..

**B. Didactic Lecture Topics.**

1. Personal Health Care Services vs Public Health Services.
2. Primary Health Care strategy.
3. Evolution of Health care delivery system in India from Bhole committee to Health Missions.

4. Prevailing health care delivery system in Rural & Urban India.
5. District Health system in India its organization, manpower, functioning and its role in providing comprehensive health care.
6. Functions of each health institution from Primary to tertiary and the responsibility of each health functionaries from community level to District level.
7. Monitoring and evaluation of the functioning of District Health system.

**C. Practical:** Case study on Functioning of a Sub-centre, PHC, and Community based Health functionaries.

#### **3.9.10.14. Health Planning & Management.**

**A. Objective:** At the end of the course, the student should be able to

1. Describe the National Health Policy
2. Describe the planning cycle & Process.
3. Describe the use health and other epidemiological data in the planning process.
4. Describe Health planning process in India.
5. Describe the broad principles of Management,
6. Describe the Health Management System in India.
7. Principles Material management & Personal Management.

#### **B. Didactic Lecture Topics**

1. National Health Policy.
2. Health Needs and Demands.
3. Planning cycle and process.
4. Health Information System.
5. Material Management
6. Personal Management.

**C. Practical:** Project: Plan for Health care delivery during Natural Disaster.

#### **3.9.10.15. Health Economics.**

**A. Objective:** At the end of the course, the student should be able to:

1. Appreciate cost considerations in clinical and public health interventions.

## **B. Didactic Lecture Topics**

1. Need of health economics
2. Methods of economic analyses in health

### **3.9.10.16. National Health Programs.**

**Objective:** At the end of the course, the student should be able to describe the Goal, major objectives, Intervention packages, Strategy of delivery of packages and monitoring the performance.

#### **A. Didactic Lectures:** Description of all the following Programs

1. RNTCP.
2. National Vector borne disease control program.
3. National Blindness control program.
4. Integrated Disease Surveillance Project (IDSP)
5. National leprosy control program.
6. National AIDS control program.
7. Reproductive and Child Health.
8. National Iodine deficiency disorder control program.
9. National cancer control program.
10. National cancer control program.
11. Health related Millennium Development Goals.
12. Integrated Child Development Scheme.
13. National Family welfare program.
14. National Health Mission.

**B. Practical:** Case study: Evaluation of any one of the program. Group Exercise group of 5

### **3.9.10.17. Public Health Legislation.**

#### **A. Objective:** At the end of the course, the student should be able to describe

1. The role of legislation in the prevention and control of disease in India.
2. The role of legislation in the Health Promotion in India.
3. The role of legislation in Health care delivery for special groups.
4. The existing import health legislation of India.
5. International Health Regulation applicable to India.

**B. Content.**

1. Epidemic Control.
2. MTP
3. Food Adulteration.
4. Environmental Protection.
5. Employees State Insurance Act.
6. Work man compensation Act.
7. Tobacco Control Act.

**3.9.10.18. Global Health, International Health Agency & International Health regulation.**

**3.9.10.19. Topics for Integrated Teaching with Department of Community medicine.**

1. Nutritional Disorders.
2. Communicable diseases of national importance.
3. Non Communicable disease of national importance.
4. Geriatric medicine
5. Adolescent Health
6. Rational drug use
7. Mother and Child Health
8. Industrial health
9. Ethical issues
10. Genetics
11. Mental Health
12. Disaster Management

**3.9.11.0. Field posting in Community Medicine (Duration : 4 weeks in each semester during the III, IV and V Semesters: Total 12 Weeks)**

**3.9.11.1. Objectives: At the end of the posting, the student should be able to:**

1. Collect information from the patient and draw the Natural History of the morbid condition of the attending patient.

2. Carry out physical examination and undertake available laboratory investigation to come to a diagnosis and provide primary care under the supervision of the preceptors or refer the case to a suitable institution.
3. Understand the social, economic cultural belief and practices dynamics affecting the health seeking behavior of a family for illness and other health promotion and prevention programs.
4. Understand the medico-social problems of patients attending primary health centers.
5. Identify the factors which contribute to the health seeking behavior and health practices.
6. Identify the prevailing health problem in the community.

### **3.9.11.2. Methodology:**

**1. Training in Primary Health Care:** During the IIIrd. Semester they will be posted to the Community Medicine for IV weeks. Each batch posted in urban or rural health centre will be divided into two batches one batch will be alternately posted in Urban/Rural Primary health centre. Each batch will have one supervisor from among the faculty of Community Medicine and selected clinical Department (who has the OPD). In the Primary Health centre/ Urban Health centre during the initial period will be taught how to communicate with the patients attending the Health centre and how to collect information and do physical and other examination of the patient to draw the Natural History of the presenting morbidity as per the Natural History of Disease paradigm and find out the Social, psychological and economic factor affecting the natural history e.g. Clinico-psycho-social case review. In some cases they will visit the family and complete the Natural History and also study the socio cultural factor affecting the family and also the compliance.

### **2. Family Health Study (FHS) during IV th. & Vth Semester (Once a Week, 2-5PM)**

For the Family Health study the students will be posted in the community during the III rd. semester. Two students will make one unit and each unit will be allotted Ten (10) families for each two (2) students. The students posted with an objective of making the student understand the dynamics of Health & Disease in a family and the students will be able to assess the health status of the family members and able to identify the health needs of the family and provide the available services. The following exercise will be carried out by each student in the unit.

1. To study the family structure and health status of the individual members with special reference to:
2. Nutritional status of the Children under 5 and record in a growth chart.
3. Immunization Status.
4. Identifying special groups like pregnant & lactating mother, Women in the reproductive age group, Under 5 child, adolescent child, school aged children adults and geriatric members, their general health needs and special health problems related to the group. (General Health status, Specific health status related to the different groups).
5. Immunization status

6. General Health status

- a. Immunization,
  - b. General Health.
  - c. Specific health problems related the category of the members.
  - d. Family Planning.
  - e. Other health problems related to Preventive & promotive care during special life cycle periods and physiological condition(Pregnancy, Lactation)
1. To identify the Health problems of families over a period (of posting).
  2. To assess the knowledge, attitude, behavior and practices regarding health and disease.
  3. To counsel the family in solving their health problems and to educate the families to improve their health and family welfare.
  4. To provide services to the families allotted (with the help of FHS Team
  5. Each batch visits the allotted families along with preceptors once a week and discuss the findings with faculty supervisor next week.

The students will also maintain a record of their family visits and present the family's case history book at the end of the posting. The HOD will be allotted family in the during field visits as well as in briefing. The junior residents will act as **preceptors**. Each batch visits the allotted families along with preceptors once a week and discusses the findings with faculty supervisor

**3. Statistical data of the villages under Rural Health Training Centre & Urban Health training centre which will be compared to UP state and India.**

The statistics to be known are:

Birth Rate

Death Rate

Infant Mortality Rate

Maternal Mortality Rate

Eligible Couple Protection Rate

Immunization Coverage

**4. Conducting an epidemiological study:** This is a group exercise a group 10 students will be given a topic. The final report (typed two copies) is to be submitted within 1 week of completion of the posting.

1. Selection of a problem occurring in the community.
2. Review literature to find out the extent of the problem in the country.
3. Decision whether to survey the entire population or a sample using the usual sampling techniques.
4. Designing a Performa, pretesting and then using.
5. Data collected is analyzed and presented to the faculty of community medicine for discussion.
6. A plan for feasible intervention measures is drawn up and will be executed.

**5.Field Visits to study the health care delivery in rural areas and execution of the National Health Programs.**

1. Visit to District to CMO's office Lucknow: The class will be divided in three batches and be taken to the CMO's office where they will learn about the Organizational Structure, HMIS, Integrated Disease surveillance and Health Missions asd well as other Health programs.
2. Case Study of Primary Health Centre: 5 to 6 Primary Health centers will be identified and each 10 students will be asked to study the functioning of the PHC and the sub-centers and Anganwadi.
3. Visit to Schools for assessment of Health status, Health promotion.
4. Visit to any selected Industry ( eg. Sugar) to observe the nature of the work, assess the occupational hazard if any and type of services possible.
5. Visit to Sewage disposal plant.
6. Visit to water treatment Plants.

**3.9.12.0. Recommended Books in Community Medicine.:**

1. Textbook of Preventive and Social Medicine by K Park .
2. Textbook of Preventive and Social Medicine by Gupta & Mahajan.
3. Textbook of Preventive and Social Medicine by Sunderlalal.
4. Textbook of Preventive and Social Medicine by J S Mathur.
5. Essential preventive medicine by Ghai.
6. An Introduction to Biostatistics by P S S Sundar Rao. .
7. National Health Programme by Dr. D.K. Taneja.
8. Advanced text book on food & nutrition .Vol-I & II by Dr M S Swaminathan.
9. Community health education methods: A practical guide by Ben slay.
10. Basic Epidemiology by Beaglehole.

**3.9.13.0. Third Professional Part I, to be conducted at the end of VII th. Semester:**

**Distribution of marks in Community Medicine Examination: Total Marks=200**

**3.9.13.1. Written paper: 2 numbers. Paper I & Paper II; 60 marks for each paper. Total Marks=120**

- **Paper: I:** General concepts of health & disease, epidemiology, disease screening, epidemiology of communicable (including childhood diseases like ARI, diarrhea, VPDs) & non-communicable diseases, health Information, biostatistics, environmental health, disaster management.
- **Paper-II:** Demography, maternal & child health, nutrition & health, social & behavioural sciences as relevant to community health, occupational health, health education & communication including counseling, health planning & management, health care delivery.

**3.9.13.2. Viva: Total Marks = 10**

**3.9.13.3. Practical: Total Marks=30**

- Epidemiological exercise = 5 marks
- Statistical exercise = 5 marks
- Problem solving exercise = 10 marks
- Project work = 5 marks
- Family study exercise = 5 marks

**Total = 30 marks**

**3.9.13.4.. Internal assessment: Total Marks =40**

Theory	
Continuous	= 10 marks
Terminal	= 10 marks

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**Total = 20 marks**

Practical	
Continuous	= 10 marks
Terminal	= 10 marks

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**Total = 20 marks**

**3.9.13.5. Pass: A candidate must obtain 50% in aggregate with a minimum of 50% in theory and minimum of 50% in practical.**

### **3.9.14.0. Internship Program in Community Medicine:**

During one year of internship, the interns are posted for 3 months at Sansarpur Rural Health Training Centre: 15 kms. away from the Institute.

**3.9.14.1. Objective of the training:** This posting aims to train the interns in managing common health problems at Primary Health centre level. They are specifically trained to provide Primary Health care services and judicious referral to the Secondary & tertiary hospitals under the tutelage of the faculty & direct supervision of the Sr. Residents of the specialties of Pediatrics, Obstetrics & gynecology, Medicine Surgery. In this fully residential posting, the distribution of posting is as under. **At the end of their posting, an evaluation is done for the interns.**

1. Six weeks posting at Sansarpur, Kursi and Beheta Health centre PHC with 10 observation beds. These PHC's are managed by the IIMS&R through the department of Community Medicine. The interns are posted at Sansarpur and the posting is residential.
2. Six weeks posting in Urban Health centre managed by the Deptt. Of Community Medicine of IIMS&R.

**CLINICAL SUBJECTS OF PHASE II & PHASE III:** The teaching and training in clinical subjects will commence at the beginning of Phase II and continue throughout. The clinical subjects will be taught to prepare the MBBS graduates to understand and manage clinical problems at the level of a practitioner. Exposure to subject matter will be limited to orientation and knowledge required of a general doctor. Maximum attention to the diagnosis and management of the most common and important conditions encountered in general practice should be emphasized in all clinical subject areas. Instructions in clinical subjects should be given both in outpatient and in-patient during clinical posting. Each of the clinical departments shall provide integrated teaching calling on pre-clinical, para-clinical and other clinical departments to join in exposing the students to the full range of disciplines relevant to each clinical area of study. Problem approach will be emphasized based on basic social sciences and a continuation of clinical and laboratory syllabi to optimally understand and manage each clinical condition.

### **3.10.0.0. Syllabus for Ophthalmology.**

**3.10.1.0. Goal.:** The broad goal of the teaching of students in ophthalmology is to provide such knowledge and skills to the students that shall enable him 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 Program for the prevention of blindness and rehabilitation of the visually impaired.

#### **3.10.2.0. Objective**

**A. Knowledge:** At the end of the course, the student should have knowledge of:

1. common problems affecting the eye:
2. principles of management of major ophthalmic emergencies
3. main systemic diseases affecting the eye
4. effects of local and systemic diseases on patient's vision and the necessary action required to minimize the sequel of such diseases;
5. adverse drug reactions with special reference to ophthalmic manifestations;
6. magnitude of blindness in India and its main causes; National program of control of blindness and its implementation at various levels
7. eye care education for prevention of eye problems
8. role of primary health centre in organization of eye camps
9. organization of primary health care and the functioning of the ophthalmic assistant.
10. integration of the national program for control of blindness with the other national health programs;
11. eye bank organization

**B. Skills:** At the end of the course, the student should be able to:

1. elicit a history pertinent to general health and ocular status;
2. assist in diagnostic procedures such as visual acuity testing,
3. examination of eye, Schiottz tonometry, Staining for Corneal pathology,
4. confrontation perimetry,
5. Subjective refraction including correction of presbyopia and aphakia, direct ophthalmoscopy and conjunctival smear examination and Cover test.
6. diagnose and treat common problems affecting the eye;

7. interpret ophthalmic signs in relation to common systemic disorders;
8. assist/observe therapeutic procedures such as sub-conjunctival injection, Corneal/Conjunctival foreign body removal, Carbolic cautery for corneal ulcers, Nasolacrimal duct syringing and tarsorrhaphy;
9. provide first aid in major ophthalmic emergencies;
10. assist to organise community surveys for visual check up;
11. assist to organise primary eye care service through primary health centres;
12. use effective means of communication with the public and individual to motivate for surgery in cataract and for eye donation;
13. establish rapport with his seniors, colleagues and paramedical workers, so as to effectively function as a member of the eye care team.

**C. Integration:** The undergraduate training in Ophthalmology will provide an integrated approach towards other disciplines especially neurosciences, Otorhino-laryngology, General Surgery and Medicine.

### **3.10.3.0. Teaching program**

#### **3.10.3.1. Didactic lectures**

##### **A. Semester 5th**

1. Microbiology in relation to eye
2. Pathology in relation to eye
3. Pharmacology in relation to eye
4. Symptomatology in Ocular disorders and their Pathogenesis
5. Ocular involvement in systemic diseases

##### **B. Semester 6th**

1. Disorders of the Lid
2. Disorders of the Lacrimal Apparatus
3. Conjunctivitis & Ophthalmia Neonatorum
4. Trachoma & Other chronic conjunctivitis
5. Keratitis and corneal ulcers
6. Corneal ulcer
7. Scleritis & Episcleritis
8. Refractive Errors & Method of correction

9. Presbyopia, accommodation convergence
10. Congenital cataract
11. Senile cataract
12. Metabolic & complicated cataract
13. Primary Angle closure glaucoma
14. Congenital glaucoma
15. Primary Open angle glaucoma
16. Secodary glaucomas
17. Anterior uveitis
18. Posterior uveitis
19. Blindness prevalence, prevention & rehabilitation

### **C. Semester 7th**

1. Retinopathies, Hypertensive, Toxaemia & Pregnancy
2. Diabetic Retinopathy
3. Retinal Detachment, types, symptoms & pre-disposing factors
4. Endocrine ophthalmology
5. Retinal vascular disorders
6. Retinoblastoma & other ocular neoplasms
7. Binocular vision amblyopia & concomitant squint
8. Nutritional disorders
9. Incomitant strabismus
10. Visual acuity, pupillary path ways & cranial nerve palsies
11. Optic nerve lesions
12. Ocular emergencies (Traumatic)
13. Ocular emergencies (Non-Traumatic)
14. Minor ophthalmic surgery
15. General principles of Intra ocular surgery
16. National programme for control of blindness
17. Comprehensive eye care in rural set up
18. Eye banking & ethics in ophthalmology

### **3.10.3.2. Clinical ward teaching**

1. Trachoma
2. Entropion / ectropion
3. Pterygium
4. NLD block / Dacryocystitis
5. Conjunctivitis / allergic / acute
6. Corneal ulcer
7. Keratitis
8. Iridocyclitis
9. Angle closure glaucoma
10. Scleritis / episcleritis
11. Dark room
12. Refractive errors & presbyopia
13. Cataract – senile
  - a. Complicated
  - b. Post operative
  - c. Complications
  - d. Intraocular lenses
14. Basic sciences (Microbiology, Pharmacology, Pathology)
19. Open angle glaucoma
20. Xerophthalmia
21. Corneal opacities
22. Ocular injury
23. Perforating / concussional injuries
25. Diabetic retinopathy
26. Hypertensive retinopathy
27. Anemic and other retinopathies
28. Indirect ophthalmoscopy
29. Orthoptics
30. Concomitant squint
31. Paralytic squint
32. Surgical Instruments

**3.10.4.0. Third Professional Part I, to be conducted at the end of VII th. Semester: Distribution of marks in**

**Ophthalmology: Total Marks=100**

**3.10.4.1. Written Papers one**

**Total Marks=40**

**Module of theory Questions. 4 questions.**

- |  |                |
|--|----------------|
| 1. Question (short answer type) Pre & para clinical subjects =10 marks | 10 Marks       |
| 2. Two out of three of which one operative question                    | 10 (5x2) Marks |
| 3. Problem based questions   | 10 Marks       |
| 4. Short notes (Two out of three)                                      | 10 (5x2) Marks |

**3.10.4.2. Oral:**

**Total Marks=10**

- |                       |         |
|-----------------------|---------|
| Instrument Two        | 3 Marks |
| X -ray, other imaging | 3 Marks |
| Oral questions        | 4 Marks |

**3.10.4.3. Practical:**

**Total Marks=30**

- |                |          |
|----------------|----------|
| One long case  | 20 Marks |
| One short case | 10 Marks |

**3.10.4.4. Internal Assessment:**

**Total Marks=20**

- |   |          |
|---|----------|
| 4th Semester & 6th Semester (Continuous Assessment) | 10 Marks |
| Final Assessment                                    | 10 Marks |

**3.10.4.5. Pass: A candidate must obtain 50% in aggregate with a minimum of 50% in theory and minimum of 50% in practical.**

### 3.11.0.0. SYLLABUS FOR OTO-RHINO-LARYNGOLOGY

**3.11.1.0.Goal.**The broad goal of the teaching of undergraduate students in Otorhinolaryngology is that the undergraduate student have acquired adequate knowledge and skills for optimally dealing with common disorders and emergencies and principles of rehabilitation of the impaired hearing.

#### 3.11.2.0. Objectives:

**A. Knowledge:** At the end of the course, the student should be able to:

1. Describe the basic pathophysiology of common ENT diseases and emergencies.
2. Adopt the rational use of commonly used drugs, keeping in mind their adverse reactions.
3. Suggest common investigative procedures and their interpretation.

**B. Skills:** At the end of the course, the student should be able to:

1. Examine and diagnose common ENT problems including the pre-malignant and malignant disorders of the head and neck.
2. Manage ENT problems at the first level of care and be able to refer whenever necessary.
3. Assist/carry out minor surgical procedures like ear syringing, ear dressings, nasal packing etc.
4. Assist in certain procedures such as tracheostomy, endoscopies and removal of foreign bodies.

**C. Integration:** The undergraduate training in ENT will provide an integrated approach towards other disciplines especially neurosciences, ophthalmology and general surgery.

#### 3.11.3.0. Course Content. 4<sup>TH</sup> and 6<sup>th</sup> semester

##### A. EAR

1. Surgical anatomy of the ear
2. physiological consideration with special emphasis on the conduction and perception of sound
3. Audiology and vestibulometry.
4. Diseases of external auditory canal and different types of foreign bodies in the ear and their management e.g. wax and otomycosis.
5. Inflammatory disorders of middle ear ASOM and CSOM. With their complications and management.
6. Secretory otitis media, otosclerosis, Stapedectomy
7. Different types of deafness, causes and their management.
8. Vertigo – causes, investigations and management; meniers diseases and acoustic neuroma
9. Ototoxicity

10. Noise induced hearing loss
11. Methods of screening a deaf child and their rehabilitation

## **B. NOSE AND PARANASAL SINUSES**

1. Brief anatomy of the nose and paranasal sinuses.
2. Function of the nose, PNS and physiology of olfaction.
3. Common injuries of the nose and mid facial fractures
4. Epistaxis – causes, investigations and management.
5. Common diseases of nose and PNS – rhinitis (atrophic rhinitis), vestibulitis, sinusitis
6. Foreign body of nose – types and management- maggots in nose
7. Cysts and tumors of the nose and paranasal sinuses
8. Angiofibroma of the nasopharynx
9. Carcinoma nasopharynx
10. Nasal polyps, deviated nasal septum

## **C. PHARYNX, OESOPHAGUS LARYNX**

1. Brief anatomy of the pharynx and esophagus
2. Physiology of taste and deglutition
3. Functions of the sub epithelial lymphoid tissue around upper aero digestive tract
4. Common diseases of the pharynx with special emphasis on tonsils and adenoids
5. Laryngeal carcinoma, benign tumors, hoarseness, stridor and Dysphagia, their investigations and treatment.

### **3.11.3.1. Clinical Teaching & Didactic LecturesD**

#### **A. 4<sup>TH</sup> Semester**

- OPD: Four days a week: Three Hours per day.
- One day X-Ray /Instruments.
- One day Clinical method and approach.
- Operation Theatre: One day a week three hours duration ( Observation of Video transmission or Physical presence in OT.
- One day a week Bed side clinic Three hours.

**B. 6<sup>TH</sup> Semester**

- Didactic Lectures 20 classes of one hour duration.
- Ear ( Anatomy, Physiology, Diseases of External Ear, CSOM,ASOM etc) Eight (8) classes.
- Nose ( DNS polyposis, Epistaxis, sinusitis,) Six (6) classes.
- Throat ( Anatomy, Physiology, Dysphagia and deglutition, Stridor, Tracheostomy etc). Six (6) classes.

**C. Clinical Posting:**

- OPD: Two days a week; Three hours per day.
- One day X-Ray/ Instruments.
- One Day Clinical methods & approach (a total 24 Hrs. instruction on the above).
- Operation Theatre: Two days a week Three hours per day / observing some operation / 4weeks. Total hours will be 24 Hrs.

3.11.3.2. **Group Discussion & Seminars:** Two days in a week Three hours duration of each session. Total hours to be spent is 24 hours in 4 weeks.. We have all facilities' for all surgical interventions. Topics suggested are Hoarseness of Voice, Complication of Middle year infections, osteosclerosiss, Complication of Middle year infection, Foreign body in ear, Cerumen, Ototoxicity, Noise induced Hearing los, Sub eptholmid etc.

**3.11.4.0. Third Professional Part I, to be conducted at the end of VII th. Semester: Distribution of marks in Ophthalmology: Total Marks=100 Total Marks= 100.**

**3.11.4.1. Written Paper: Question Paper 01.**

**Total Marks= 40**

**A. Module of Question Paper.(4 numbers of Question)**

- **Q1. Pre & Para clinical Subjects (any two) = 10(5x2) Marks.**

(e.g. Anatomy of Tympanic membrane  
Mechanism of Muco-ciliary clearance  
Nose & PNS, Pathology of Tubotympanic  
Type of CSOM)

- **Q.2. Operative & Clinical Question ( any two) = 10(5X2) Marks.**

( e.g. steps of operation & complication  
Clinical features & investigation, Treatment  
Protocols).

- **Q.3. Problem based question. = 10 Marks.**

- **Shot Notes (two out of three) = 10(5x2)**

**3.11.4.2. Oral**

**Total Marks= 10.**

**OSCE:** (Instruments:2, X Ray and other imaging)

**3.11.4.3. Practical;**

**Total Marks= 30 .**

One Long Case. =20 Marks

One Short Case = 10 Marks.

**3.11.4.4. Internal Assessment:**

**Total Marks=20**

- 4<sup>TH</sup> 5<sup>th</sup> & 6<sup>TH</sup> semester day to day assessment: (Ward completion: Theory/Practical, Case history: 10 Marks
- 5<sup>th</sup>. 6<sup>th</sup>, 7th. End semester Theory and Practical: 10 marks.

**3.11.4.6. Pass: A candidate must obtain 50% in aggregate with a minimum of 50% in theory and minimum of 50% in practical.**

### 3.12.0.0. Syllabus of Medicine

**3.12.1.0. Goal:** The broad goal of the teaching of undergraduate students in Medicine is to have the knowledge, skills and behavioral attributes to function effectively as the first contact physician.

#### 3.12.2.0. Objective

**A. Knowledge:** At the end of the course, the student should be able to:

1. Diagnose common clinical disorders with special reference to infectious diseases, nutritional disorders, tropical and environmental diseases.
2. Outline various modes of management including drug therapeutics especially dosage, side effects, toxicity, interactions, indications and contra-indications.
3. Propose diagnostic and investigative procedures and ability to interpret them.
4. Provide first level management of acute emergencies promptly and efficiently and decide the timing and level of referral, if required.
5. Recognize geriatric disorders and their management.

**D. Skills:** At the end of the course, the student should be able to:

1. Develop clinical skills (history taking, clinical examination and other instruments of examination) to diagnose various common medical disorders and emergencies.
2. Refer a patient to secondary and/or tertiary level of health care after having instituted primary care.
3. Perform simple routine investigations like haemogram, stool, urine, sputum and biological fluid examinations.
4. Assist the common bedside investigative procedures like pleural tap, lumbar puncture, bone marrow aspiration/biopsy and liver biopsy.

**E. Integration:**

1. with community medicine and physical medicine and rehabilitation to have the knowledge and be able to manage important current national health programs, also to be able to view the patient in his/her total physical, social and economic milieu.
2. With other relevant academic inputs which provide scientific basis of clinical medicine e.g. anatomy, physiology, biochemistry, microbiology, pathology and pharmacology, Forensic Medicine & Toxicology.

#### 3.12.3.0. Contents:

#### 3.12.4.0. Didactic lectures:

Srl No	Topic	Semester	Remarks
	<b>Nutrition &amp; Health</b>	<b>4<sup>th</sup> &amp; 5<sup>th</sup>.semester</b>	
1	Nutritional assessment Needs		<b>Integrated</b>
2	Nutritional and metabolic disorders		_do-
3	Protein energy malnutrition.		do
4	Nutritional Anaemia		do
5	Obesity		do
6	Vitamin and mineral deficiency & excess		do
7	Diet therapy including parenteral nutrition therapy		do
	<b>Water, electrolyte and acid-base imbalance</b>		<b>Integrated</b>
1	Water and electrolyte physiology		Do
2	Acid-base disorders		Do
3	Fluid and electrolyte disturbances		Do
<b>III</b>	<b>Critical care Medicine</b>		Do
1	Physiology of the critically ill patient		Do
2	Major manifestations of critical illness		Do

3	Circulatory failure: shock		Do
4	Respiratory failure		Do
5	Renal failure		Do
Srl.no	Topic	Semester	Remark
6	Coma		do
7	Sepsis		Do
8	Disseminated intravascular coagulation		Do
9	General principles of critical care management		Do
10	Scoring systems in critical care		Do
11	Outcome and costs of intensive care		do
<b>IV.</b>	<b>Pain management and palliative care</b>		
1	General principles of pain		<b>do</b>
2	Assessment and treatment of pain		
3	Palliative care		
<b>V</b>	<b>Poisonings</b>		
1	General approach to the poisoned patient		
2	Poisoning by specific pharmaceutical agents		
3	Drugs of misuse		
4	Chemicals and pesticides		
5	Snake bite and Envenomation		
6	Other bites and Stings- Scorpion, Spider.		
<b>VII</b>	<b>Specific environmental and occupational hazards</b>		
1	Heatstroke and hypothermia		
2	Drowning and near drowning		
3	Electrical injuries		
4	Radiation injury.		<b>Integrated</b>
5	Heavy metal poisoning		
6	High altitude sickness		
<b>VIII</b>	<b>Specific Infections : Epidemiology, clinical features, laboratory diagnosis, treatment and prevention of</b>		<b>Integrated</b>
<b>A</b>	<b>Vector Borne Infection:</b>		
1	Malaria		
2	Leishmaniasis .		
3	Filaria		
4	Dengue		
5	Typhus fever		
6	Chikunguniya fever		
<b>B</b>	<b>Zoonotic Disease</b>		
1	Rabies		
2	Plague		
3	Brucellosis		
4	Anthrax		
<b>IX</b>	<b>Respiratory Infection</b>		
1	Bacterial Infection: Strepto, Pneumo, Diphtheria, Pertusis,		
2	Common viral Respiratory Infection		

<b>X</b>	<b>Topic: Gastro Intestinal Infection</b>	<b>Semester</b>	<b>Remarks</b>
1	Amobiasis		
2	Giardiasis		
3	Cholera		
4	Salmonellosis - Typhoid and paratyphoid fevers		
5	Shigellosis and bacillary dysentery		
6	Helicobacter Pylori@		
7	Viral Gastro enteritis.		
8	Hepatitis A, B & C		
9	Other Viral Infection		
10	Helminthic Infestation		
11	Food Poisoning		
<b>XI</b>	<b>Acute Bacterial infection, Tetanus, Gas gangrene other clostridial infection.</b>		
	Viral infections- Common exanthemata: Measles, Mumps, , Rubella, Varicella.		
<b>XII</b>	<b>Hematology</b>		<b>Remarks</b>
1	Haemolytic Anaemia		
2	Approach to a bleeding patient		
3	Iron deficiency Anaemia, Macrocytic Anaemia		
4	Leukaemias		
5	Lymphoma		
6	Haematological manifestation of systemic disorders		
7	Haematoproliferative disorder- Multiple Myeloma		
8	Aplastic Anaemia		
9	Transfusion Medicine		
<b>XIII</b>	<b>General Medicine GI. system</b>	<b>6<sup>th</sup>. Semester</b>	
1	Diseases of mouth, oesophagus, dysphagia, hiatus hernia, pharyngeal pouch (GORD)		
2	Peptic ulcer with special reference to H. pylori infection		
3	Gastro-duodenal bleeding: hematemesis, malaena		<b>Integrated</b>
4	Malabsorption syndrome		
5	Inflammatory bowel disease and peritoneal disease		
6	Cirrhosis of liver, portal hypertension, ascites, jaundice, hepatic coma (porto-systemic encephalopathy)		
7	Liver tumours, peritoneal diseases		
8	Diseases of Gall Bladder and biliary tract		<b>Integrated</b>
9	Diseases of Pancreas		
10	Recent advances in Gastroenterology		
<b>XIV</b>	<b>Endocrinology</b>		
1	Introduction to endocrine diseases: Applied Anatomy, Physiology- hormone receptors, central control and feedback (positive and negative)		<b>Integrated</b>
2	Hypothalamic and pituitary diseases		
3	Diseases of thyroid and parathyroid including calcitonin secretion and disorder		
4	Disorders of sex and reproduction		<b>INTEGRATED</b>
5	Diseases of adrenals- cortex and medulla		
6	Ectopic hormone secretion and endocrine treatment of malignancies, hormone replacement therapy& chromosomal disorder.		

Srl. No	Topic	7 <sup>th</sup> . Semester	Remarks
<b>.XV</b>	<b>_Diseases of Kidney, Ureter and Bladder.</b>		
1	Introduction- Pathophysiology and Investigations, Glomerulonephritis and acute nephritic syndrome		<b>Integrated</b>
2	Urinary tract infection and tubulo-interstitial nephritis		
3	Renal affection in systemic diseases- SLE, Vasculitis, Diabetes, systemic sclerosis, amyloidosis, multiple myeloma, haemolytic uraemic syndrome, gout, Hypertension, Renal artery stenosis, renal vein thrombosis		
4	Calculi and Nephrocalcinosis, Hydronephrosis, Obstructive uropathy		<b>Integrated</b>
5	Acute renal failure		
6	Dialysis		
7	Nephritic syndrome		
8	Chronic renal failure and fluid-electrolyte balance, Acidosis and alkalosis		<b>Integrated</b>
9	Cystic, congenital and familial diseases of kidneys		<b>Integrated</b>
10	Drugs and kidneys		<b>Integrated</b>
11	Tumours of the kidney and genitor-urinary tract, hypernephroma, Wilm's tumour, renal adenoma, prostatic adenoma and Ca-prostate, testicular tumours		<b>Integrated</b>
12	Recent advances in Nephrology		
<b>XVI</b>	<b>Cardiovascular System</b>		
1	Rheumatic Fever, Valvular heart diseases, Bacterial Endocarditis		
2	Applied Anatomy, Physiology Disorders of cardiac rhythm and conduction		
3	Pericarditis and pericardial effusion		
4	I.H.D.		
5	Cardiomyopathy, Myocarditis		
6	Hypertension		
7	Heart failure		
9	Congenital heart disease		
10	Recent advances in Cardiology		
<b>XVII</b>	<b>Metabolic Diseases</b>	8 <sup>th</sup> . Semester	
1	Diabetes Mellitus complications, C/F, etiology, management		
2	Disorders of lipid metabolism		
3	Inborn errors carbohydrate, amino acid metabolism, Lysosomal storage disease		
4	Amyloidosis and porphyria,		
5	Osteoporosis and osteomalacia.		<b>Integrated.</b>

<b>XVII</b>	<b>Neurology</b>		
1	Disorders affecting cranial nerves		
2	Coma and brain death		<b>INTEGRATED</b>
3	Epilepsy and brain tumours		
4	Cerebro-vascular diseases		
5	Movement disorders- Parkinsonism and other disorders affecting the extra-pyramidal system		
6	Demyelinating diseases and disorders to sleep		
7	Infection of nervous system (Poliomyelitis, Pyogenic Meningitis, T.B. Meningitis, fungal and other viral affection including encephalitis), Syphilis of nervous system		
8	Paraplegia and other disorders of spinal cord		<b>INTEGRATED</b>
9	Peripheral neuropathies		
10	Degenerative disorders-M.N.D. hereditary ataxias		
11	Myopathies, myasthenia, paramalignant neurological syndrome		
12	Cervical spondilosis and disc. Syndrome		<b>INTEGRATED</b>
13	Recent advances in Neurology		
	<b>To be taught in 9<sup>th</sup> Semester</b>		
<b>XIX</b>	<b>Theumatology, Connective Tissues &amp; Collagen Diseases.</b>		
1	Osteoarthrosis and spondylo-arthropathies - ankylosing spondylitis, Reiter's syndrome, reactive arthritis, enteropathic synovitis, juvenile chronic arthritis (Still's juvenile R.A. Juvenile ankylosing spondylitis).		
2	Infective arthritis – pyogenic, T.B. ,VIRAL		
3	Rheumatoid arthritis		
4	Crystal deposition diseases - Gout, pyrophosphate arthropathy acute calcific periarthritis.		
5	Connective tissue diseases - S.L.E., systematic sclerosis (morphea CREST syndrome polymyositis dermatomyositis, MCTD & vasculitis (PAN, polymyalgia imatica & Giant cell arteritis)		
6	Back pain & disc diseases (acute & chronic)		<b>Integrated</b>
7	Recent advances – Organ donation and organ transplant		<b>Integrated</b>
<b>XX</b>	<b>Intensive Care medicine.N</b>		
1	General aspects of intensive care, O <sub>2</sub> delivery and features of shock, C.V.P.		<b>Integrated</b>
2	Renal, respiratory failure (ARDS), Brain death		<b>Integrated</b>
<b>XXI</b>	<b>Poisoning and Adverse Drug Reaction (only those topics which were not covered in 4<sup>th</sup> semester)</b>		
1	Introduction and General Principles of management of corrosives- H <sub>2</sub> SO <sub>4</sub> , HCl, HNO <sub>3</sub> , Carbolic and Oxalic Acids, NaOH poisoning		
2	Phosphorus, Organophosphorus & Chloride		
3	Analgesics, salicylate, paracetamol, opium, inebriants, alcohol, chloroform, CH <sub>3</sub> OH		
4	DHATURA, Cannabis, Vegetable irritants, aconite, Nux Vomica, Mushrooms, Argemone Mexicana poisoning		
5	CO and Phosgene Gas Cyanide		
6	Metallic: As, Hg, Pb, CuSO <sub>4</sub> , Al, Fe		
7	Animals: Scorpion, Cantherides, Snake bites		
8	Psychotropic drugs and Hypnotic		<b>Integrated</b>
9	Adverse drug reactions- definition, classification, factors and diseases influencing drug reactions. Monitoring and Reduction of adverse drug reactions		

**3.12.5.0. Clinical Training including skill development and Integration in General Medicine and allied sciences.:** The student posted in the medicine department for 6 weeks in 3<sup>rd</sup> semester after knowledge of subjects of first professional will be divided in four batches of 25 each. They will be learning basic examination i.e. pulse recording, Blood Pressure recording, Temperature recording and observation of positive finding in general examination for initial three days from a total of 9 days. Rest of the six days will be dedicated to learning of basics of communication skills in history taking. This will spread out in six days, which will cover history relevant to each systemic examination. As there is no knowledge of the diseases among these students in third trimester, it would be logical to encourage knowledge acquired in first professional to be used judiciously in clinical setting. Curriculum in the morning clinic of third trimester students will also be acquainting them with equipment required in medical examination. At the end of above training the student will be subjected to ward leaving test, which will become part of internal assessment of five marks. It goes without saying that whenever there is a class related to medical diseases one of the faculties of Medicine will be available in the lecture hall and will enlighten the students about the clinical relevance of this lecture after the teacher has completed his lecture.

**3.12.5.1. In the 4<sup>th</sup> semester** when the student goes for initial training of chest and medical diseases and skin and STD for two weeks each. The training imparted in medicine earlier will work as a foundation stone for acquiring further knowledge in these weeks. At the end of above training the student will be subjected to ward leaving test, which will become part of internal assessment of 2.5 marks each for chest and medical disease and skin and STD.

**3.12.5.2. In the 5<sup>th</sup> semester,** when the student have working knowledge of subject of second profession individual diseases will be discussed bedside, when signs and symptoms will be corroborated. He will be encouraged. Perform simple routine investigations like haemogram, stool, urine, sputum and biological fluid examinations. The pattern will remain the same of four batches of 25 each and ward-leaving test will be held at the end, which will become part of internal assessment of five marks. This will be followed by two weeks training in Psychiatry where internal assessment will be for 2.5 marks.

**3.12.5.3. In the 6<sup>th</sup> semester** there will be a repeat training in skin & STD for two weeks when cases will be discussed in detailed in wards/OPD. This will be followed by ward leaving test in Skin & VD where internal assessment will be for 2.5 marks. In 7<sup>th</sup>, 8<sup>th</sup> & 9<sup>th</sup> semester a training for 4, 6 & 6 weeks respectively will be given for in medicine where evaluation of cases, investigations pleural tap, lumbar puncture, bone marrow aspiration/biopsy and liver biopsy and therapeutic modalities will be highlighted. ECG training will be imparted in 7<sup>th</sup> semester for one week for each batch. In these semester emergency management will be highlighted and to give him knowledge with reasoning so as to decide when to refer to higher centre. Current national health program will be refreshed, so that once he passes written examination, he can practice the same in during internship period.

### 3.12.5.0. Syllabus for Tuberculosis and Respiratory Diseases

**3.12.6.1. Goal:** The aim of teaching the undergraduate student in Tuberculosis & Respiratory Disease is to impart such knowledge and skills that may enable him to diagnose and treat common ailments and to refer rare diseases or complications/unusual manifestations of common diseases, to the specialist.

**3.12.6.2. Objectives.:**

**A. Knowledge:** At the end of the course of Tuberculosis & Respiratory Disease, the student shall be able to:

1. demonstrate sound knowledge of the Natural history of tuberculosis and common respiratory diseases, their clinical manifestations, including emergent situations and of investigative procedures to confirm their diagnosis;
2. demonstrate comprehensive knowledge of various modes of therapy used in treatment of tuberculosis and other respiratory diseases;
3. describe the mode of action of commonly used drugs, their doses, side effects/toxicity, indications and contra-indications and interactions; commonly used modes of management including the medical and surgical procedures available for the treatment of various diseases and to offer a comprehensive plan of management for a given disorder;

**C. Skills:** At the end of the Course, the student should be able to:

1. Interview the patient, elicit relevant and correct information and describe the history in a chronological order.
2. conduct clinical examination, elicit and interpret physical findings and diagnose pulmonary TB and other common disorders and emergencies;
3. perform simple, routine investigative and office procedures required for making the bed-side diagnosis, especially the examination of sputum for after staining for AFB.
4. Able to interpret other available test in the diagnosis of tuberculosis and other acute and chronic respiratory disease.
5. manage common diseases recognizing the need for referral for specialized care, in case of inappropriateness of therapeutic response;
6. assist in the performance of common procedures, like laryngoscopic examination, pleural aspiration, respiratory physiotherapy, laryngeal intubation and pneumothoracic drainage/aspiration.

**C. Integration:** The broad goal of effective teaching can be obtained through integration with departments of Medicine, Surgery, Microbiology, Pathology, Pharmacology and Preventive & Social Medicine.

1. Tuberculosis, Natural History, Management, RNTCP
2. Acute Respiratory infection, Swine Flu, SARS
3. Chronic Respiratory Infection
4. Bronchial Asthma.
5. COPD
6. Cor-pulmonale
7. Lung abscess, Pneumothorax

### 3.12.7.0. Syllabus for Dermatology & Sexually Transmitted Diseases.

**3.12.7.1: Goal:** The aim of teaching the undergraduate student in Dermatology, S.T.D. and Leprology is to impart such knowledge and skills that may enable him to diagnose and treat common ailments and to refer rare diseases or complications/unusual manifestations of common diseases, to the specialist.

#### 3.12.7.1. Objectives:

**A. Knowledge:** At the end of the course of Dermatology -S.T.D. and Leprology, the student Shall be able to:

1. demonstrate sound knowledge of common diseases, their clinical manifestations, including emergent situations and of investigative procedures to confirm their diagnosis;
2. demonstrate comprehensive knowledge of various modes of therapy used in treatment of respiratory diseases;
3. describe the mode of action of commonly used drugs, their doses, side effects/toxicity, indications and contra-indications and interactions; commonly used modes of management including the medical and surgical procedures available for the treatment of various diseases and to offer a comprehensive plan of management for a given disorder;

**B. Skills:** The student should be able to:

1. Interview the patient, elicit relevant and correct information and describe the history in a chronological order.
2. conduct clinical examination, elicit and interpret physical findings and diagnose common disorders and emergencies;
3. perform simple, routine investigative and office procedures required for making the bedside diagnosis, especially the examination of scrapings for fungus, preparation of slit smears and staining for AFB for leprosy patients and for STD cases;
4. take a skin biopsy for diagnostic purposes;
5. manage common diseases recognizing the need for referral for specialized care, in case of inappropriateness of therapeutic response;

**C Integration:** The broad goal of effective teaching can be obtained through integration with departments of Medicine, Surgery, Microbiology, Pathology, Pharmacology and Preventive & Social Medicine.

#### 3.12.7.3. Proposed topics and lectures related to Dermatology

1. Anatomy, Physiology and biochemistry of skin, nail and Hair (Anatomy, Physiology, Biochemistry)
2. Skin histopathology – Normal, Psoriasis, LP eczema, Pemphigus, Pemphigoid, DLE, Leprosy, Lupus vulgaris (Pathology)
3. Functions of skin (Physiology)

4. Pruritus-mechanism and pathways (Physiology)
5. Primary and secondary skin lesions, cutaneous signs and diagnosis (skin)
6. Cutaneous bacterial (folliculitis, impetigo, SSSS, ecthyma) and viral infections (HPV, HSV, VZV, MOLLUSCUM, measles) and their management (skin, microbiology, SPM)
7. Skin tumors-SCC, BCC, malignant melanoma (Skin, patho, surgery)
8. Scabies and pediculosis (Skin, SPM)
9. Leprosy and cutaneous tuberculosis (Skin, pathology, Microbiology, SPM)
10. Papulosquamous and keratinizing disorders – Psoriasis / LP/Pityriasisrosea/ ichthyosis/ keratodermas (skin)
11. Eczema, urticaria (skin) and occupational dermatosis (skin, SPM)
12. Bullous disorders – Pemphigus/Pemphigoid/ epidermolysisbullosa (skin)
13. STD-gonococcal and non gonococcal urethritis, Syphilis, Chancroid, LGV, donovanosis and HIV (Skin, micro, patho, SPM and medicine)
14. Connective tissue disorders – SLE/Systemic Sclerosis / Dermatomyositis (Skin and medicine)
15. Pigment disorders and nevi (Skin)
16. Cutaneous manifestations of hypo/hyperthyroidism, diabetes, renal / liver failure and drug reactions (skin, medicine, surgery)
17. Skin affections in nutritional diseases (skin, paed, SPM)
18. Diseases of mouth (ENT, dental)
19. Drugs (Pharmacology and skin):
  - Systemic [Steroids, antihistamines, MTX,PUVA, Retinoids, antifungals, ALT (Dapsone, Clofazimine, Rifampicine), Thalidomide, CQ & HCQ, acyclovir]
  - Topical [steroids, antifungals, emollients, retinoids, vitamin D analogs, depigmenting agents, permethrin, GBH, benzoyl peroxide]

### 3.12.8.0. Syllabus for Psychiatry.

**3.12.8.1. Goal:** The aim of teaching the undergraduate student in psychiatry is to impart such knowledge and skills that may enable him to diagnose and treat common psychiatric disorders, handle psychiatric emergencies and to refer complications/unusual manifestations of common disorders and rare psychiatric disorders to the specialist.

#### 3.12.8.2. Objectives

**A. Knowledge:** At the end of the course, the student should be able to:

1. comprehend nature and development of different aspects of normal human behavior like learning, memory, motivation, personality and intelligence;
2. recognize differences between normal and abnormal behaviour;
3. Classify psychiatric disorders;
4. recognize clinical manifestations of the following common syndromes and plan their appropriate management of organic psychosis, functional psychosis, schizo-phrenia, affective disorders, neurotic disorders, personality disorders, psycho-physiological disorders, drug and alcohol dependence, psychiatric disorders of childhood and adolescence;
5. describe rational use of different modes of therapy in psychiatric disorders.

**B. Skills::** The student should be able to:

1. interview the patient and understand different methods of communications in patient-doctor relationship;
2. elicit detailed psychiatric case history and conduct clinical examination for assessment of mental status;
3. define, elicit and interpret psycho-pathological symptoms and signs.
4. diagnose and manage common psychiatric disorders;
5. identify and manage psychological reactions and psychiatric disorders
6. in medical and surgical patients in clinical practice and in community setting.

**C. Integrated:** Training in Psychiatry should prepare the students to deliver preventive, promotive, curative and rehabilitative services for the care of patients both in the family and community and to refer advance cases to a specialized Psychiatry department/Mental Hospital. Training should be integrated with the departments of Medicine, Neuro Anatomy, Community Medicine (behavioral sciences) and Forensic medicine.

1. Introduction and general aspects: Epidemiology, community psychiatry, techniques of the psychiatric interview and psychiatric history taking
2. Symptomatology: Symptoms and signs of psychiatric disorders- concept of normality, identification and assessment of symptoms, subtle and gross signs of abnormal behavior. Principles of treatment used in Psychiatry – Psychotherapy, Behavior therapy, cognitive therapy, physical treatment including drugs, social treatment, E.C.T. psycho-surgery: “Psychiatric First Aid”.

3. Etiology of mental disorders- giving balanced presentation of its multifactorial causation (genetic endowment, somatic, psychological and social)- predisposing precipitating and perpetuating factors. Classification of psychiatric disorders and concept of psychosomatic diseases.
4. Classification of psychiatric disorders and rating scales in psychiatry.
5. Organic psychiatric disorders- delirium, dementia, and amnesic disorders.
6. Mental & behavioral disorder related to substance misuse (alcoholism and drug abuse).
7. Schizophrenia and other psychotic disorders ( including delusional disorders & psychosis).
8. Mood disorders, depressive disorders, mania and bipolar disorders, dysthymia, and cyclothymia.
9. Anxiety stress related somatoform disorders: Phobia and panic and panic disorders related to stress ( including dissociative disorders, adjustment disorder and post traumatic stress disorder), somatoform disorders.
10. Sleep related disorder, eating disorders, psychosexual disorders, mental & behavioral disorders related to pregnancy and Puerperium.
11. Principles of treatment used in psychiatry, pharmacotherapy, other biological methods of treatment including ECT, psychotherapy, behavior therapy, CBT.
12. Outline of normal personality and brief description of personality disorders.
13. Assessment in child psychiatry mental retardation, emotional and behavioral disorders of childhood.
14. Psychiatric emergencies( including suicidal patient and deliberate self harm)
15. Community psychiatry( including National Mental Health Program) legal aspects of psychiatry..
16. Psychiatric prevention and mental health promotion and role of general practitioner

**3.12.9.0. Teaching and Learning Methodology:** Department of Medicine will stress on teaching of basic fundamentals of internal medicine through various methods especially bed side teaching. The following tools are employed:

- A. Didactic lectures: discussion a particular topic at length in an one hour lecture
- B. Seminars: conducted by a combined team of clinician, pathologist and microbiologist discussing a particular topic for two hours
- C. Clinical training: The clinical training of undergraduate medical students occurs in four phases:
  1. 3<sup>rd</sup> semester: 6 weeks, wards posting. Each batch is divided into groups and will be attached to different medical units. Time: 9 a.m. - 11 AM
  2. 5<sup>th</sup> semester-4 weeks positing in batches of about 12 students each at medical outpatient department. Time: 9 a.m. - 11 AM
  3. 7<sup>th</sup> semester - 4 weeks posting in 4 batches of about 12 students,
  4. 8th semester 6 weeks posting in 4 bathes.
  5. During medical posting undergraduates will also be asked to attend specialized department like cardiology, neurology.
  6. Medical students are supposed to complete the logbook and signed by faculty after every clinical case discussion. Their logbook will be evaluated at the time of examination.
  - 7.

**3.12.10.0. Recommended Books:**

- a. Davidson's Principles of Medicine - Latest edition
- b. Oxford Text books of Medicine
- c. Chamberlin Clinical Medicine.
- d. Hutchinsons' Clinical Method.

### 3.12.10.0. Third Professional Part II Examination: General Medicine.

#### 3.12.10.1. Theory paper each paper shall have two sections. Question requiring essay type answers should be avoided. Marks in each paper 60x2 Total Marks= 120

1. Topics Included in paper I: Cardiology, G I System, Deficiency Disorder ,Genitourinary, Tropical Diseases, Rheumatology, Genetics and Immunology.
2. Respiratory System, Endocrinology, Infectious including HIV, Neurology. Psychiatry, Dermatology & STD.
3. Type of Questions & marks breakup.
  - Q.1. Basic & Allied topics Type: Modified Essay Question (1out of 2) Marks=10.
  - Q2. Clinical Problem, Type Constructive Response Question (CRQ) Marks=10.
  - Q.3. Clinical Problems Type: MCQ. , Extended matching items(EMI). Marks5x4=20 (5 out of7)
  - Q.4.Short notes (5 out of 7) Marks 5x4=20

#### 3.12.11.2.Practical Examination

**Total Marks: 100**

- 1.Long Case Marks=60  
Break up of Long case marks
  - History Taking =15
  - Demonstration=30
  - Discussion =15
- 2.Short Case: one number Marks=30
- 3.Spot Cases: Two number Marks=10

#### 3.12.11.3 Oral

**Total Marks= 20**

##### 1.Structure of Oral Examination : OSCE

- 5 stations, Interpretation of Charts, ECG, X ray and other imaging, Investigation Reports, Pathological Specimens.

#### 3.12.11.4.Internal Assessment

**Total Marks= 60**

##### I. Structure of Internal Assessment

- Theory (cumulative average of all semester Examination) **Marks=30**
- Practical( Clinical portfolio of 10 cases and Clinical performance report (item card) of all Semesters) **Marks =30**

**3.12.11.5: In Medicine a candidate must obtain 50% in aggregate with a minimum of 50% in theory including orals and minimum of 50% in practical/ clinical. each**

### **3.13.0.0. Syllabus of Pediatrics including Neonatology.**

**3.13.1.0.. Goal:** The broad goal of the teaching of 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.

**3.13.2.1. Objectives.:** The course includes systematic instructions in growth and development, nutritional needs of a child, immunization schedules and management of common diseases of infancy and childhood, scope of Social Pediatrics and counseling.

**A. Knowledge:** At the end of the course, the student should be able to:

1. Describe the normal growth and development during fetal life, neonatal period, childhood and adolescence and outline deviations thereof.
2. Describe the common pediatric disorders and emergencies in terms of epidemiology, etio pathogenesis, clinical manifestations, diagnosis, rational therapy and rehabilitation.
3. State age related requirements of calories, nutrients, fluids, drugs etc. in health and disease.
4. Describe preventive strategies for common infectious disorders, malnutrition, genetic and metabolic disorders, poisonings, accidents and child abuse.
5. Outline national programmes relating to child health including immunization programmes.

**B. Skills:** At the end of the course, the student should be able to:

1. Take a detailed pediatric history, conduct an appropriate physical examination of children including neonates, make clinical diagnosis, conduct common bedside investigative procedures, interpret common laboratory investigation results and plan and institute therapy.
2. Take anthropometric measurements, resuscitate newborn infants at birth, prepare oral rehydration solution, perform tuberculin test, administer vaccines available under current national programs, perform venesection, start an intravenous saline and provide nasogastric feeding.
3. Conduct diagnostic procedures such as lumbar puncture, liver and kidney biopsy, bone marrow aspiration, pleural tap and ascitic tap.
4. Distinguish between normal newborn babies and those requiring special care and institute early care to all new born babies including care of preterm and low birth weight babies, provide correct guidance and counselling in breast feeding.
5. Provide ambulatory care to all sick children, identify indications for specialized/inpatient care and ensure timely referral of those who require hospitalization.

**C. Integration:** The training in pediatrics should prepare the student to deliver preventive, promotive, curative and rehabilitative services for care of children both in the community and at hospital as part of a team in an

integrated form with other disciplines, e.g. Anatomy, Physiology, Biochemistry, Microbiology, Pathology, Pharmacology, Forensic Medicine, Community Medicine.

### **3.13.3.0. Course Content**

#### **3.13.3.1. Growth and Development:**

1. Definitions, determinants of growth and assessment of growth, concept of percentiles.
2. Growth & sexual development during childhood and adolescence, anthropometry, velocity of growth, growth monitoring, road to health, deviation from normal.
3. Development of milestones, determinants of normal development and factors affecting development.
4. Assessment of development- gross motor, fine motor, language, social/adaptive, concept of DQ.
5. Approach to a child with failure to thrive, growth retardation, short stature, obesity.

#### **3.13.3.2. Nutrition and disorders.**

1. Age related requirements of calories, nutrients, vitamins, minerals, trace elements.
2. Feeding – normal/during illness, weaning.
3. PEM – diagnosis, growth charts, clinical features, complications, management.
4. Deficiency disorders – Vit. A D E K, Vit C, B complex.
5. Nutritional anaemia in infancy and childhood.

#### **3.13.3.4. Immunizations:** UIP, EPI, contra indications /adverse reactions to vaccines, cold chain, pulse polio.

#### **3.13.3.5. Fluid and electrolyte** – Pathophysiology and principle of management.

#### **3.13.3.6. Infectious diseases.**

1. Common childhood exanthematous illnesses e.g. measles, chicken pox.
2. Mumps, Whooping cough.
3. Typhoid, Diphtheria, Tuberculosis – pulmonary and extra- pulmonary.
4. Parasitic infestations e.g. Malaria, Kalazar, amoebic dysentery, giardiasis.
5. Childhood AIDS.

#### **3.13.3.7. Respiratory system.**

1. AURI - Common cold, Otitis media, pharyngitis, croup.
2. ALRI - Pneumonia / Bronchiolitis.
3. Bronchial asthma.

#### **3.13.3.8. Cardiovascular system :**

1. Congestive cardiac failure – cause, diagnosis, management.
2. Congenital heart diseases – acyanotic /cyanotic.
3. Rheumatic fever and rheumatic heart disease.

#### **3.13.3.9. Genitourinary system :**

1. Acute post-streptococcal glomerulonephritis.
2. Nephrotic syndrome.
3. Urinary tract infection.
4. Childhood hypertension

### **3.13.3.10. GI system :**

1. Acute diarrhea /dysentery – etiology, Pathophysiology, C.F., management.
2. Persistent diarrhea.
3. Jaundice in childhood.
4. Cirrhosis of liver.

### **3.13.3.11. Haemato-oncology :**

1. Anemia in children – classification.
2. Thalassaemias.
3. Acute Leukaemia, lymphoma.
4. Hemophilia / ITP.

### **3.13.3.12. CNS disorders :**

1. Meningitis – Tubercular, Bacterial, viral.
2. Encephalitis.
3. Cerebral palsy: etiology, diagnosis, prevention, treatment.
4. Mental retardation: etiology, diagnosis, prevention, treatment
5. Hydrocephalus, microcephaly.
6. Acute ant poliomyelitis, GB syndrome.

### **3.13.3.13. Endocrine system :**

1. Cretinism- early diagnosis, management.
2. Juvénile diabètes mellitus.

### **3.13.3.14 Miscellaneous :**

1. Child abuse.
2. Accidents.
3. Juvenile delinquency.
4. Poisoning (K. Oil, snake bite, scorpion bite)

### **3.13.4.0. Lectures: 30 (Thirty)**

1. Growth and development.
2. Nutrition-age related requirements, PEM, vitamin / mineral deficiencies.
3. Bronchial asthma.
4. Pulmonary and extra pulmonary TB .
5. Pneumonia / Bronchiolitis .
6. Rheumatic fever and rheumatic heart disease.
7. Congenital heart disease – a cyanotic (VSD) / cyanotic (Fallot's)
8. Meningitis – TB, pyogenic, viral encephalitis.
9. Cerebral palsy
10. Convulsive disorders
11. Diarrhea / dysentery, dehydration , malabsorption.
12. Liver diseases – hepatitis, complications.
13. I. C. C.

14. Parasitic infest.-malaria , kalazar
15. Failure to thrive.
16. Anemia in children-chronic hemolytic anemia, nutritional anemia.
17. AGN / nephrotic syndrome.
18. UTI, childhood hypertension.
19. Juvenile diabetes mellitus.
20. Hypothyroidism, Down syndrome.
21. Vaccine preventable diseases.
22. Acute leukaemia / lymphoma.
23. Poliomyelitis.
24. JRA
25. Common childhood poisoning, accidents.
26. Child abuse.
27. Fluid electrolytes.
28. Childhood AIDS
29. National programme related to RCH / ICDS.
30. Acute Febrile illnesses with exanthems.

**3.13.5.0. Integrated Teaching:**

1. PEM.(Pediatrics, Biochemistry, Community Medicine)
2. Growth & Development. (Pediatrics, Community Medicine, Anatomy)
3. Vaccine Preventable Diseases of Childhood.(Pediatrics, Microbiology, Community Medicine)
4. Diarrheal Diseases.(Pediatrics, Microbiology, Physiology, Community Medicine)
5. ARI.(Pediatrics, Microbiology, Community Medicine)
6. Childhood Tuberculosis.(Pediatrics, Microbiology, Community Medicine)
7. Child Abuse.(Pediatrics, FSM, Community Medicine)
8. Juvenile Delinquency.(Pediatrics, FSM, Community Medicine)
9. ICDS/RCH and other National Program. (Pediatrics, Community Medicine).
10. Congenital Heart Disease. (Anatomy,Radiology,Pediatrics)

**3.13.6.0. Seminar Topics**

1. Shock
2. Heart failure
3. Convulsions
4. Bleeding
5. Jaundice
6. Coma

### 3.13.7.0 Neonatology Syllabus

**3.13.7.1: Goal:** To acquire competence to promote rational care of normal neonates and to undertake appropriate management of at risk and sick neonates.

**3.13.7.2. Objective:** At the end of training undergraduate Medical students will be able to :-

1. Resuscitate newborn at birth.
2. Identify at risk/sick neonates and decide required level of care.
3. Provide care to normal newborn.
4. Diagnose and manage common neonatal problems.
5. Impart health education to mother and the family regarding care of neonates with birth spacing.
6. Promote breast feeding, impart lactation management and feeding.
7. Learn specific neonatal procedures.
8. Interpret reports of investigations.
9. Maintain neonatal case record and use basic neonatal equipments.
10. Implementation of national programs aimed at newborn.

#### 3.13.7.3. Didactic Lectures:

1. Introduction to neonatology. Classification of sick neonates. Concept of high risk neonates in community and health center. Identification of high risk neonates . Neonatal transport .
2. Care of the normal newborn, natural phenomena of neonates.
3. LBW – etiology, complications, management.
4. Neonatal feeding – breast feeding, lactation management.
5. Fluid and nutrition therapy . Hypothermia of neonates.
6. Infection.
7. Jaundice
8. Respiratory distress.
9. CNS (asphyxia and seizure) and metabolic problems (hypoglycaemia etc.)
10. Miscellaneous :
  - Congenital malformations and common surgical problem: External-meningomyelocel TEV/Cleft lip palate, CDR. Internal Esophageal atresia and fistula, diaphragmatic hernia, anal atresia, congenital heart disease.
  - Birth trauma:Caput, cephalhematoma, brachial plexus injury ,fracture of clavicle & other long bones, intracranial hemorrhage.

#### 3.13.7.4. Clinical Training:

1. **History taking-** relevant to making diagnosis and relating to antenatal, natal, neonatal and family history from parents.
2. **Clinical examination to normal newborn :**
  - Anthropometry

- Identification of common malformations and birth trauma
- Neonatal reflexes
- Vital signs -breathing, heart rate, perfusion, temp.recording.
- Some normal phenomena -physiological jaundice, erythema toxicum, Mongolian spot, epstein pearls, skin- hemangiomas, breast enlargement, withdrawal vaginal bleeding, non-retractile prepuce, subconjunctival haemorrhage, caput, cephalhaematoma, watering of eyes, sleep pattern, maconium passage, transitional stool, vomiting, urine passage, etc.
- Systemic examinations.

**3. Clinical examination of LBW and sick newborn and their management.**

- Gestational age assessment,
- Abnormal signs e.g. cold stress, hypothermia, CGT, poor pulse, apnoea, chest retraction, grunting, sclerema, abnormal fontanelle, abnormal cry, poor activities, cyanosis, abnormal umbilical stump, abdominal distension, abnormal sensorium, seizures, jitteriness, neonatal jaundice .
- Levels of neonatal care with elements of service.

**4. Diagnosis and management of common neonatal problems :**

- Infection
- Jaundice
- Respiratory distress
- Convulsions
- Bleeding
- Common malformations.

**5. Breast feeding and lactation management :**

**6. Equipments demonstration-- (phototherapy unit, radiant warmer, incubator, oxygen hood, infantometer, pulse oxymeter etc.)**

**3.13.7.5. Demonstration:**

1. Anthropometry
2. Development assessment
3. Common pediatric equipments.
4. Common X-rays.
5. ORT Corner.
6. Procedures – LP, bone marrow aspirations, venous blood sampling, pleural tap, ascitic tap, liver biopsy.
7. IV line with fluid therapy.
8. MT, BCG vaccination.
9. Blood transfusion, blood component therapy.
10. Cardiopulmonary resuscitation.

11. Drug dosage.
12. Nebulizer therapy
13. Oxygen therapy.
14. Feeding normal newborn, LBW and in diseased state.
15. Handling paediatric emergencies under supervision- status asthmaticus /cyanotic spell.
16. A.F.P. Stool collection, storage, referral.
17. Vaccinations-storage, maintenance of cold chain.
18. Health education talks in small groups – Neonatal / breast feeding / home care during diarrhoea and ARI.
19. Urine examination- RE, ME, urine collection, PBS, sepsis screen.

**3.13.7.6. Practical :( with mannequin) NEONATAL RESUSCITATION: one full session of demonstration, then assisted practice, & finally independent practice.**

**3.13.8.0. Time Distribution**

**3.13.8.1. Didactic teaching:** 90 +10 hrs. in Neonatology = Total 100 hours.

- |                  |             |                 |
|------------------|-------------|-----------------|
| 1. Lectures      | : 30 in no. | : 1 hour each.  |
| 2. Seminars      | : 10 in no. | : 2 hours each. |
| 3. Demonstration | : 20 in no. | : 2 hours each. |

**3.13.8.2 Clinical / Practical:**

- |                       |                            |            |
|-----------------------|----------------------------|------------|
| 1. Clinical postings: | 4 <sup>th</sup> . Semester | : 2 weeks  |
|                       | 6 <sup>th</sup> . Semester | : 2 weeks  |
|                       | 7 <sup>th</sup> . Semester | : 2 weeks  |
|                       | 8 <sup>th</sup> . Semester | : 4 weeks. |

-----  
 Total : 10 weeks.

**3.13.8.3. Neonatology:**

- |                               |          |   |            |   |              |
|-------------------------------|----------|---|------------|---|--------------|
| <b>1. Didactic teaching:</b>  | Lectures | : | 10 in no.  | : | 1 hour each. |
| <b>2. Clinical/ Practical</b> |          |   | 10 classes |   |              |

### **3.13.9.0\_Third Professional Part II Examination: Pediatrics**

#### **3.13.10.1. Theory paper I**

**Total Marks= 40**

##### 1. Questions & marks breakup.

- Q.1. Basic & Allied topics Type: Modified Essay Question (1out of 2) Marks=10.
- Q2. Clinical Problem, Type Constructive Response Question (CRQ) Marks=10.
- Q.3. Clinical Problems Type: MCQ. , Extended matching items(EMI) Marks5x2=10  
(5 out of7)
- Q.4.Short notes (2 out of 4) Marks 5x2=10

#### **3.13.10.2. Oral: Structure of Oral Examination: OSCE**

**Total Marks=10**

- 5 stations, Interpretation of Charts, ECG, X ray and other imaging, Investigation Reports, Pathological Specimens.

#### **3.13.10.3. Clinical**

**Total Marks=30.**

Long Case Marks=20

Short case/ Spotting Marks=10

#### **3.13.10.4. Internal assessment (Theory=10 marks, Practical=10 marks)**

**Total Marks=20**

(Theory cumulative average of all semester Examination, Practical (Clinical portfolio of 10 cases and Clinical performance report (item card) of all)

### **3.14.0.0. Surgery & its Allied Specialties: Surgery Including Pediatric Surgery.**

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

#### **3.14.2.0. Objectives:**

**3.14.2.1. Knowledge:** At the end of the course, the student should be able to:

1. Describe etiology, pathophysiology, principles of diagnosis and management of common surgical problems including emergencies, in adults and children.
2. Define indications and methods for fluid and electrolyte replacement therapy including blood transfusion.
3. Define asepsis, disinfection and sterilization and recommended judicious use of antibiotics.
4. Describe common malignancies in the country and their management including prevention.
5. Enumerate different types of anesthetic agents, their indications, mode of administration, contraindications and side effects.

**3.14.2.2. Skills:** At the end of the course, the student should be able to:

1. Diagnose common surgical conditions both acute and chronic, in adult and children.
2. Plan various laboratory tests for surgical conditions and interpret the results.
3. Identify and manage patients of hemorrhagic, septicemic and other types of shock.
4. Be able to maintain patent air-way and resuscitate
  - i) a critically injured patient
  - ii) Patient with cardio-respiratory failure
  - iii) a drowning case
5. Monitor patients of head, chest, spinal and abdominal injuries, both in adults and children.
6. Provide primary care for a patient of burns.
7. Acquire principles of operative surgery, including pre-operative, operative and post operative care and monitoring.
8. Treat open wounds including preventive measures against tetanus and gas gangrene.
9. Diagnose neonatal and pediatric surgical emergencies and provide sound primary care before referring the patient to secondary/tertiary centers.
10. Identify congenital anomalies and refer them for appropriate management. In addition to these he should have observed/assisted/ performed the following:
  - Incision and drainage of abscess
  - Debridement and suturing open wound
  - Venesection
  - Excision of simple cyst and tumors
  - Biopsy of surface malignancy
  - Catheterization and nasogastric intubation
  - Circumcision
  - Meatotomy
  - Vasectomy
  - Peritoneal and pleural aspirations
  - Diagnostic proctoscopy
  - Hydrocele operation
  - Endotracheal intubation
  - Tracheotomy and cricothyroidotomy
  - Chest tube insertion.

**3.14.2.3. Integration:** The undergraduate teaching in surgery should be integrated at various stages with different pre and para and other clinical departments.

### 3.14.3.0. Course Content, Theory,

#### 3.14.3.1. Didactic Lectures 4<sup>th</sup> & 5<sup>th</sup> . Semester (50 Hrs.)

1. Asepsis, Antisepsis, Sterilization
2. Nonspecific and specific surgical infections: Lymph adenopathy, tetanus, Gas gangrene, Leprosy, TB, Syphilis, AIDS, Nosocomial infections. Filariasis
3. Wounds -classification and management, Wound, Healing, wound infections.
4. Shock, Hemorrhage, Blood transfusion
5. Burns
6. Nutrition and fluid therapy in surgery (Basics of Electrolyte and acid base balance).
7. Cysts, Haematomas, Ulcers, sinus, Fistula, Tumours-Benign and malignant and Management of Malignant tumour, Peripheral vascular diseases -ischemic limbs, varicose veins, Lymphoedema.
8. Abdominal Wall, Umbilicus, hernia
9. Acute abdomen, Peritonitis and intra-abdominal Abscess, Management of abdominal trauma.
10. Principle of organ + tissue transplantation
11. **Anesthesia** -General principles & techniques, Patient preparation, complications, CPR,
12. **Orthopedic Surgery**- Classification of bone and joint injuries
  - (A) diagnosis, principles of treatment of closed and open injuries, complications.
  - (B) Specific orthopedic injuries of upper and Lower limbs and spinal trauma.

#### 3.14.3.2. 6th & 7th Semester (45 Hrs)

1. Liver, GB, CBD
2. Pancreas, spleen
3. Stomach & Duodenum, Upper G.I. Hge
4. Intestinal Obstruction, Mesentery
5. Appendix, large gut including rectum and anal canal, Lower G .I.Hge
6. Breast
7. Thyroid
8. Para thyroid. Adrenal
9. Orthopedic Surgery
  - Bone and joint infections -non specific and specific
  - Tumours.
  - Deformities -congenital and paralytic
  - Metabolic bone diseases.
  - Arthritis and degenerative diseases.
  - Amputation And disarticulations.
10. Physical Medicine & Rehabilitation

#### 3.14.3.3. 8th & 9th Semester (30 Hrs. + 25 Hrs.)

1. Head injuries, Intracranial SOL's, Pituitary.
2. Chest injuries Post op. chest complications, Bronchial carcinoma
3. Dysphagia -Esophageal, strictures and malignancy.
4. Mouth, Tongue, jaw swellings, salivary glands,
5. Peripheral nerve injury.
6. Common pediatric surgical problem.
7. Urology -Congenital anomalies, Urolithiasis, Genitourinary Trauma, TB, Tumors., Haematuria, Retention of urine, Prostate, Urethra, Scrotal pathologies, Testis epididymis, Hydroceles. Diseases of penis, Male infertility.
8. Radiotherapy and Chemotherapy

#### **3.14.3.4. Tutorial classes (May be in batches)**

1. Operative surgery and surgical anatomy
  - i. (including instruments).
2. Surgical pathology and specimens.
3. Radiodiagnosis.
4. Pre-op. preparation and post op. management and complications.
5. Surgical emergencies.
6. Recent advances.

### 3.14.4.0. Syllabus of Orthopedics:

**3.14.4.1. Knowledge:** The student should be able to:

1. Explain the principles of recognition of bone injuries and dislocation.
2. Apply suitable methods to detect and manage common infections of bones and joints.
3. Identify congenital, skeletal anomalies and their referral for appropriate correction or rehabilitation.
4. Recognize metabolic bone diseases as seen in the country.
5. Explain etiology, pathogenesis, diagnosis of neoplasm affecting bones.

**3.14.4.2. Skills:** At the end of the course, the student should be able to:

1. Detect sprains and deliver first aid measures for common fractures and sprains and manage uncomplicated fractures of clavicle, Calles's, forearm, phalanges etc.
2. Techniques of splinting, plaster, immobilization etc.
3. Management of common bone infections, learn indications for sequestration, amputations and corrective measures for bone deformities.
4. Aspects of rehabilitation for Polio, Cerebral Palsy and Amputation.

**3.14.4.3. Application:** Be able to perform certain orthopedic skills, provide sound advise of skeletal and related conditions at primary or secondary health care level.

**3.14.4.4. Integration:** Integration with anatomy,surgery,pathology, radiology and Forensic Medicine will be done.

**3.14.4.5. Course Content:** Orthopedic Surgery. Theory. Duration 100 Hrs.

#### A. 4<sup>TH</sup> and 5<sup>TH</sup>. Semester Lecture Classes Total 15 lectures.

1. Classification of bone and joint injuries and their diagnosis	-1	
2. Principles of treatment of closed and open injuries	-1	
3. Complications -Early & Late, Local & Systemic		-1
4. healing of fractures	-1	
<b>I. Orthopedic trauma of upper limbs</b>		
1. Fracture clavicle		}
2. Injuries around shoulder joint		
• Rotator cuff injury		
• Acromioclavicular dislocation		
• Shoulder dislocations		-2
• Fracture of upper end of humerus		
3. Fracture of shaft of humerus		}
4. Injuries around elbow joint		
• Supracondylar and transcondylar fractures of humerus		
• Dislocation of Elbow		
• Fracture of radial head and olecranon		-2
5. Fracture of forearm bones and Monteggia and Galeazzi		}
• Injuries around wrist joint		
• Colles' fracture and other fractures of distal radius		
• Fracture scaphoid		
• Bennett's fracture dislocation		-1
6. Injuries around wrist joint		}
• Colles' fracture and other fractures of distal radius		
• Fracture scaphoid		
• Bennett's fracture dislocation.		

## II. Orthopedic trauma of pelvis lower limbs and spine –

- |   |   |    |
|---|---|----|
| 1. Stable and unstable fractures of pelvis }                            | } | -1 |
| 2. Dislocation of hip   |   |    |
| 3. Fracture of neck of femur and trochanteric/subtrochanteric fractures | } | -2 |
| 4. Fracture of shaft of femur   |   |    |
| 5. Injuries around knee joint   | } | -2 |
| Supracondylar and condylar injuries                                     |   |    |
| Internal derangement of knee  |   |    |
| Fractures of patella -2   |   |    |
| Proximal tibial injuries  | } | -2 |
| 6. Fracture of shaft of tibia and fibula                                |   |    |
| 7. Injuries around ankle and foot injuries.                             |   |    |
| 8. Spinal trauma.   |   |    |

-1.

## B. 6th. & 7<sup>th</sup>. Semester Lecture classes Total 16 lectures:

### I. Bone and joint infections

1. Acute and chronic pyogenic osteomyelitis.
2. Septic arthritis
3. Bone and joint tuberculosis -Hip, Knee, Spine.

### II. Bone Tumors:

1. Classification
2. Osteochondroma
3. Chondroma
4. Chondrosarcoma
5. Osteosarcoma
6. Giant cell tumours
7. Ewing's tumour
8. Multiple myeloma
9. Secondary bone tumours

### III. Deformities -Congenital and paralytic

1. Syndactyly & Polydactyly.
2. Exostosis
3. Fibrous dysplasia
4. Osteogenesis imperfecta
5. Congenital dislocation of hip (developmental dysplasia)
6. Torticollis
7. CTEV
8. Genu Valgum & Varum
9. Spina bifida -occulta & cystica
10. Scoliosis and Kyphosis
11. Basics of Poliomyelitis and cerebral palsy.

### IV. Metabolic and degenerative diseases and arthritis

1. Gout
2. Rheumatoid arthritis
3. Spondylosis and spondylolisthesis
4. Osteoarthritis
5. Ankylosing spondylitis
6. Disc prolapse
7. Perthes' disease.

### V. Amputations and disarticulations

1. General principles, Indications, types, complications.
2. Symes', Gritti-stokes, Below knee, Above knee, Forearm, Arm, Fingers and toes.

### 3.14.5.0. Syllabus for MBBS course in Physical Medicine & Rehabilitation (4 classes)

1. Introduction -History, Scope, definition, terminology and facets of Rehabilitation.
2. Treatment modalities used in Physical Medicine and Rehabilitation -Heat, Cold, Electricity, Exercise, Traction etc.
3. Rehabilitation in different conditions- e.g. CVA, Paraplegia, Cerebral palsy, PPRP, Myopathy, Arthritis etc,
4. Rehabilitation of Amputees, Prosthesis, Orthosis and aids to mobility. Disability Evaluation and certification.

### 3.14.6.0. SYLLABUS FOR ANAESTHESIOLOGY:

The purpose of anesthesia training for medical students is not to make anesthesiologists out of all medical students, but to give students knowledge of basic concepts used in anesthesia and to teach them skills of airway management and vascular access that may be useful to them in other areas of medical practice. The student, therefore, should observe and study the physiological changes which take place in the anesthetized patient. When these changes are of sufficient magnitude, they become complications or toxic effects. The student should learn what these are, how they are caused, and how they may present and be treated. Emphasis should be laid on good preoperative preparation. Students should learn basic techniques of maintaining a clear airway and giving assisted or artificial ventilation. They should also learn how to position the patient's head, how to hold the chin and how to insert an airway. Medical students should learn enough about an anesthetic machine. In addition to these technical accomplishments, the student may have the opportunity to administer either general or spinal anesthesia under the direct and constant supervision of a member of the staff.

**3.14.6.1. Objective:** The objective is to train a student in the arts & science of Anesthesiology and the minimum time is 20 Hrs.

**3.14.6.2. Knowledge:** The students, at the end of their posting should be able to:

1. Introduce principles of acute medicine as it is practiced in managing the anesthetized patient in the operating room and in managing the patient in the recovery unit.
2. Discuss and demonstrate principles of applied physiology and applied pharmacology. Simulation on Human patient Simulator (HPS) is ideal to teach many aspects of applied physiology and pharmacology.
3. Review principles of and teach skills in resuscitation (cardiopulmonary, cerebral, fluid and others).
4. Teach care of the unconscious patient, including airway and ventilation management.
5. Teach management of blood, fluid, electrolyte balance, and metabolic disturbances in the surgical patient, with specific emphasis on those derangements which are encountered in the anesthetized patient.
6. Review management of acute and chronic pain problems.
7. Introduce concepts of drug interactions, especially as they apply to patients receiving anesthesia.
8. Demonstrate the evaluation of patients relative to surgical and anesthetic risk. Teach appropriate preoperative preparation of patients subjected to surgery and anesthesia.
9. Introduce the various techniques of anesthesiology.
10. Pharmacology of muscle relaxant, application and monitoring
11. Pharmacology : Basic / Applied of local anaesthetics : Various types of blocks advantages / Problems with each. Descriptive for some main blocks. Local infiltration, Brachial Plexus, Caudal etc.

**3.14.6.3. Skill:** The students, at the end of their posting should be able to

1. Maintenance of Clear airway
2. Bag Mask Ventilation
3. Starting A Venous Access
4. CPR — Basic and advanced
5. Giving a simple infiltration block, Some nerve block
6. Performing A lumbar puncture.

**3.14.6.4. Integration:** The training will be integrated with the department of Pharmacology & general surgery & Physiology

**3.14.6.5. Didactic Lectures:**

<b>General Principles &amp; Technique -</b>	Introduction	-[3 Lectures] ,
1. Regional Anesthesia		-Spinal -Epidural
2. Local Anesthesia		-Safety -Complication -Diagnosis & Management.
3. Patient Preparation:	-	Assessment -[3 Lectures.] Preparation Premedication
4. Complication -		Hypoxia Hypotension -[1 Lecture] Post Operative lung complications -[1 lecture.]
5. CPR -		Adult/ Pediatrics / Neonate -[2 Lectures.]

#### **3.14.7.0 Teaching Learning Methodology in Anesthesia:**

Teaching and learning in anesthesiology should be guided through a series of posting in which the emphasis is laid on practical hands –on experience. Human patient simulator (HPS) will be purchased for better skill development and to reduce the danger to the patients during the learning curve of student. To allow repeat practice according to ability of the student to reach the level of competence needed.

#### **3.14.7.1. Posting Schedule**

Two Weeks in 7th semester To achieve the objectives The students will be posted to:

1. **Pre-anesthetic Clinic .**
2. **Preoperative evaluation & optimization.**
3. **Operating theatre:** Anesthetic Machine /monitoring, Anaesthetic Techniques
4. **Recovery Room:** Recovery criteria : Management of complications.
5. **Intensive Care Unit:** Management of respiratory failure Various types of ventilatory Assistance devices Monitoring Devices and application .Management of patient in Coma.
6. **Pain Clinic:** Evaluation of patient / non invasive / invasive management.

### **3.14.7.2. Emergency On Call:**

The Intern will be posted to same areas as above and Will be asked to follow a case from preoperative preparation to full recovery to get an idea of comprehensive Care.

### **3.14.7.3. Log Book:**

A log book will need to be completed by the student under the supervision of the faculty member. The skills to be obtained are:

1. I/V Cannulation 5
2. Oropharyngeal/Nasopharyngeal Airway insertion 10
3. Bag Mask Ventilation first on Mannekin 5
4. Mask Ventilation in unconscious patient 5
5. Attaching pulse oximeter, BP cuff and ECG
6. electrodes and setting up a monitor 5
7. Lumbar puncture 2
8. Infiltration block 2
9. Demonstration of epidural/nerve block 2 each
10. LMA insertion demo 5
11. Intubation demo 5
12. CPR on mannekin 5

### **3.14.8.0. Syllabus for Radio Diagnosis:**

#### **3.14.8.1: Goal:**

The broad goal of teaching the 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 should be aware of the techniques required to be undertaken in different situations for the diagnosis of various ailments as well as during prognostic estimations.

#### **3.14.8.2. Objective:**

The objective is to train a student in the arts & science of Radiodiagnosis and able to use in the diagnosis and management of patients.

#### **3.14.8.3. Knowledge:**

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

1. Understand basics of X-ray production, its uses and hazards.
2. Appreciate and diagnose changes in bones - like fractures, infections, tumours and metabolic bone diseases.
3. Identify and diagnose various radiological changes in disease conditions of chest and mediastinum, skeletal system, G.I. Tract, Hepatobiliary system and G.U. system.
4. Learn about various imaging techniques, including isotopes C.T., Ultrasound, M.R.I. and D.S.A.

#### **3.14.8.4. Skill:**

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

1. Use basic protective techniques during various imaging procedures.
2. Interpret common X-ray, radio-diagnostic techniques in various community situations.
3. Advise appropriate diagnostic procedures in specialized circumstances to appropriate specialists.

#### **3.14.8.5. Surgery and Allied Specialties: Minimum time period of training excluding period for University Examination.**

1. General Surgery. (including cardiothoracic and Vascular Surgery, Urology, Pediatric . Surgery, Plastic Surgery Neurosurgery, and casualty	300 Hrs
2. Orthopedic Surgery.	100 Hrs.
3. Physical Medicine	20 Hrs.
4. Anesthesiology.	20 Hrs.
5. Radio-diagnosis	20 Hrs.
6. Dentistry.	10 Hrs.

### 3.14.8.6. Surgery & allied specialities ( ward Clinics)- 3 Hrs/day (9.A.M to 12 Noon)

#### A. Time table.

Subject	3 <sup>rd</sup> Semester (18 wks)	4th. Semester (22 wks)	5th. Semester (18 wks)	6th. Semester (22 wks)	7th. Semester (18 wks)	8th. Semester (22 wks)	9th. Semester (22 wks)	Total (142 wks)
1. General Surgery & Anesthesiology	6		4		4	6	6	26
2. Orthopedic surgery & Physical Medicine			4	4			2	10
3. Casualty.					2			2
4. Radio diagnosis.					2			2
5. Dentistry.					2			2
	6	X	8	4	10	6	8	42

#### 3.14.8.7. Rules of Clinical posting:

Ward ending examinations should be taken preferably on the last day of the particular allotted ward.

- Students should not be placed in ward clinics during preparatory leave of not more than 10 days for Final Internal assessment Examination and not more than 15 days for Final University Examination for each professional examination.(dates of such examination should be announced well before for proper planning and execution).
- Time table for different examination needs to be displayed at the beginning of academic session.

#### 3.14.8.7.; Teaching and Learning Methodology:

**A. 3<sup>rd</sup> Semester – 6 weeks:** Students are required to bring following: A pen torch, measuring tape, Stethoscope and patellar hammer and also read Hamilton Bailey's clinical book in order to acquire theoretical background of clinical examination. The learning objectives for this term are to learn the following:

- The art and science of history taking
- General evaluation of overall health
- Basic principles of examining of a lump
- Examination of hernia hydrocele and abdomen
- Examination of breast
- Examination of wounds, ulcers and siauses

**C. V, VII<sup>th</sup>. Semester, Clinical Posting:** Cases presentation / discussion

- Long cases / Short cases – list of cases will be with department.. These cases will be seen in OPD and also in the wards.
- Writing – 5 long and 20 short cases in the log book.

**D. VIII and IX. Semester, Clinical Posting.**

- Operative surgery lectures (to procedures list with the dept.)
- X Ray – Interesting with department
- Surgical instruments demonstration
- Pathology specimen

The other training activities are a

1. Small group tutorials, Live video display of surgical procedures and seminars on interesting topics.
2. A surgical department museum containing instruments, sets of interesting X-Ray and pathological specimen will be made available with setting capacity of 25-30 student for the demonstration.
3. Objectives of clinical posting in surgery – a student should be able to :
  - Elicit a detailed & relevant history
  - Carry out a physical examination
  - Make a provisional diagnosis
  - Reach a differential diagnosis
  - Formulate appropriate investigations
  - Interpret the result of investigation
  - Plan appropriate management
  - Undertake some aspect, of management
  - Demonstrate adequate communication shall

#### **3.14.8.8. Proposed integrated topics with surgery**

1. Anatomy
  - Venous system lower limb
  - inguinal and femoral canal
  - Rotation cut
  - ANO Rectal anomaly
2. Microbiology  
Surgical infection
3. ENT  
Dysphagia
4. Pathology  
CA breast
  - CA Stomach
  - Renal Tumors
  - Testicular Tumors
  - Thyroid Tumor
  - 5. Medicine - Thyrotoxicosis
  - Secondary Hypertension
  - Surgical Complication DM
  - Jaundice
  - Septic Shock
  - Portal Hypertension
  - Pancreatitis

#### **3.14.8.9. Recommended Text Books of Surgery**

1. Bailey & Love – Short Practice of surgery 2013
2. Essential of surgery - Sunil chamber Jaypee
3. SRB'S Manual of surgery - Sri Ram Bhatt Jaypee
4. Das Clinical Method in Surgery
5. Hamilton & Bailey's clinical signs
6. SRB's Bed side clinics in surgery
- 7.

Students are advised to have personal copies of book no. 1, 4, 5 rest of the books along with 5<sup>th</sup> lower book should be made available in the college library for the referral.

### 3.14.9.0\_Third Professional Part II Examination: Surgry & Allied sciences

3.14.9.1. Theory paper each paper shall have two sections. Question requiring essay type answers should be avoided. Marks in each paper 60x2 Total Marks= 120

- A. Topics Included in paper I:** General Surgery, Gastro-intestinal including colo-rectal surgery. Abdominal Wall & Hernia, Hepato-biliary System, Pancreas, Spleen, Peritoneum Retroperitoneal, Breast, Head Neck surgery, Orthopedics.
- B. Topics included in the second paper:** General Surgery including venous, arterial & lymphatic diseases, Genitourinary System., Endocrinology, Anesthesiology, Radiology & Radiotherapy, Dental Surgery, Special Surgery – Pediatric Surgery, Cardio-Vascular Surgery, Neurosurgery, Plastic Surgery and Traumatology
- C. Type of Questions & marks breakup.**

#### Paper I

**Total Marks 60**

- Q. 1. Basic & Allied sciences. on general surgery (Modified Essay Question) Marks 10.  
Q. 2. Clinical Problem. (Constructive Response Question,( With alternative); Marks 10  
Q.3. Clinical Problems Type: MCQ. , Extended matching items(EMI). Marks 5x4=20  
(5 out of7)  
Q.4. Short notes on any five(5 out of 7)) Marks 5 x 4 = 20

#### Paper II.

**Total Marks=60**

- Q.1. Basic & Allied topics Type: Modified Essay Question (1out of 2) Marks=10.  
Q2. Clinical Problem, Type Constructive Response Question (CRQ) Marks=10.  
Q.3. Clinical Problems Type: MCQ. , Extended matching items(EMI). Marks5x4=20  
(5 out of7)  
Q.4.Short notes (5 out of 7) Marks 5x4=20

### 3.14.9.2.Practical Examination

**Total Marks: 100**

1. Long Case Marks=60
- Break up of Long case marks
    - History Taking =15
    - Demonstration=30
    - Discussion =15
- 2.Short Case: one number Marks=30  
3.Spot Cases: Two number Marks=10

### 3.14.9.3. Oral

**Total Marks= 20**

#### Structure of Oral Examination : OSCE

- 5 stations, Interpretation of Charts, ECG, X ray and other imaging, Investigation Reports, Pathological Specimens.

### 3.14.9.4..Internal Assessment

**Total Marks= 60**

#### A. Structure of Internal Assessment

- Theory (cumulative average of all semester Examination) **Marks=30**
- Practical( Clinical portfolio of 10 cases and Clinical performance report (item card) of all semesters) **Marks =30**

**3.12.11.5: In Medicine a candidate must obtain 50% in aggregate with a minimum of 50% in theory including orals and minimum of 50% in practical/clinical each.**

### **3.15.0.0. Syllabus for Obstetrics & Gynecology.**

**3.15.1.0. Goal:** The main goal of curriculum is to enable the undergraduate students to acquire the knowledge, skills and attitudes in the discipline of Obstetrics & Gynaecology as essential for a general practitioner.

**3.15.1.1. Objectives:** The student should be able to:

1. Make Diagnosis and organize management of antenatal, intranatal and postnatal period of normal and abnormal pregnancy;
2. Provide adequate care of common gynae problems and emergencies
3. Manage common gynae problems and emergencies
4. Provide Counseling and delivery of fertility regulation methods.
5. Acquire knowledge of methods of termination of pregnancy.
6. Apply knowledge of vital statistics in obstetrics and RCH programme.

#### **3.15.2.1. Skills to be imparted during clinical postings**

##### **3.15.2.2. Obstetrics**

1. History taking and examination of a pregnancy woman
2. Watching progress of labour and conduct of a normal labour, recognize complications and provide postnatal care.
3. Management of third stage of labour, prevention and treatment of post partum haemorrhage
4. Witness caesarean section, breech delivery, forceps and vacuum delivery evacuation of incomplete abortion.
5. Essential care of a newborn and recognize congenital anomalies.
6. Resuscitation of newborn.
7. Non stress testing of fetus; biophysical scoring of fetus
8. Recognize high risk cases and make appropriate referrals.

##### **3.15.2.3 Gynecology**

1. How to take history and examination of female pelvic organs
2. Making of pap smear, wet smear preparation on vaginal discharge
3. Diagnose and manage common gynaecological problems including early detection of genital malignancies.
4. Minor gynaecologic procedures : cervical biopsy, endometrial biopsy, dilatation & curettage; fractional curettage
5. Medical termination of pregnancy (MTP) : in first & second trimesters
6. Insertion and removal of intrauterine contraceptive device• Develop communication
7. Observe major gynecological surgeries-abdominal and vaginal hysterectomies.

##### **3.15.2.4. Operative Skills**

1. Conduct of normal delivery
2. Making and repair of episiotomy
3. Insertion and removal of intrauterine device
4. Making of pap smear
5. Performing minilap tubectomy (under supervision).

##### **3.15.3.0. Training:**

Student will be posted in Labour Room/Obstetrics Ward /OT for a period of 15 days .During this period he/she will conduct minimum 10 deliveries and observe minimum 5 LSCS under supervision. All students are supposed to write all delivery cases in their notebook /maternity notebook which will be signed by residents/consultants.

### **3.15.4.0 Content of the Course:**

#### **3.15.4.1. Theory: 3<sup>rd</sup>. Semester**

##### **A. Didactic Lecture**

1. .Diagnosis of pregnancy; Physiological changes in pregnancy
2. (Including definition –LMP, ,EDD,,Preterm,term post term, pregnancy etc)
3. .Antenatal Care, Management of normal pregnancy, maternal nutrition, common complications and management.
4. .Hemorrhage in early pregnancy-Abortions
5. .Ectopic pregnancy
6. .Normal Menstruation, different terminology,(eg. -polymenorrhoea) Menstrual disorders

##### **B. Integrated Lectures**

1. .Diagnosis and physiological changes in pregnancy
2. .Physiology of menstruation and it's disorders
3. .Endocrinology

#### **3.15.4.2. Theory. 4<sup>th</sup> Semester**

##### **C. Didactic Lecture:**

1. Physiology and Mechanism of labour
2. management of 1<sup>st</sup> stage of labour and its complications
3. Management of 2<sup>nd</sup> stage of labour and its complications
4. Management of 3<sup>rd</sup> stage of labour and it's complications and management
5. Normal Puerperium and breast feeding

##### **D. Integrated Lectures**

1. Maternal pelvis ,fetal skull
2. Physiology of labour,
3. Breast feeding

#### **3.15.4.3. Theory. 5<sup>th</sup> Semester**

##### **B. Didactic Lectures:**

1. Partogram
2. Amenorrhoea
3. Pelvic infections and sexually transmitted disease
4. Genital tuberculosis
5. Physiology of puberty and menopause
6. Preterm Labour
7. Premature Rupture of Membrane
8. Haemorrhage in late pregnancy
9. Hypertensive disorders in pregnancy(2 Lectures)
10. Post Caesarean pregnancy
11. Nutrition and drugs in pregnancy

#### **3.15.4.4. Didactic Lectures 6<sup>th</sup> Semester**

1. Induction and augmentation of Labour
2. Prolonged and Obstructed labour
3. Post dated Pregnancy
4. Post Caesarean pregnancy
5. Anaemia in pregnancy

6. Hydramnios and Oligohydramnios
7. Medical and surgical disorders in pregnancy (4 lectures)
8. Diabetes in pregnancy

#### **3.15.4.5. Didactic Lectures 7<sup>th</sup> Semester**

1. Abnormal Puerperium
2. Maternal Mortality, Perinatal Mortality
3. Ectopic pregnancy
4. Fibroid Uterus
5. Endometriosis
6. Ovarian Neoplasia (2 lectures)
7. Infertility
8. Post menopausal bleeding
9. Menstrual Disorders –DUB, amenorrhoea
10. Uterovaginal Prolapse (2 Lectures)
11. Vesicular Mole and Choriocarcinoma

#### **3.15.4.6. Didactic Lectures: 8<sup>th</sup> SEMESTER**

1. National and state level programmes in MCH.
2. Immunology in Pregnancy
3. Induction and augmentation of Labour
4. Multiple Pregnancy
5. Intra uterine Foetal Death
6. Foetal Distress
7. Hypertensive disorders in pregnancy
8. Benign tumours of genital tract
9. Malignancy of Cervix, Uterus, Vagina, Vulva (3 lectures)
10. Post menopausal bleeding
11. Induction and augmentation of Labour
12. Prolonged and Obstructed labour, Rupture uterus
13. Post dated Pregnancy
14. Post Caesarean pregnancy
15. Anaemia in pregnancy
16. Menopause, HRT, and non-hormonal therapy

#### **3.15.4.7. Didactic Lecture. 9<sup>th</sup> SEMESTER**

1. Maternal Pelvis and Foetal Skull
2. Occipitoposterior, Face & Brow Presentation
3. Breech Presentation
4. Transverse Lie, Compound Presentation, cord Prolapse and cord Presentation
5. Forceps and Vacuum Delivery
6. Obstetrics Injury to Birth Canal, destructive Operations
7. Vesicular Mole and Choriocarcinoma (2 Lectures)
8. Intrauterine Foetal Growth Retardation
9. Pregnancy with Rh incompatibility
10. Pregnancy with HIV infection
11. Pregnancy with Heart Disease
12. Newer Surgical Techniques-Endoscopic Surgeries
13. Importance of Genetics in Clinical Obstetrics and high risk pregnancies
14. Population Control, Contraception (2 lectures)
15. Operative Gynaecology and Obstetrics (3 Lectures)
16. Infertility (2 lectures) .Fibroid Uterus
17. Endometriosis
18. Ovarian Neoplasia
19. Uterovaginal Prolapse (2 lectures.)
20. Genital tract injuries, VVF, RVF and complete perineal tear.

### 3.15.4.8. Integrated

1. Ultrasound in Obs. And Gynae.
2. Reconception and Prenatal Diagnosis and Counselling(PNDT Act) with Radiologist
3. Heart disease in pregnancy
4. Diabetes in pregnancy
5. Liver disorder in pregnancy
6. Haemological disorders in pregnancy
7. Neonatal resuscitation.
8. Anemia in pregnancy
9. Adolescent medicine
10. HIV infection and AIDS
11. Analgesia
12. Urological problems
13. Tuberculosis.
14. Cord banking.
15. DIC
16. Shock

### 3.15.5.0. Teaching Learning Methodology clinical/ practical

Teaching and learning Obstetrics and Gynecology will be guided through a series of posting in which the emphasis is laid on practical hands on experience. Human patient simulator will be provided for both skill development and reduce the danger to the patient during the learning curve of the students. To allow repeat practice according to ability of the student to reach the level of competence.

#### 3.15.5.1. 3<sup>rd</sup> Semester

##### A. 1<sup>st</sup> Week

1. History taking of Obstetrics Cases.
2. Details of history taking and it's significance.
3. Knowledge of terminology-LMP,EDD ,Parity,Gravida etc.

##### C. 2<sup>nd</sup> Week

1. History of gynaecology Patients
2. Details of History-Menstrual history.Awareness of different terminology-Amenorrhoea, Polymenorrhoea, Menorrhagia

**D. Evaluation At the end of each week there will be a clinical test on OSCE pattern and ward leaving test at the end of the clinical Posting. The test will be part of internal assessment(practical).**

#### 3.15.5.2. 4<sup>th</sup> semester:

Total Posting of 4 weeks:

- A. First two weeks Students will be posted in OPD and will learn history taking and examination of Obstetrics patients, monitoring well being of fetus with fetal doppler, NST trimester wise changes and management of common ailments.
- B. Next two weeks students will see gynaecology patients in Gynae. OPD History taking of common gynaecology patients. pap smear, vaginal swab collection, colposcopy, PS and PV examination of Gynaecological patients and it's importance. They will be taught about common gynaecological infections, STD'S. They will observe CU-T insertions and removal.
- C. **At the end of each week there will be a clinical test on OSCE pattern and ward leaving test at the end of the clinical Posting. The test will be part of internal assessment(practical).**

### 3.15.5.3. 5<sup>th</sup> semester:4 weeks

- A. **OPD Posting** –students will be rotated in the antenatal, infertility, cancer detection clinic and family planning clinics.They will observe and conduct daily OPD procedures.
- B. The students will be posted in the ward and bed side clinics and interactive sessions will be undertaken.The students will be posted in the LR and in the OT-to observe major and minor procedures.
- C. **At the end of each week there will be a clinical test on OSCE pattern and ward leaving test at the end of the clinical Posting. The test will be part of internal assessment(practical).**

### 3.15.5.4. 7<sup>th</sup> semester

- A. **OPD POSTING** history taking and examination of Obstetrics patients, monitoring well being of fetus with fetal doppler, NST trimester wise changes and management of common ailments. History taking of common gynecology patients. pap smear,vaginal swab collection, colposcopy,PS and PV examination of Gynecological patients and it's importance. They will be taught about common gynecological conditions, STD'S. They will be taught IUCD insertions and removal. Students will be rotated in the antenatal, infertility cancer detection clinic and family planning clinics.
- B. **At the end of each week there will be a clinical test on OSCE pattern and ward leaving test at the end of the clinical Posting. The test will be part of internal assessment(practical).**

### 3.15.5.5. 8<sup>th</sup> semester.

- A. OPD POSTING: history taking and examination of Obstetrics patients, partogram plotting monitoring well being of fetus with fetal Doppler, NST,CST,BPP trimester wise changes and management of normal and abnormal labour. History taking of common gynecology patients. pap smear,vaginal swab collection, colposcopy, PS and PV examination of Gynecological patients and it's importance. They will be taught about common gynecological infections, STD'S,benign and malignant conditions of genitourinary tract.
- B. Students will be rotated in the antenatal, infertility cancer detection clinic and family planning clinics.The students will be posted in the ward and bed side clinics and interactive sessions will be undertaken.The students will be posted in the LR to conduct deliveries and in the OT-to observe major and minor procedures.
- C. **At the end of each week there will be a clinical test on OSCE pattern and ward leaving test at the end of the clinical Posting.The test will be part of internal assessment(practical).**

### 3.15.5.6. 9<sup>th</sup> semester

- A. **Revision classes:** Examine pregnant patient, recognize high risk pregnancies. Conduct a normal delivery and recognize abnormal labour. Resuscitate newborn and recognize congenital anomalies. Knowledge of contraception including insertion and removal of IUCD. history taking and examination of Obstetrics patients, partogram plotting monitoring well being of fetus with fetal Doppler, NST,CST,BPP..Trimester wise changes and management of normal and abnormal labour. History taking of common gynecology patients. pap smear,vaginal swab collection, colposcopy, PS and PV examination of Gynecological patients and it's importance. They will be taught about common gynecological infections, STD'S, benign and malignant conditions of genitor-urinary tract. Students will be rotated in the antenatal, infertility cancer detection clinic and family planning clinics. The students will be posted in the ward and bed side clinics and interactive sessions will be undertaken.The students will be posted in the LR to conduct deliveries and in the OT-to observe major and minor procedures
- B. **At the end of each week there will be a clinical test on OSCE pattern and ward leaving test at the end of the clinical Posting. The test will be part of internal assessment(practical).**

### 3.15.6..0\_Third Professional Part II Examination: Obstetrics & Gynecology.

3.14.9.1. Theory paper each paper shall have two sections. Question requiring essay type answers should be avoided. Marks in each paper 40x2 Total Marks= 80

- A. Topics Included in paper I: Obstetrics including social obstetrics  
B. Topics included in Paper II: Gynecology, Family welfare and Demography.

#### C. Type of Questions & marks breakup.

##### Paper I

**Marks 40**

- Q. 1. Basic & Allied sciences. on Obstetrics (Modified Essay Question) marks 10.  
Q. 2. Clinical Problem. (Constructive Response Question,( With alternative)marks 10  
Q.3. Clinical Problems Type: MCQ. , Extended matching items ( EMI). marks5x2=10  
(2out of4)  
Q.4. Short notes on any two (2 out of 4)) marks; 5 x 2 = 10

##### Paper II.

**Marks=40**

- Q.1. Basic & Allied topics Type: Modified Essay Question (1out of 2) Marks=10.  
Q2. Clinical Problem, Type Constructive Response Question (CRQ) Marks=10.  
Q.3. Clinical Problems Type: MCQ. , Extended matching items(EMI). Marks5x2=10  
(2 out of 4)  
Q.4.Short notes (5 out of 7) Marks 5x2=10

#### 3.14.9.2. Clinical/Practical Examination

**Total Marks: 50.**

1. Long Case Marks=25
- Break up of Long case marks
    - History Taking =05
    - Demonstration=10
    - Discussion =10
- 2.Short Case: one number Marks=25

#### 3.14.9.3. Oral

**Total Marks=30**

##### 3. Structure of Oral Examination : OSCE

- 5 stations, Interpretation of Charts, ECG, X ray and other imaging, Investigation Reports, Pathological Specimens. 20+10(for record of delivery cases)

#### 3.14.9.4..Internal Assessment

**Total Marks= 40**

##### A. Structure of Internal Assessment

- Theory (cumulative average of all semester Examination) **Marks=20**
- Practical( Clinical portfolio of 10 cases and Clinical performance report (item card) of all Semesters) **Marks =20**

3.12.11.5: In Medicine a candidate must obtain 50% in aggregate with a minimum of 50% in theory including orals and minimum of 50% in practical/ clinical each.

(Chapter three is adapted from MCI and syllabus of AIIMS, WB Health University )

## CHAPTER IV

### UNIVERSITY EXAMINATION, APPOINTMENT OF EXAMINERS, LEAVE OF ABSENCE, DEBARMENTS, REPEATS, READMISSION. DRESS CODE AND CONDUCT OF STUDENTS

#### 4.0.0. University Examination

**4.0.1.** The objective of the examination will be to ascertain whether the candidate has acquired the necessary knowledge, minimum skills and professional values with clear concepts of the fundamentals which are necessary for him/her to function effectively and appropriately as a physician of first contact. The assessment shall be carried on an objective basis to the extent possible.

**4.0.2.** Theory papers will be prepared by examiners as prescribed, Nature of question will be short answer type/ and the marks for each part indicated separately. Question papers should be of short structured/objective type.

**4.0.3.** Practical /clinical examination will be conducted in the laboratories or hospital wards. The Objective will be assessing proficiency in skills, conduct of experiment, interpretation of data and logical conclusion. Clinical cases should preferably include common diseases not esoteric syndromes or rare disorders. Emphasis should be on candidate's capability in eliciting physical signs and their interpretation.

**4.0.4.** Viva/oral includes evaluation of management approach and handling of emergencies. Candidate's skill in interpretation of common investigative data, x-rays, identification of specimens, ECG,etc. will also be assessed.

#### 4.1.0. University Examination shall be held as under:

**4.1.1. First Professional:-** The first professional examination shall be held at the end of Phase I training (12 months) in the subjects of Anatomy, Physiology and Bio-Chemistry. Maximum number of attempts allowed at the first professional Examination will be four, the first professional course must be completed within 4 years of admission. Partial attendance in an examination in any subject shall be counted as an attempt.

**4.1.2. Second Professional:-** The second professional examination shall be held at the end of the phase II training (12 months) in the subjects of Pathology, Microbiology, Pharmacy and Forensic Medicine.

**4.1.3. Third Professional: - It will be conducted in two parts.**

- 1. Third Professional Part I** shall be held in the VII th. Semester of Phase III in the subjects of Ophthalmology, Oto-rhinolaryngology and Community Medicine.
- 2. Third Professional Part II-(Final Professional)** will be held att the end of Phase III training in the subjects of Medicine, Surgery, Obstetrics & Gynecology and Pediatrics. The discipline of orthopedics will constitute 25% of the total theory marks in surgery. The questions will form a separate section in Surgery paper II. The student must secure at least 40% marks in the orthopedics Section with the proviso to obtain 50% marks in total as pass percentage.

#### Note:

1. Passing in 1<sup>st</sup>. professional is compulsory before proceeding to Phase II training.
2. A student who fails in the 2<sup>nd</sup>. Professional examination should not be allowed to appear in 3<sup>rd</sup>. Professional part I examination unless he passes all subjects of 2<sup>nd</sup>. Professional examination.
3. Passing in 3<sup>rd</sup>. professional (part I) is compulsory for being eligible for 3<sup>rd</sup>. Professional part (II) examination.
4. The supplementary examination for 1<sup>st</sup>. Professional MBBS examination may be conducted within 6 months so that the students who pass can join the main batch and the failed students will have to appear in subsequent year provided that the students who pass supplementary examination shall be allowed to

appear in the second professional MBBS examination only after he/she completes the full course of study of three semesters (i.e. 18 months) for the second professional MBBS examination irrespective of the examination of the main batch.

5. Results of all university examinations shall be declared before the start of teaching for next semester.

#### 4.2.0. Distribution of Marks in various Disciplines:

##### 4.2.1 First Professional examination: (Pre-clinical Subjects):-

- (a) **Anatomy:**  
Theory-Two papers of 50 marks each (One applied question of 10 marks in each paper) 100 marks. Oral (Viva) 20 marks Practical 40 marks. Internal Assessment (Theory-20; Practical-20) 40 marks Total 200 marks
- (b) **Physiology including Biophysics** Theory-Two papers of 50 marks each ( One applied question of 10 marks in each paper) 100 marks Oral(Viva) 20 marks Practical 40 marks Internal Assessment (Theory- 20; Practical- 20) 40 marks Total 200 marks
- (a) **Biochemistry:** Theory-Two papers of 50 marks each ( One applied question of 10 marks in each paper) 100 marks Oral (Viva) 20 marks Practical 40 marks Internal Assessment (Theory-20; Practical-20) 40 marks Total 200 marks Pass: In each of the subjects, a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including orals and minimum of 50% in Practical.

##### 4.2.2. Second Professional Examination: (Para-clinical subjects)

- (a) **Pathology:** Theory-Two papers of 40 marks each (One applied question of 10 marks in each paper) 80 marks Oral (Viva) 15 marks Practical Internal assessment (Theory-15; Practical-15) 30 marks Total 150 marks
- (b) **Microbiology:** Theory-Two papers of 40 marks each (One applied question of 10 marks in each paper) 80 marks Oral (Viva) 15 marks Practical Internal assessment (Theory-15; Practical-15) 30 marks Total 150 marks
- (c) **Pharmacology:** Theory-Two papers of 40 marks each Containing one question on clinical therapeutics 80 marks Oral (Viva) 15 marks Practical 25 marks. Internal assessment (Theory-15; Practical-15) 30 marks Total 150 marks
- (d) **Forensic Medicine:** Theory-one paper 40 marks Oral (Viva) 10 marks Practical/Clinical 30 marks Internal assessment (Theory-10; Practical-10) 20 marks Total 100 marks

**Pass: In each of the subjects, a candidate must obtain 50 % in aggregate with a minimum of 50% in Theory including oral and minimum of 50% in Practical's/clinical.**

##### 4.2.3. Third Professional (Part I)

###### A. Part:1 1(Clinical subjects) To be conducted during end period of seventh semester.

1. **Ophthalmology:** Theory: One paper 40 marks (should contain one question on pre-clinical and para-clinical aspects, of 10 marks) Oral (Viva) 10 marks Clinical 30 marks. Internal assessment 20 marks (Theory-10; Practical-10) Total 100 marks
2. **Oto-Rhino-Laryngology :** Theory: One paper 40 marks (should contain one question on pre-clinical and para-clinical aspects, of 10 marks) Oral(Viva) 10 marks Clinical 30 marks Internal assessment 20 marks (Theory –10 Practical-10) Total 100 marks
3. **Community Medicine including Humanities:** Theory :Two papers of 60 marks each 120 marks (includes problem solving, applied aspects of management at primary level including essential drugs,

occupational (agro based) diseases, rehabilitation and social aspects of community). Oral (Viva) 10 marks  
Practical/Project evaluation 30 marks Internal assessment 40 marks (Theory -20; Practical-20) Total 200 marks

**Pass: In each of the subjects a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including orals and minimum of 50% in practical's/clinical.**

- B. **PART-II:** Each paper shall have two sections. Questions requiring essay type answers may be avoided.
1. **Medicine:** Theory- Two papers of 60 marks each 120 marks Paper 1- General Medicine Paper II- General Medicine (including Psychiatry Dermatology and S.T.D.) (Shall contain one question on basic sciences and allied subjects) Oral (Viva) Interpretation of X-ray ECG, etc. 20 marks Clinical (Bed side) 100 marks Internal assessment 60 marks (Theory-30; Practical-30) Total 300 marks
  2. **Surgery:** Theory-Two papers of 60 marks each 120 marks: Paper-1-General Surgery (Section 1) Orthopedics (Section 2) PAPER II-General Surgery including Anesthesiology, Dental diseases and Radiology (shall contain one question on basic sciences and allied subjects) Oral (Viva) Interpretation of Investigative data 20 marks. Clinical (Bed Side) 100 marks Internal assessment 60 marks (Theory-30; Practical-30) 60 marks Total 300 marks  
***Paper 1 of Surgery shall have one section in Orthopedics. The questions on Orthopedic Surgery be set and assessed by examiners who are teachers in the orthopedic surgery.***
  3. **Obstetrics and Gynecology:** Theory Two papers of 40 marks each 80 marks. Paper I- Obstetrics including social obstetrics. Paper II – Gynecology, Family Welfare and Demography (Shall contain one question on basic sciences and allied subjects) Oral (Viva) including record of delivery cases (20+10) 30 marks. Clinical 50 marks Internal assessment 40 (Theory-20; Practical-20) Total 200 marks
  4. **Pediatrics:** (Including Neonatology) Theory : One paper 40 marks (Shall contain one question on basic sciences and allied subjects) Oral (Viva) 10 marks Clinical 30 marks Internal assessment 20 marks (Theory-10; Practical-10) Total 100 marks

**Pass: In each of the subjects a candidate must obtain 50% in aggregate with a minimum of 50% in Theory including orals and minimum of 50% in Practical's/clinical.**

#### **4.3.0. Appointment of Examiners:**

- 4.3.1. No person shall be appointed as an examiner in any of the subjects of the professional examination leading to and including the final Professional examinations for the award of the MBBS degree unless he has taken at least five years previously, a doctorate degree of a recognized university or an equivalent qualification in the particular subject as per recommendation of the Council on teachers' eligibility qualifications and has had at least five years of total teaching experience in the subject concerned in a college affiliated to a recognized university at a faculty position.
- 4.3.2. There shall be at least four examiners for 100 students, out of whom not less than 50% must be external examiners. Of the four examiners, the senior most internal examiner will act as the Chairman and coordinator of the whole examination program so that uniformity in the matter of assessment of candidates is maintained. Where candidates appearing are more than 100, one additional examiner, for every additional 50 or part thereof candidates appearing, be appointed.
- 4.3.3. Non medical scientists engaged in the teaching of medical students as whole time teachers, may be appointed examiners in their concerned subjects provided they possess requisite doctorate qualifications and five year teaching experience of medical students after obtaining their postgraduate qualifications. Provided further that the 50% of the examiners (Internal & External) are from the medical qualification stream
- 4.3.4. External examiners shall not be from the same university and preferably be from outside the state. The internal examiner in a subject shall not accept external examiner ship for a college from which external examiner is appointed in his subject.
- 4.3.5. A university having more than one college shall have separate sets of examiners for each college, with internal examiners from the concerned college.(6) External examiners shall rotate at an interval of 2

years.(8) There shall be a Chairman of the Board of paper-setters who shall be an internal examiner and shall moderate the questions.

- 4.3.6.** Except Head of the department of subject concerned in a college/institution, all other with the rank of reader or equivalent and above with requisite qualifications and experience shall be appointed internal examiners by rotation in their subjects; provided that where there are no posts of readers, then an Assistant Professor of 5 years standing as Assistant Professor may be considered for appointment as examiner.

**A. Grace Marks.** The grace marks up to a maximum of five marks may be awarded at the discretion of the University to a student who has failed only in one subject but has passed in all other subjects.

**B. Internal Assessment:** Student must secure at least 35% marks of the total marks fixed for internal assessment in a particular subject in order to be eligible to appear in final university examination of that subject.

#### **4.4.0. Attendance & Leave of Absence:**

As the MBBS curriculum primarily aims to achieve knowledge linked competence development in an integrated way; a strict time schedule has to be maintained. More over as the duration of the course is short, once a topic is over it is generally not repeated. The other aspect is that the training strategy adopted is group based individual learning. As such the academic schedule as well as each individual student's attendance and participation is essential. On the above context we are extremely concerned with the regular attendance and participation of students. If a single student misses classes/assignment a new schedule will have to be made for imparting training. Accordingly besides the official leave we discourage all types of leave of absence. If a student is absent continuously for more than 30 days, without any information his name will be suck off from the rolls. Such students will have to take readmission to pursue his course. In such case also he will have to fulfill the required attendance for eligibility of appearing in examination.

**4.5.0. ATTENDANCE:** Attendance requirement for each specific subject is 75% in theory, practical/clinical/community posting individually for eligibility to appear for the examination in that subject. Attendance is also inclusive of attendance in non-lecture teaching i.e. seminars, group discussions, tutorials, demonstrations, practical, hospital, (Secondary, Primary) posting and bed side clinics & Community Posting etc."

- 4.5.1.** Students who do not have at least 75% attendance in the foundation course will not be eligible for the phase I examination.
- 4.5.2.** Students who do not have at least 75% attendance in elective will not be eligible for the phase III- part 2 examination.
- 4.5.3..** Candidates appearing in an examination comprising of more than one subject, (Surgery and allied (orthopedics) must have 75% attendance in each subject.

#### **4.6.0. LEAVE OF ABSENCE:**

- 4.6.1.** A student who for good reason ((medical or pressing matter) wishes to be absent from an academic program must apply formally for leave of absence to the HOD of all the departments and the Dean. In case the faculty board feels that the reason is genuine they will arrange for alternative training without any additional cost. But if they find out the cause of absence is not genuine than the students will have to pay extra for the extra coaching.
- 4.6.2.** The length of such leave of absence, if granted, will not be more than 7 days subject to approval of the faculty board.
- 4.6.3.** Leave of absence will not be granted for more than one in each semester..

#### **4.7.0. Debarments, Repeat & readmission.**

**4.7.1. As per Clause 4.6.0 Attendance:** Students falling short of 75% attendance and as per **Clause 4.3.6. B.** student who cannot secure 35% in the internal assessment will be debarred from appearing in the summative evaluation (University examination).

**4.7.2.** Where there is dissatisfaction with the performance of a student on attendance (Irregular attendance in class below 60%), or academic (non participation or poor grades in any formative evaluation) the Head of the a Department may report the matter to the Dean and the Faculty Board which recommend for special counseling and request the department to organize extra coaching. Accordingly the student will be counseled and he will be advised for undergoing extra coaching organized by the department. To restrict the misuse of the system there will be a nominal charge as a disincentive for not repeating the same in future. There will also be a provision of waving in deserving cases by the Dean.

**4.7.3.** All Repeaters (failed students) has to readmit themselves and attend specially organized training program to improve their individual deficiency and this will be compulsory.

**4.7.4.** Any student who is absent continuously for 2 months, his name will be stuck off from the rolls and will have to take readmission.

**4.8.0. DRESS CODE AND CONDUCT:** Students must at all times conduct and present themselves in a manner in keeping with the nature of the profession for which they are in training, and as directed by the IIMS&R. Any student who is not appropriately attired will not be attended to by staff in the Dean's Office, Departments & Hospital. During academic hours and in official functions the students will wear the prescribed dress.

**4.8.1.** Student ID cards must be displayed at all times, when on IIMS&R/ Hospital/ Integral University premises. This includes attending classes, laboratory sessions and clinical rotations, field and community visits. Student ID cards are required to facilitate all transactions in the Faculty/ University.

**4.8.2.** The University and IIMS&R and the IIMS&R Hospital campus is a Tobacco free zone. And consumption of any Tobacco or its product is strictly prohibited in the IIMS&R/ Integral University Campus and is a punishable offence. Food and drink should not be brought into the classrooms/ laboratories or be consumed in the classrooms and the corridors of the IIMS&R Academic and hospital building. Students should also refrain from chewing betel nut, pan, also.

**4.8.3.** Use of Mobile phone is strictly prohibited in the class rooms, laboratories and inside the hospital. All the mobiles should be switched off during classes, practical and clinical posting. Contravention of the same is a punishable offence.

**4.8.4.** During any examination no students will be allowed to carry any mobile or any other communication devices with them. If it is found on their body he will fined or debarred from the examination

#### **4.9.0. IMMUNISATION AGAINST HEPATITIS B & TETANUS :**

It is expected that all prospective students entering the Integral Institute of Medical Sciences & Research should have been inoculated against Hepatitis B and also get a booster shot of Tetanus toxoid prior to admission.

**(Adapted from MCI MSR only)**

# CHAPTER - V

## INTERNSHIP

**5.0.0.** Internship is a phase of training wherein a graduate is expected to conduct actual practice of medical and health care and acquire skills under supervision so that he/she may become capable of functioning independently.

**5.0.1. Objectives:** At the end of the internship training, the student shall be able to:

1. diagnose clinical common disease conditions encountered in practice and make timely decision for referral to higher level;
2. use discreetly the essential drugs, infusions, blood or its substitutes and laboratory services.
3. Manage all type of emergencies-medical, surgical obstetric, neonatal and pediatric, by rendering first level care;
4. Demonstrate skills in monitoring of the National Health Program and schemes, oriented to provide preventive and promotive health care services to the community;
5. Develop leadership qualities to function effectively as a leader of the health team organized to deliver the health and family welfare service in existing socio-economic, political and cultural environment;
6. Render services to chronically sick and disabled (both physical and mental) and to communicate effectively with patient and the community.

**5.1.0. Time Distribution:** Time allocation to each discipline is approximate and shall be guided more specifically by the actual experience obtained. Thus a student serving in the Rural Health Training Centre's emergency room may well accumulate skill in surgery, orthopedics, medicine, obstetrics and Gynecology and Pediatrics during even a single night on duty. Responsible authorities from the medical college shall adjust the intern experience to maximize intern's opportunities to practice skills in patient care in rough approximation of the time allocation suggested.

**5.1.1. Compulsory duration 11 months. (330 days)**

1. Community Medicine: 2 months
2. Medicine: 2 months
3. Surgery including Orthopedics: 2 months
4. Obstetrics & gynecology including Family welfare Planning: 2 months
5. Pediatric: 1 month
6. Orthopedics including PMR : 1 month
7. Ophthalmology: 15 days
8. Otorhinolaryngology: 15 days
9. Casualty 15 days

**5.1.1. Elective Postings duration One month (30 days):**

Elective posting will include two of the following for 15 days in each subject. The **Elective subjects are:**

1. Dermatology and Sexually Transmitted Diseases,
2. Psychiatry,
3. Tuberculosis and Respiratory Diseases,
4. Anaesthesia,
5. Radio-diagnosis,
6. Physical Medicine and Rehabilitation,
7. Forensic Medicine and Toxicology,
8. Blood bank and Transfusion Department

### **5.2.0. Other details:**

1. All parts of the internship shall be done as far as possible in IIMS&R or any MCI recognized institutions of India. In case of any difficulties, the matter may be referred to the Medical Council of India to be considered on individual merit.
2. Every candidate will be required after passing the final MBBS examination to undergo compulsory rotational internship to the satisfaction of the IIMS&R authorities and Integral University for a period of 12 months so as to be eligible for the award of the degree of Bachelor of Medicine and Bachelor of Surgery (MBBS) and full registration.
3. The Integral University shall issue a provisional MBBS pass certificate on passing the final examination.
4. The State Medical Council will grant provisional registration to the candidate on production of the provisional MBBS pass certificate. The provisional registration will be for a period of one year. In the event of the shortage or unsatisfactory work, the period of provisional registration and the compulsory rotating internship may be suitably extended by the appropriate authorities.
5. The intern shall be entrusted with clinical responsibilities under direct supervision of senior medical officer. They shall not be working independently.
6. Interns will not issue a medical certificate or a death certificate or a medico-legal document under their signature.
7. In recognition of the importance of hands-on experience, full responsibility for patient care and skill acquisition, internship should be increasingly scheduled to utilize clinical facilities available in Rural Health Training Centre, Urban Health Centre and attached Primary Health centre in addition to the IIMS&R Hospital. A critical element of internship will be the acquisition of specific experiences and skill as listed in major areas: Provided that where an intern is posted to RHTC for training, there shall be a committee consisting of representatives of the HOD's of different clinical department (ROME Committee) and the representative of the state government's district administration who shall regulate the training of such trainee. Provided further that for such trainee a certificate of satisfactory completion of training shall be obtained from the relevant administrative authorities which shall be countersigned by the Principal/Dean of College;
8. Adjustment to enable a candidate to obtain training in elective clinical subjects may be made.
9. IIMS&R will try to establish links with one entire district extending out-reach activities. Similarly, Re-orientation of Medical Education (ROME) scheme may be suitably modified to assure teaching activities at each level of District health system which will be coordinated by Dean of the medical college;
10. Out of one year, 6 months shall be devoted to learning tertiary care being rendered in teaching hospital/district hospital suitably staffed with well qualified staff, 3 months of secondary care in the secondary level RHTC and 3 months in Primary Health care out of which 2 months should be in Primary Health care program at the Community level. One month of primary care training may be in the form of preceptors hip with a practicing family physician or voluntary agency or other primary health care provider.
11. One year's approved service in the Armed Forces Medical Services, after passing the final MBBS examination shall be considered as equivalent to the pre-registration training detailed above; such training shall, as far as possible, be at the Base/General Hospital.

### **5.3.0. Assessment of Internship.**

1. The intern shall maintain a record of work which is to be verified and certified by the medical officer under whom he works. Apart from scrutiny of the record of work, assessment and evaluation of training shall be undertaken by an objective approach using situation tests in knowledge, skills and attitude during and at the end of the training. Based on the record of work and date of evaluation, the Dean/Principal shall issue certificate of satisfactory completion of training, following which the University shall award the MBBS degree or declare him eligible for it.

2. Satisfactory completion shall be determined on the basis of the following:-

- I. Proficiency of knowledge required for each case **Score 0-5**
- II. The competency in skills expected to manage each case: **Score 0-5**
  - Competency for performance of self performance,
  - of having assisted in procedures,
  - Of having observed.

3. Responsibility, punctuality, work up of case, involvement in treatment, follow-up reports.: **Score 0-5**

4. Capacity to work in a team (Behavior with colleagues, nursing staff and relationship with paramedical): Score 0-5

5. Initiative, participation in discussions, research aptitude. Score 0-5

Poor / Fair / below average / average / above average / excellent 0 1 2 3 4 5. (A Score of less than 3 in any of above items will represent unsatisfactory completion of internship.)

6. Full registration shall only be given by the State Medical Council/Medical Council of India on the award of the MBBS degree by the university or its declaration that the candidate is eligible for it.

7. Some guidelines in the implementation of the training program are given below.

#### **5.4.0. Discipline related Internship:**

##### **5.4.1. Community Medicine:**

**A. Rural Health Training Centre:** Interns shall acquire skills to deal effectively with an individual and the community in the context of primary health care. This is to be achieved by hands on experience in the Rural Health Training Centre. During this period of internship an intern must acquire

1. Clinical competence for diagnosis of common ailments, use of bed side investigation and primary care techniques;
2. Gain information on 'Essential drugs' and their usage;
3. Recognize medical emergencies, resuscitate and institute initial treatment and refer to suitable institution.
4. Undergo specific Government of India/Ministry of Health and Family Welfare approved training using Government of India prescribed training manual for Medical Officers in all National Health Programs (e.g. child survival and safe motherhood-EPI, CDD, ARI, FP, ANC, safe delivery, Tuberculosis, Leprosy and others as recommended by Ministry of Health and Family Welfare:-
  - gain full expertise in immunization against infectious disease;
  - participate in programs in prevention and control of locally prevalent endemic diseases including nutritional disorders.
  - learn skills first hand in family welfare planning procedures;
  - learn the management of National Health Programs;
5. Be capable of conducting a survey and employ its findings as a measure towards arriving at a community diagnosis.
6. Conduct program on health education & gain capabilities to use Audiovisual aids,
7. Acquire capability of utilization of scientific information for promotion of community health
8. Be capable of establishing linkages with other agencies as water supply, food distribution and other environmental/social agencies.

9. Acquire quality of being professional with dedication, resourcefulness and leadership.
10. Acquire managerial skills, delegation of duties to paramedical staff and other health professionals.

**B. Primary Health Centre/ C. Urban Health Centre.**

1. Initiate or participate in family composite health care (birth to death), Inventory of events;
2. Participation in all of the modules on field practice for community health e.g. safe motherhood, nutrition surveillance and rehabilitation, diarrhea disorders etc.
3. Acquire competence in diagnosis and management of common ailments e.g. malaria, tuberculosis, enteric fever, congestive heart failure, hepatitis, meningitis acute renal failure etc.;
4. Acquire proficiency for Family Welfare Programs (ante natal care, normal delivery, contraception care etc.)

**5.4.2. General Medicine:** Interns shall acquire following training during their term.

1. acquire competence for clinical diagnosis based on history physical examination and relevant laboratory investigation and institute appropriate line of management; this would include diseases common in tropics (parasitic, bacterial or viral infections, nutritional disorders, including dehydration and electrolyte disturbances) and system illnesses
2. The intern shall have assisted as a care team in intensive care of cardiac, respirator, hepatic, neurological and metabolic emergencies.
3. The intern shall be able to conduct the following laboratory investigations:
  - Blood: (Routine haematology smear and blood groups);
  - Urine: (Routine chemical and microscopic);
  - Stool: (for ova/cyst and occult blood);
  - Sputum and throat swab for gram stain or acid fast stain and
  - Cerebro Spinal Fluid (CSF) for smear.
4. Conduct following diagnostic procedures:
  - Urethral Catheterization Proctoscopy; Ophthalmoscopy/ Otoscopy; Indirect laryngoscopy.
  - Therapeutic procedures; Insertion of Ryle's Tube; Pleural, ascetic tap, Cerebro Spinal Fluid (CSF) tap, installing or air way tube, Oxygen administration etc.
  - Biopsy Procedures:
    - Liver, Kidney, Skin, Nerve, Lymph node, and muscle biopsy,
    - Bone marrow aspiration, Biopsy of Malignant lesions on surface, Nasal/nerve/skin smear for leprosy.
5. Familiarity with usage of life saving procedures:
  - including use of aspirator, respirator and defibrillator,
  - Competence in interpretation of different monitoring devices such as cardiac monitor, blood gas analysis etc.
6. Participate as a team member in total health care of an individual including appropriate follow-up and social rehabilitation.
7. Other competencies as indicated in general objectives.

**5.4.3. Pediatrics:** The details of the skills that an intern shall acquire during his/her tenure in the department of Pediatrics will make the intern to able to:

1. diagnose and manage common childhood disorders including neonatal disorders and acute emergencies( enquiry from parents of sick children), examining sick child making a record of information;
2. carry out activities related to patient care such as laboratory work, investigative procedures and use of special equipments. The details are given as under:-
  - diagnostic techniques: blood (including from femoral vein and umbilical cord),abscess, cerebrospinal fluid, urine, pleura and peritoneum and common tissue biopsy techniques;
  - techniques related to patient care: immunization, perfusion techniques, feeding procedures, tuberculin testing & breast feeding counseling;
  - use of equipment: vital monitoring, temperature monitoring, resuscitation at birth and care of children receiving intensive care;
3. screening of newborn babies and those with objective risk factors for any anomalies and steps for prevention in future;
4. plan in collaboration with parents and individual, collective surveillance of growth and development of new born babies, infants and children so that he/she is able to:
  - recognize growth abnormalities;
  - recognize anomalies of psychomotor development;
  - detect congenital abnormalities;
5. assess nutritional and dietary status of infants and children and organize prevention, detection and follow up of deficiency disorders both at individual and community level such as:
  - protein-energy malnutrition
  - deficiencies of vitamins especially A, B, C and D;
  - Iron deficiency;
6. institute early management of common childhood disorders with special reference to Pediatrics dosage and oral rehydration therapy.
7. Participate actively in public health programme oriented towards children in the community.

**5.4.4. GENERAL SURGERY:** An intern is expected to acquire following skills during his/her posting:

1. Diagnose with reasonable accuracy all surgical illnesses including emergencies
2. resuscitate a critically injured patient and a severe burns patient;
3. control surface bleeding and manage open wound;
4. monitor patients of head, spine, chest abdominal and pelvic injury;
5. institute first-line management of acute abdomen;
6. Able to perform independently
  - Venesection;
  - Perform tracheostomy and endotracheal intubation;
  - catheterise patients with acute retention or perform trocar cystostomy,
  - drain superficial abscesses,
  - suturing of wound,
  - perform circumcision,
  - biopsy of surface tumours,
  - Perform vasectomy

**5.4.5. Casualty::** The intern after training in Casualty must be able to:

1. identify acute emergencies in various disciplines of medical practice;
2. manage acute anaphylatic shock;
3. manage peripheral-vascular failure and shock;
4. manage acute pulmonary oedema and Left Ventricular failure (LVF);
5. undertake emergency management of drowning poisonings and seizures;

6. undertake emergency management of bronchial asthma and status asthmaticus;
7. undertake emergency management of hyperpyrexia;
8. undertake emergency management of comatose patients regarding airways positioning, prevention of aspiration and injuries;
9. assess and administer emergency management of burns;
10. assess and do emergency management of various trauma victims;
11. identify medico-legal cases and learn filling up forms as well as complete other medico-legal formalities in cases of injury, poisoning, sexual offenses, intoxication and other unnatural conditions.

**5.4.6. Obstetrics & Gynecology:** Technical skills that interns are expected to learn:

1. diagnosis of early pregnancy and provision of ante-natal care;
2. diagnosis of pathology of pregnancy related to:
  - abortions;
  - ectopic pregnancy;
  - tumors complicating pregnancy;
  - acute abdomen in early pregnancy;
  - hyper emesis gravidarum;
3. detection of high risk pregnancy cases and suitable advise e.g. PIH, hydramanios, antepartum hemorrhage, multiple pregnancies, abnormal presentations and intra-uterine growth retardation;
4. antenatal pelvic assessment and detection of cephalopelvic disproportion;
5. induction of labour and amniotomy under supervision;
6. management of normal labour, detection of abnormalities, post-partum hemorrhage and repair of perennial tears;
7. assist in forceps delivery;
8. assist in caesarean section and postoperative care thereof;
9. detection and management of abnormalities of lactation;
10. perform non-stress test during pregnancy;
11. per speculum, per vaginum and per rectal examination for detection of common congenital, inflammatory, neoplastic and traumatic conditions of vulva, vagina, uterus and ovaries;
12. Medico-legal examination in Gynecology and obstetrics.
13. To perform the following procedures:-
  - dilation and curettage and fractional curettage;
  - endometrial biopsy;
  - endometrial aspiration;
  - pap smear collection;
  - Intra Uterine Contraceptive Device (IUCD) insertion;
  - Minilap ligation;
  - Urethral catheterisation;
  - Suture removal in postoperative cases;
  - Cervical punch biopsy;
14. To assist in major abdominal and vaginal surgery cases in Obstetrics and Gynaecology.
15. To assist in follow-up postoperative cases of obstetrics and gynaecology such as:
  - Colposcopy;
  - Second trimester Medical Termination of Pregnancy (MTP) procedures e.g. Emcredyl Prostaglandin instillations;
16. To evaluate and prescribe oral contraceptive.

#### **5.4.7. OTO RHINO LARYNGOLOGY (ENT)**

1. Interns shall acquire ability for a comprehensive diagnosis of common Ear, Nose and Throat (ENT) diseases including the emergencies and malignant neoplasma of the head and neck;
2. He/she shall acquire skills in the use of head mirror, otoscope and indirect laryngoscopy and first line of management of common Ear Nose and Throat (ENT) problems;
3. He/she shall be able to carry out minor surgical procedures such as:
  - earsyringing antrum puncture and packing of the nose for epistaxis,
  - nasal douching and packing of the external canal,
  - Remove the foreign bodies from the nose and ear
  - Observed or assisted in various endoscopic procedures and trachesotomy;
4. An item shall have participated as a team member in the community diagnosis e.g. Chronic Suppurative Otitis Media (CSOM) and be aware of national programme on prevention of deafness
5. He/she shall possess knowledge of various ENT rehabilitative programmes.

#### **5.4.8. OPHTHALMOLOGY:** An intern shall (he/she) be able to

1. diagnose and manage common ophthalmological conditions such as:-
  - Trauma,
  - Acute conjunctivitis, allergic conjunctivitis.
  - xerosis, entropion.
  - corneal ulcer, iridocyclitis.
  - myopia, hypermetropia.
  - cataract, glaucoma.
  - ocular injury and sudden loss of vision;
2. he shall be able to carry out assessment of refractive errors and advise its correction;
3. he shall be able to diagnose ocular changes in common systemic disorders;
4. he/she shall be able to perform investigative procedures such as:- Tonometry, syringing, direct ophthalmoscopy, subjective refraction and fluorescein staining of cornea.
5. he/she shall have carried out or assisted the following procedures:
  - Subconjunctival injection;
  - Ocular bandaging;
  - Removal of concretions;
  - Epilation and electrolysis;
  - Corneal foreign body removal;
  - Cauterization of corneal ulcers;
  - Chalazion removal;
  - Entropion correction;
  - Suturing conjunctival tears;
  - Lids repair
  - Glaucoma surgery (assisted);
  - Enucleation of eye in cadaver;
6. he/she shall have full knowledge on available methods for rehabilitation of the blind.

**5.4.9. ORTHOPAEDICS:** The aim of teaching the undergraduate student in Orthopaedics and Rehabilitation is to impart such knowledge and skills that may enable him to diagnose and treat common ailments. He shall have ability to diagnose and suspect presence of fracture, dislocation, actual Osteomyelitis, acute poliomyelitis and common congenital deformities such as congenital talipes equinovarus (CTEV) and dislocation of hip (CDH). At the end of the training the intern must be able to:

##### **A. Skill that an intern should be able to perform without supervision**

1. Splinting (plaster slab) for the purpose of emergency splintage, definitive splintage and post operative splintage and application of Thomas splint;

2. Manual reduction of common fractures – phalangeal, metacarpal, metatarsal and Colles's fracture;
3. Manual reduction of common dislocations – internphalangeal,metacarpophalangeal, elbow and shoulder dislocations;
4. Plaster cast application for undisplaced fractures of arm, fore arm, leg and ankle;
5. Emergency care of a multiple injury patient;
6. Precautions about transport and bed care of spinal cord injury patients.

**B. (Skill that an intern should be able to perform under supervision)**

1. Advise about prognosis of poliomyelitis, cerebral palsy, CTEV and CDH;
2. Advise about rehabilitation of amputees and mutilating traumatic and leprosy deformities of hand;
3. An intern must have observed or preferably assisted at the following operations:
  - drainage for acute osteomyelitis;
  - sequestrectomy in chronic osteomyelitis;
  - application of external fixation;
  - internal fixation of fractures of long bones.

**5.4.10 DERMATOLOGY AND SEXUALLY TRANSMITTED DISEASES:** An intern must be able to: -

1. conduct proper clinical examination; elicit and interpret physical findings, and diagnose common disorders and emergencies.
2. Perform simple, routine investigative procedures for making bedside diagnosis, specially the examination of scraping for fungus, preparation of slit smears and staining for AFB for leprosy patient and for STD cases;
3. Take a skin biopsy for diagnostic purpose;
4. Manage common diseases recognizing the need for referral for specialized care in case of inappropriateness of therapeutic response.

**5.4.11. PSYCHIATRY:** An Intern must be able to:

1. diagnose and manage common psychiatric disorders;
2. identify and manage psychological reaction and psychiatric disorders in medical and surgical patients in clinical practice and community setting.

**5.4.12. TUBERCULOSIS AND RESPIRATORY DISEASES:** An intern after training must be able to: -

1. conducting proper clinical examination, elicit and interpret clinical findings and diagnose common respiratory disorders and emergencies;
2. perform simple, routine investigative procedures required for making bed side diagnosis, specially sputum collection, examination for etiological organism like AFB, interpretation of chest X-rays and respiratory function tests;
3. Interpret and manage various blood gases and pH abnormalities in various respiratory diseases.
4. Manage common diseases recognizing need for referral for specialized care in case of inappropriateness of therapeutic response;
5. Perform common procedures like laryngoscopy, pleural aspiration, respiratory physiotherapy, laryngeal intubation and pneumo-thoracic drainage aspiration.

**5.4.13. ANAESTHESIA:** After the internship in the department of Anesthesiology an intern shall acquire knowledge, skill and attitude to:

1. perform pre-anaesthetic check up and prescribe pre-anaesthetic medications;
2. perform venepuncture and set up intravenous drip;
3. perform laryngoscopy and endotracheal intubation;
4. perform lumbar puncture, spinal anaesthesia and simple nerve blocks;
5. conduct simple general anaesthetic procedures under supervision;
6. monitor patients during anaesthesia and post operative period;

7. recognise and manage problems associated with emergency anaesthesia;
8. maintain anaesthetic records;
9. recognise and treat complication in post operative period;
10. perform cardio-pulmonary brain resuscitation (C.P.B.R.) correctly, including recognition of cardiac arrest.

**5.4.14 RADIO-DIAGNOSIS:** An intern after training must be able to identify and diagnose:

1. all aspects of 'Emergency Room' Radiology like –
    - a. all acute abdominal conditions;
    - b. all acute traumatic conditions with emphasis on head injuries;
    - c) differentiation between Medical and surgical radiological emergencies;
- (2) Basic hazards and precautions in Radio-diagnostic practices.

**5.4.15 PHYSICAL MEDICINE AND REHABILITATION:** An intern is expected to acquire the following skills during his/her internship: -

1. competence for clinical diagnosis based on details history an assessment of common disabling conditions like poliomyelitis, cerebral palsy, hemiplegia, paraplegia, amputations etc;
2. participation as a team member in total rehabilitation including appropriate follow up of common disabling conditions;
3. principles and procedures of fabrication and repair of artificial limbs and appliances;
4. various therapeutic modalities;
5. use of self help devices and splints and mobility aids;
6. familiarity with accessibility problems and home making for disabled;
7. ability to demonstrate simple exercise therapy in common conditions like prevention of deformity in polio, stump exercise in an amputee etc.

**5.4.16 FORENSIC MEDICINE AND TOXICOLOGY:** The intern is to be posted in the casualty department of the hospital while attached under Forensic Medicine Department with the following objectives:

1. to identify medico-legal problem in a hospital and general practice;
2. to identify and learn medico-legal responsibilities of a medical man in various hospital situations;
4. to be able to diagnose and learn management of basic poisoning conditions in the community;
5. to learn how to handle cases of sexual assault;
6. to be able to prepare medico-legal reports in various medico-legal situations;
7. to learn various medicolegal post-mortem procedures and formalities during its performance by police.

**(Adapted from MCI MSR only)**