

**THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY,
CHENNAI – 600 032.**

**FIRST M.B.B.S. DEGREE COURSE
(NON-SEMESTER) REGULATIONS - 2005**

I M.B.B.S. Regulation - 2005

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THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI

REGULATIONS FOR THE BACHELOR OF MEDICINE AND
BACHELOR OF SURGERY DEGREE COURSE

In exercise of the powers conferred by Section 44 of the Tamil Nadu Dr. M.G.R. Medical University, Chennai, Act, 1987 (Tamil Nadu Act 37 of 1987), the Standing Academic Board of the Tamil Nadu Dr. M.G.R. Medical University hereby makes the following regulations:

1. SHORT TITLE AND COMMENCEMENT:

These regulations shall be called "REGULATIONS FOR THE M.B.B.S. DEGREE COURSE (NON-SEMESTER) 2005 OF THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI".

These regulations are applicable to the students who are admitted to the course from the academic year 2005-06*.

The regulations framed are subject to modification by the Standing Academic Board from time to time.

2. GENERAL CONSIDERATIONS AND TEACHING APPROACH:

(1) Graduate medical curriculum is oriented towards training students

*XXIX S.A.B. held on 05-08-2005.

to undertake the responsibilities of a physician of first contact who is capable of looking after the preventive, promotive, curative and rehabilitative aspects of medical care.

(2) With a wide range of career opportunities available today a graduate has a wide choice of career opportunities. The training though broad based and flexible should aim to provide educational experience of the essentials required for health care in our country.

(3) To undertake the responsibilities of various service situations, it is essential to provide adequate placement training tailored to the needs-of such services. To avail of opportunities and engage in professional activities the graduate shall endeavour to acquire basic training in different aspects of medical care.

(4) The importance of the community aspects of health care and of rural health care services is to be emphasised. This aspect of education and training of graduates should be adequately recognised in the prescribed curriculum. Adequate exposure to such experiences, should be available throughout in all the three phases of graduate medical education and training. This has to be further intensified by providing exposure to field practice areas and training during the internship period. The aim of the period of rural training during internship is to enable the fresh graduates to function effectively under such settings.

(5) The educational experience should emphasize health and community orientation instead of only disease and hospital orientation or being concentrated on curative aspects. As such all the basic concepts of modern scientific medical education are to be adequately dealt with.

(6) Enough experience must be provided for self learning. The methods and techniques that would ensure this must become a part of the teaching-learning process.

(7) The medical graduate of modern scientific medicine shall endeavour to become capable of functioning independently in both urban and rural environment. He/She shall endeavour to master the fundamental aspects of the subjects taught and all common problems of health and disease avoiding unnecessary details of specialization.

(8) The importance of social factors in relation to the problem of health and disease should receive proper emphasis throughout the course. To achieve this purpose the educational process should also be community based rather than only hospital based. The importance of population control and family welfare planning should be emphasized throughout the period of training with the importance of health and development duly emphasized.

(9) Adequate emphasis is to be placed on cultivating logical and scientific habits of thought, clarity of expression and independence of judgement, ability to collect and analyse information and to correlate the facts.

(10) The educational process should be placed in a historical background as an evolving process and not merely as an acquisition of a large number of disjointed facts without a proper perspective. The history of Medicine with reference to the evolution of medical knowledge both in this country and in the rest of the world should form a part of this process.

(11) Lectures alone are generally not adequate as a method of training and a means of transferring information and even less effective at skill development and in generating the appropriate attitudes. Every effort should be made to encourage the use of active methods related to demonstration and first hand experience. Students shall be encouraged to learn in small groups through sheer interactions so as to gain maximal experience through contact with patients and the communities in which the patients live. While the curriculum objectives often refer to areas of knowledge or science, they are best taught in a setting of clinical relevance with hands on experience for the students to assimilate and make this knowledge a part of their own working skills.

(12) The graduate medical education in clinical subjects should be based primarily on teaching in out-patient and emergency departments and within the community including peripheral health care institutions. The out-patient departments should be suitably planned to provide training to graduates in small groups.

(13) Clinics should be organized in small groups of preferably not more than 10 students so that a teacher can give personal attention to each student with a view to improving his skill and competence in handling of patients.

(14) Proper records of the work should be maintained which will form a basis for the student's internal assessment. They should be available to the inspectors at the time of inspection of the college by the Medical Council of India.

(15) Maximal efforts have to be made to encourage integrated teaching between traditional subject areas using a problem based learning approach starting with clinical. or community cases and exploring the relevance of various pre-clinical disciplines in both understanding and resolving a problem. Every attempt must be made to avoid compartmentalisation of disciplines so as to achieve both horizontal and vertical integration in different phases.

(16) Every attempt is to be made to encourage students to participate in group discussions and seminars to enable them to develop personality, character, expression and other faculties which are necessary for a medical graduate to function either in solo practice or as a team member/leader when he begins his independent career. A discussion group should not have more than 20 students.

(17) Faculty members should avail of modern educational technology while teaching the students. To attain this objective Medical Education Units/Departments should be established in all medical colleges for faculty development and providing learning resource material to teachers.

(18) To derive maximum advantage out of this revised curriculum the vacation period of students in one calendar year should not exceed one month during the 4 ½ years Bachelor of Medicine and Bachelor of Surgery (MBBS) Degree Course.

3.. ELIGIBILITY

(1) Age limit:

No candidate shall be allowed to be admitted to the Medical curriculum of First Bachelor of Medicine and Bachelor of Surgery (MBBS) Degree Course until; he/she shall complete the age of 17

years on or before 31st December of the year of admission to the course;

(2) Qualifying examination:

No candidate shall be allowed to be admitted to the First Bachelor of Medicine and Bachelor of Surgery (MBBS) Degree Course until he/she has passed a qualifying examination as under:

(a) 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 of study, the last two years of study comprising of Physics, Chemistry and Biology with English at a level not less than the core course for English as prescribed by the National Council for 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

(b) The Intermediate Examination in science of an Indian University / Board or other recognized examining body with Physics, Chemistry and Biology which shall include a practical test in these subjects and also English as a compulsory subject.

OR

(c) The Pre-professional/Pre-medical Examination with Physics, Chemistry and Biology, 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 & Biology and also English as a compulsory subject.

OR

(d) The first year of the three years degree course of a recognized University, with Physics, Chemistry and Biology including a practical test: in these 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

(e) 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 and Zoology) and further that he/she has passed the earlier qualifying examination with the following subjects Physics, Chemistry, Biology and English.

OR

(f) 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 including a practical test in each of these subjects and English.

Note: The Pre-medical course may be conducted either in a Medical College or in a Science College.

- (i) The marks obtained in Mathematics are not to be considered for admission to MBBS Course.
- (ii) Candidates who have passed the H.Sc. in the vocational stream are not eligible for admission to M.B.B.S. course.
- (iii) After the 10+2 course is introduced, the integrated courses should be abolished.

(3) (a) SELECTION OF STUDENTS :

The Selection of students to medical college shall be based solely on merit of the candidates and for determination of merit, the following criteria be adopted:

- (i) In a state having more than one Board/examining body conducting the qualifying examination of where there is more than one medical college under the administrative control of one authority a competitive entrance examination should be held.
- (ii) To be eligible for competitive entrance examination, the candidate must have passed any of the qualifying examinations as enumerated above at 3(2).

- (iii) *A candidate for admission to M.B.B.S. Degree Course must have obtained individual pass in English and the following marks in Physics, Chemistry and Biology taken together at the qualifying examinations” :

Sl. No.	Community	Minimum Eligibility Marks *
1.	O.C.	Minimum of 60% of marks in Biology or Botany & Zoology taken together. 60% of marks in each of Physics and Chemistry. Aggregate should not be less than 140 out of 200.
2.	B.C.	Minimum of 60% of marks in Biology or Botany & Zoology taken together. 60% of marks in each of Physics and Chemistry. Aggregate should not be less than 130 out of 200.
3.	M.B.C.	Minimum of 55% of marks in Biology or Botany & Zoology taken together. 55% of marks in each of Physics and Chemistry. Aggregate should not be less than 120 out of 200.

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- XXVI SAB dt. 16-12-2003

4. S.C./S.T. Minimum of 40% of marks in Biology or Botany & Zoology taken together. 40% of marks in each of Physics and Chemistry. Aggregate should not be less than 80 out of 200.

(b) Selection of students under All India Quota:

The following are the eligibility criteria for the candidates selected under All India Quota scheme:-

A candidate for admission to M.B.B.S. degree course under All India Quota must have passed in the subjects of Physics, Chemistry, Biology (Botany & Zoology) and English individually and must have obtained a minimum of 50% marks taken together in Physics, Chemistry and Biology (Botany & Zoology) at the qualifying examination as mentioned in clause (a) to (f) under Regulation 3 (2) above.

In respect of candidates belonging to Scheduled Castes, Scheduled Tribes or other Backward classes, the marks obtained in Physics, Chemistry & Biology (Botany & Zoology) taken together in qualifying examination be 40% instead of 50% as above with a pass in English.

C) Admission Procedure For NRI Quota Seats in Self - Financing Colleges [G.O.(Ms.) No: 137 Health and Family Welfare (MCA1) Department dated 14.08.2006]. *

- (1) The marks fixed by Medical Council of India as indicated below shall be adopted as minimum eligibility marks for admission to MBBS/BDS/Para Medical Course under NRI Quota in Self-Financing Colleges
 - (i) The candidates must pass Physics, Chemistry, Biology (Botany and Zoology) and English individually and obtain minimum of 50% of marks taken together in Physics, Chemistry and Biology in the qualifying examination.
 - (ii) For SC/ST students – 40 % of the marks as stated above
- (2) The following guidelines shall be followed for admission to NRI students in Self-Financing Colleges:
 - (i) Admission to the NRI seats may be made on the basis of the marks in the qualifying examination.
 - (ii) The candidates who are seeking admission under NRI Quota are exempted from appearing for the Tamil Nadu Professional Courses Entrance Examination.
 - (iii) NRI financially supporting the candidate must be a blood relation such as Father/Mother/Brother/Sister/Uncle/Aunt only.
 - (iv) Applicants for admission under NRI Quota shall not have completed 21 years of age as on the 1st of July of the respective academic year.
 - (v) Candidate must furnish the Xerox copies of the following supporting documents:-
 - (a) NRI Status Certificate of the financial supporter issued by the Embassy of respective Country under their seal.
 - (b) NRI Bank Account Pass Book of the financial supporter
 - (c) Passport of the Financial Supporter
 - (d) Nativity Certificate of the Financial Supporter
 - (e) Evidence of payment of Development Charges of US \$ 1000.

* 32nd SAB dt.22.12.2006

(4) Eligibility Certificate:

Candidates who have passed any qualifying examination other than the Higher Secondary course examination conducted by the Government of Tamil Nadu shall obtain an eligibility certificate from the University by remitting the prescribed fee along with the application form before seeking admission to any one of the affiliated Medical Institutions. The application form and the details for obtaining Eligibility Certificate may be downloaded from the University website: www.tnmmu.ac.in.

4. **CUT-OFF DATES FOR ADMISSION * :**

The candidates admitted upto 30th September shall be registered to take up their I year examination during August of the next year and the next examination during February of the subsequent year.

All kinds of admissions shall be completed on or before 30th September of the academic year. There shall not be any admissions after 30th September even if seats are vacant.

5. **ENROLLMENT OF CANDIDATES*@ :**

The candidates admitted provisionally shall apply to the University for Enrollment within 7 days from the date of admission in prescribed

* XXVI SAB dt. 16-12-2003 @ No enrolment of candidates from the academic year 2006-07 onwards (31st Standing Academic Board dated:29.06.2006).

form, which shall be downloaded from the University website (www.tnmmu.ac.in) along with (i) provisional admission card issued by the College / Selection Committee, (ii) Eligibility Certificate for Non-Higher Secondary Course and other State candidates for Under- Graduate course admission and (iii) a fee of Rs.125/- (or) that may be prescribed by the authorities of the University from time to time.

Enrollment is made purely to ensure that the admission of the candidate is within the permitted intake for the academic year concerned and to check any excess admission, over and above permitted intake, by the Affiliated Colleges.

Enrollment will not confer any right on the candidate for registration with the University to take up the University Examinations, if he/she does not satisfy the eligibility criteria for admission to the course concerned.

6. REGISTRATION OF CANDIDATES:

A candidate admitted in M.B.B.S. degree course in any of the affiliated Institution of this University shall register his / her name by submitting the prescribed application form for Registration duly filled along with the prescribed fee and a declaration in the format as in Annexure-I to the Academic Officer* of this University through the

* 31st SAB dt. 29-06-2006

Head of the affiliated Institutions within 60 days from the cut-off date prescribed for M.B.B.S. course for admission.

7. COURSE OF STUDY:

(1). Every student shall undergo a period of certified course of study extending over 4 1/2 academic years followed by one year of compulsory rotating internship. The first MBBS course shall commence on the 1st August of academic year*.

(2). The period of 4 1/2 years is divided into three phases as follows:

(a) **PHASE-I (I MBBS)ONE YEAR** consisting of Pre-clinical subjects-

i) Human Anatomy, ii) Physiology including Bio-Physics, iii) Bio-Chemistry and iv) 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 Bio-chemistry combined (Physiology 2/3 and Bio-Chemistry 1/3).

(b) **PHASE-II (II MBBS)1 1/2 YEARS** consisting of para clinical / clinical subjects.

* 31st SAB dt. 29-06-2006

During this phase, teaching of para-clinical and clinical subjects shall be done concurrently.

The para-clinical subjects shall consist of :-

i) Pathology, ii) Pharmacology, iii) Microbiology, iv) Forensic Medicine including Toxicology and v) 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 shall be allotted to Pathology, Pharmacology, Microbiology and Forensic Medicine and Community Medicine combined (1/3 Forensic Medicine and 2/3 Community Medicine).

(c) **PHASE-III (III MBBS) TWO YEARS** - Continuation of study of clinical subjects from Phase-II.

The clinical subjects to be taught during Phase II and III are :

i) Medicine and its allied specialities, ii) Surgery and its allied specialities, iii) Obstetrics and Gynaecology and iv) Community Medicine.

Besides clinical posting the rest of the teaching hours should be divided between didactic lectures, demonstrations, seminars, group discussions etc. in various subjects.

The training in Medicine and its allied specialities will include General Medicine, Paediatrics, Tuberculosis and Chest, Skin and Sexually Transmitted Diseases, Psychiatry, Radio-diagnosis, Infectious diseases etc.

The training in Surgery and its allied specialities will include General Surgery, Orthopaedic Surgery including Physiotherapy and Rehabilitation, Ophthalmology, Oto-Rhino- Laryngology, Anaesthesia, Dentistry, Radio-therapy etc.

The Obstetrics & Gynaecology training will include Family Medicine, Family Welfare Planning, etc.

(3) **THE PHASE I – I M.B.B.S.** (approximately 240 teaching days) shall be occupied in the Phase I (Pre-clinical) subjects.

No student shall be permitted to join the Phase II (Para-clinical/clinical) group of subjects until he / she has passed in all the Phase I (Pre-clinical) subjects.

After passing pre-clinical subjects, 1-1/2 years shall be devoted to para-clinical subjects. Phase II will be devoted to Para-clinical and clinical subjects, along with clinical postings. During clinical phase -

(Phase III) pre-clinical and para-clinical teaching shall be integrated into the teaching of clinical subjects wherever relevant.

8. COMMENCEMENT OF THE COURSE :*

From 1st August of the Academic year.

9. CURRICULUM:

The Curriculum and the Syllabi for the course shall be as specified in these Regulations.

10. MEDIUM OF INSTRUCTION :

English shall be the medium of instruction for all the subjects of study and for examinations.

11. SUBMISSION OF LABORATORY RECORD NOTE BOOKS

At the time of practical/clinical examination each candidate shall submit to the Examiners his/her laboratory note books duly certified by the Head of the Department as a bonafide record of the work done by the candidate.

The practical record shall be evaluated by the concerned Head of the Department (Internal Evaluation) and the practical record marks shall be submitted to the University 15 days prior to the commencement of the theory examinations.

*XXVI SAB dt. 16-12-2003

The candidate may be permitted by the examiners to refer to the practical record book during the practical examination in the subject of Biochemistry only. No other materials, handwritten, cyclostyled or printed guides are allowed for reference during the practical examinations.

In respect of failed candidates the marks awarded for records at previous examinations will be carried over to the next examinations. If a candidate desires he/she may be permitted to improve his/her performance by submission of fresh records.

12. WORKING DAYS IN AN ACADEMIC YEAR:

Each academic year shall consist of not less than 240 working days.

13. INTERNAL ASSESSMENT:

a) The Internal Assessment should be done once in three months.

At the end of 3 months – First Internal Assessment

At the end of 6 months – Second Internal Assessment

One month prior to the
University Examination } - Third Internal Assessment

The Internal Assessment consists of the following points:

- a) Theory
- b) Practical/Clinical
- c) Viva Voce

All the details regarding Internal Assessment should be sent to the University at the end of January, March & May for 100 marks and the aggregate of final Internal Assessment marks at the end of June for 80 marks by the Head of the Department of the subject concerned through the Dean/Principal of the Colleges. The aggregate of Final Internal Assessment Marks submitted at the end of June for 80 marks shall be taken by the University as Internal Assessment Marks for permitting the candidates to sit for the examinations.*

The average of the Theory, Practical/Clinical & Oral should be added and aggregate must be taken and sent to the University as Internal Assessment Marks. 35% of minimum marks is necessary to appear for the examinations.

The Internal Assessment marks must be exhibited periodically on the Notice Board after completion of the I.A. examination for the knowledge of the students. It comes into effect from August 2006 examination onwards. **

* SAB dated:28.12.2005 ** XXIX SAB dated:05.08.2005

b) A failed candidate in any subject should be provided an opportunity to improve his/her internal assessment marks by conducting a minimum of two examinations in theory and practical separately and average, be considered for improvement.

c) The internal assessment marks (both in written and practical taken together) should be submitted to the University endorsed by the Head of the institutions fifteen days prior to the commencement of the theory examinations.

d) A candidate should obtain a minimum of 35%* of marks in internal assessment in a subject to be permitted to appear for the University examination in that subject.

14. ATTENDANCE REQUIRED FOR ADMISSION TO EXAMINATION :

a) No candidate shall be permitted to anyone of the parts of MBBS Examinations unless he/she has attended the course in the subject for the prescribed period in an affiliated institution recognised by this University and produces the necessary certificate of study, attendance and progress from the Head of the Institution.

*XXVI S.A.B. dated 16.12.2003.

b) A candidate is required to put in minimum 75% * of attendance in both theory and practical / clinical separately in each subject before admission to the examination.

c) A candidate lacking in the prescribed attendance in any one subject in the first appearance shall be denied admission to the entire examinations.

d) Failed candidates who are not promoted to the next phase of study are required to put in minimum 75% of attendance during the extended period of study before appearing for the next examination.

e) Attendance earned by the student should be displayed on the Notice Board of the College at the end of every 3 months and a copy of the same should be sent to the University and parents of the student concerned.

15. REGULATIONS FOR CONDONATION OF LACK OF ATTENDANCE :

There shall be no condonation of lack of attendance for the course.

16. UNIVERSITY EXAMINATIONS*

(1). COMMENCEMENT OF EXAMINATION :

a. August 1st / February 1st.

*XXVI S.A.B. dated 16.12.2003.

b. Theory examinations not to be held on Saturdays and Sundays. If the date of commencement of the examination falls on a public holiday, the next working day will be the date of commencement of examination.

(2). Timing of Examinations:

(a) Phase I - professional examination:

At the end of one academic year.

(b) Phase II - professional examination:

At the end of 1 ½ years from the commencement of Phase II.

(c) Phase III – Part I professional examination:

At the end of one year of Phase III.

(d) Phase III – Part II professional (Final Professional) examination:

At the end of 2nd year of Phase III.

(3). Exemption in passed subjects:

Candidates who fail in an examination but obtain pass mark in any subject, shall be exempted from re-examination in that subject.

(4). Carry over of failed subjects:

- (a) Passing in First MBBS Professional examination is compulsory before proceeding to Phase II training.
- (b) A student who fails in the II MBBS professional examination shall be permitted to carry the failed subjects to Phase III of the M.B.B.S. course but shall not be allowed to appear in III MBBS Professional Part I examination unless he/she passes all the subjects of the II MBBS Professional examination. Passing in II MBBS Professional examination is compulsory before entering Part II of Phase III (final year) of the course.
- (c) Passing in III MBBS Professional (Part I) examination is not compulsory before entering for Part II training; however passing of III MBBS Professional (Part I) is compulsory for being eligible to appear for III MBBS Professional, (Part II) examination.

17. REVALUATION OF ANSWER PAPERS:

There is no provision for revaluation of answer papers. However, retotalling is only allowed in the failed subjects.

18. CLASSIFICATION OF SUCCESSFUL CANDIDATES:**

Distinction will be awarded to successful candidates who

** Deleted 31st SAB dated:29.06.2006

secure 75% marks or more as a course aggregate in the first appearance taking University theory, practical and viva alone.

19. RE-ADMISSION AFTER BREAK OF STUDY:

As per the procedure laid down in a common Regulation for all the Under-graduate and Post-graduate courses of this University.

20. MIGRATION / TRANSFER OF CANDIDATES:

Migration from one recognised Medical College to another recognised Medical College is not a right of a student. However, migration of students from one recognised medical college to another recognised medical college within India may be considered by the Medical Council of India only in exceptional cases on extreme compassionate grounds, provided the following criteria are fulfilled. (Routine migrations on other grounds shall not be permitted).

i) Both the Colleges are recognised by the Medical Council of India.

ii) The applicant should have passed first professional M.B.B.S. examination.

iii) The application for Migration complete in all respects along with the Proforma as in Annexure-II is submitted to all authorities concerned within a period of one month of passing the first professional Bachelor of Medicine and Bachelor of Surgery (MBBS) examination, the period being counted from the date of declaration of results.

iv) The applicant must submit an affidavit (as in Annexure-III) duly sworn in before the 1st class Magistrate stating that he/she will pursue 18 months of prescribed study before appearing for the II professional Bachelor of Medicine and Bachelor of Surgery (MBBS) examination at the transferee Medical College. The affidavit should be duly certified by the Dean of the College concerned and the Registrar of the concerned University to which transfer is sought.

NOTE :

- (i) Migration during clinical course of study will not be considered by the University.
- (ii) All applications for migration will be referred to Medical Council of India by college authorities. The University will not consider request for migrations without the approval of the Medical Council of India.
- iii) The number of student migrating/transferring from one medical college to another medical College during one year will be kept to the minimum so that the training of the regular students of that college is not adversely affected. The number of students migrating/transferring from or to any one medical college shall not exceed the limit of 5% of its sanctioned intake in one year.
- iv) Issue of N.O.C. for all Migrations/Transfers are subject to the approval of the Vice-Chancellor.
- v) The following compassionate grounds shall be considered for the purpose of Migration.
 - a) Death of a supporting guardian.
 - b) Illness of the candidate causing disability.
 - c) Disturbed conditions declared by Government in the Medical College area.

ANNEXURE – I**REGULATION 6****DECLARATION**

I
 Son of / Daughter of
 Residing at
 and admitted to in I year of (Name of the course/
 U.G./P.G.) at
 (Name of the College) do hereby solemnly affirm and sincerely state as
 follows :

I declare that I shall abide by the rules and regulations prescribed by
 the Tamil Nadu Dr. M. G. R. Medical University, Chennai for the
 (course) including regulations for re-admission after the break of study.

Date :

Signature of the candidate.

/ Countersigned /

Dean / Principal / Director.

(Office date seal)

ANNEXURE-II**REGULATION 20(iii)****PROFORMA**

Migration of Mr/Miss. _____ from
 _____ Medical College, _____ to _____ Medical
 College _____.

1) Date of admission in I MBBS course. (Date)____(Month)____(year)____

2) Date of Passing I MBBS University Exam (Date)____(Month)____(year)____

3) Date of application (Date)____(Month)____(year)____

4) NOC from relieving college (enclosed) (date of issue)

5) NOC from relieving university (enclosed) (date of issue)

6) NOC from receiving college, (enclosed) (date of issue)

7) NOC from receiving University (enclosed) (date of issue)

8) Whether affidavit, duly Sworn before I Class Magistrate containing an undertaking that
 "I will study for full 18 months of II Phase of MBBS course in transferee Medical College,
 Before appearing in the II Professional University examination is enclosed". Yes/No

9) a) Reasons for migration in brief

b) Whether proof for the reasons enclosed Yes/No

10) Whether Bank Draft of Rs.500/- (non-refundable Migration fee) in favour of the Secretary,
 Medical Council of India, New Delhi, Payable at New Delhi enclosed. Yes/No

11) Permanent Address:-

12) Postal Address:-

SIGNATURE

ANNEXURE-III**REGULATION 20 (iv)****SWORN AFFIDAVIT**

I, _____, II M.B.B.S.student S/o./D/o. _____
 aged about _____ years and residing at _____ do
 hereby solemnly affirm and sincerely state as follows:

1. That I am at present studying II year MBBS in _____ Medical College, _____
2. That I hereby give my consent and undertaking to pursue my study for the full 18 months of
 II phase of M.B.B.S. course in _____ Medical College, _____ before
 appearing for II professional Bachelor of Medicine and Bachelor of Surgery (MBBS)
 examination at the _____ Medical College, _____ and that on the
 strength of this undertaking, I am arranging to migrate from _____ Medical College
 _____ to _____ Medical College, _____. The above facts are
 true.

Solemnly affirmed at _____ on
 This day of _____
 And signed his/her name in my presence.
 Certified that the above facts are true.

Photo Attested by Deponent
 First Class Magistrate Signature

DEAN
 ----- Medical College

IDENTIFIED BY ME

Countersigned and certified that the above facts are true

Registrar
 Tamil Nadu Dr.M.G.R.Medical University, Chennai-32

CURRICULUM

I M.B.B.S.

ANATOMY

Pre-Clinical Subjects – Phase – I:

In the teaching of these subjects, stress shall be laid on basic principles of the subjects with more emphasize on their applied aspects.

HUMAN ANATOMY

(i) Goal:

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

(ii) Objectives:

(A) Knowledge:

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

- (a) comprehend the normal disposition, clinically relevant interrelationships, functional and cross sectional anatomy of the various structures in the body;
- (b) identify the microscopic structure and correlate elementary ultra structure of various organs and tissues and correlate the structure with the functions as a prerequisite for understanding the altered state in various disease processes;
- (c) 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 shall be able to locate the site of gross lesions according to the deficits encountered.
- (d) demonstrate knowledge of the basic principles and sequential development of the organs and systems, recognise the clinical stages of development and the effects of common teratogens. He/She shall be able to explain the developmental basis of the major variations and abnormalities.

(B) Skills:

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

- (a) identify and locate all the structures of the body and mark the topography of the living anatomy.
- (b) identify the organs and tissues under the microscope;
- (c) understand the principles of karyotyping and identify the gross congenital anomalies;
- (d) understand the principles of newer imaging techniques like Ultra sound, Computerised Tomography Scan, Interpretation of plain and contrast X-rays.
- (e) understand clinical basis of some common clinical procedures i.e. intra-muscular and intravenous injection, lumbar puncture, kidney biopsy etc.

(C) Integration:

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

M.B.B.S ANATOMY
SYLLABUS

The course in Human Anatomy is to provide an understanding of the structure of the human body as a foundation for the scientific study and practice of medicine.

GENERAL ANATOMY : The word "Anatomy" denotes "Applied Anatomy"*

Descriptive terms

General features and classification of bones

General features and classification of joints

General features and classification of tissues

General features of muscle and fascia

General features of nerves and Organisation of nervous tissue

GROSS ANATOMY

Dissections of important areas to be done; Prosected specimens could replace the rest of the dissections.

* XXIII SAB dt. 05-06-2002

Detailed origin and insertion of muscles to be replaced by essential attachments and emphasis to be placed on the understanding of the function.

UPPER AND LOWER EXTREMITIES

<i>Muscles</i>	--	Names; Location; Essential attachments; Important Relations; Blood supply; Nerve supply and Action
<i>Joints</i>	--	Names; Types of joints; Movements; Muscles Responsible

Equal emphasis to be given to all joints of the extremities

<i>Vessels and Nerves</i>	--	Commencement, Course and Termination of vessels Important relations and distribution. Commencement, Course and Termination of nerves Root value, relations and distribution.
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<i>Lymphatics</i>	--	Knowledge of lymphnodes; areas of drainage
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Emphasis on important areas of venous and lymphatic drainage

<u>OSTEOLOGY</u>		Names of bones and Side identification; Parts and attachments; Growing ends. Important centers of ossification.
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In all areas, relevant and necessary applied and clinical aspects to be told and emphasized upon.

ABDOMEN AND PELVIS :

<i>Abdominal wall</i>	--	Anterior Abdominal wall; Inguinal canal; Posterior Abdominal wall; Peritoneal cavity- Greater and lesser sacs Peritoneal ligaments; Sub-diaphragmatic spaces Pelvic floor and Ischio-rectal fossa Basic knowledge of perineal spaces
<i>Viscera</i>	--	Name; Position; Important peritoneal and other Relations; Blood supply; Nerve supply; Histology and Microstructure Portal vein and Porta-systemic Anastomosis Important arteries; Inferior venacava
OSTEOLOGY	--	Sacrum and Coccyx Features of Typical and Atypical lumbar vertebrae Bony Pelvis – Sex determination & Diameters

THORAX :

<i>Thoracic cage</i>	--	Walls of thorax; Names and Types of joints of Thorax; Mediastinum – sub divisions, boundaries and Contents (including Heart and Pericardium) Lungs and Pleura Diaphragm
OSTEOLOGY	--	Features of typical and atypical thoracic vertebrae Features of typical and atypical ribs Features of sternum

HEAD AND NECK :

<i>Scalp & Neck</i>	--	Scalp Face Sub-occipital Triangle Anterior & Posterior Triangles of Neck Structures in the neck
<i>Cranial cavity</i>	--	Cranial fossae and structures related Duramater and dural venous sinuses
<i>Other areas</i>	--	Parotid region Temporal and Infra-temporal fossae Sub-mandibular region Mouth; Tongue; Palate; Pharynx; Larynx; Nose and nasal cavity; Para-nasal air sinuses; Orbit; Eyeball; Organs of Hearing & Equilibrium
<i>Vessels and Lymphatics</i>	--	The blood vessels and lymphatics of Head And Neck
<i>Nerves</i>	--	Cranial nerves and plexuses
Autonomic Nervous System		Ganglia; Outflow of ANS and distribution
OSTEOLOGY		Names & Location of bones of skull; Bony cranial cavity – sub divisions; foraminae; Bony fossae Features of typical & atypical cervical vertebrae

BRAIN AND SPINAL CORD :

<i>Spinal cord</i>	--	Spinal cord & Meninges Parts & Tracts of spinal cord Blood supply
<i>Brain</i>	--	Brain & Meninges Blood supply Parts of brain and functional components

Base of brain; Hind brain; Mid brain;
Diencephalon; Cerebrum; Cerebellum.

EMBRYOLOGY :

General Embryology

Oogenesis; Spermatogenesis; Fertilization
Bilaminar and Trilaminar germ discs;
Embryonic period;
Placenta; Amnion; Umbilical cord
Organogenesis; Basic Teratology;
Twinning

Special Embryology

Gastro-intestinal system and spleen
Urinary and genital systems
Diaphragm
Heart & Aortic arch derivatives
Respiratory system
Face; Palate; Tongue;
Brachial apparatus
Endocrine system
Vertebral column
Parts of neural tube & derivatives
Visual and auditory apparatuses
Outline of development of limbs

HISTOLOGY :

General Histology

Cell; Epithelia; Glands;
Connective tissue; Cartilage; Bone;
Muscle; Nervous tissue
Lymphoid tissue; Skin and its appendages

Special Histology

Respiratory system; Vascular system;
Salivary glands & Gastro-intestinal system
Urinary system
Reproductive system (male & female)
Endocrine system; Muco-cutaneous junctions;
Eye lid and Parts of eyeball;
Olfactory epithelium; Taste buds; Internal ear;
CNS -- Medulla, Pons, Mid brain, Cerebellum,
Cerebrum, Spinal cord, Nerve ganglia.

GENETICS :

Structure of chromosome; Karyotyping; Chromosomal aberrations (Numerical & Structural); Structure of gene; Mutation; Single gene inheritance; Autosomal Inheritance; Sex linked inheritance.

SURFACE ANATOMY :

Extremities	Bony landmarks, SM of important vessels and nerves.
Abdomen	Regions and Planes of Abdomen. SM of superficial and deep inguinal rings SM of Stomach, Liver, fundus of Gallbladder, Spleen, Duodenum Pancreas, IC junction, Base of Appendix, Kidneys and Abdominal part of ureter, Root of mesentery, Abdominal aorta And Inferior vena cava
Thorax	Borders of Heart, Valves Pleura and Lungs Major vessels
Head & Neck	Vertebral levels of Hyoid bone, Thyroid cartilage, Cricoid Cartilage Thyroid gland; Larynx; SM of Common carotid artery, Internal jugular vein, Facial artery on the face, Parotid gland and duct Palatine tonsil Inion, Nasion, Pterion. Important dural venous sinuses
Brain	Central sulcus, Sylvian sulcus

RADIOLOGICAL ANATOMY:

X-rays - Principle of X-ray - Plain and Contrast X-rays - Principles of Ultrasound and CT scan - CT scan at T3, T4 and L1 levels.

TEACHING SCHEDULE : Teaching Hours - 650 Hrs.

Introduction	1 week
General Anatomy	
General Embryology	
General Histology	
Upper extremity	6 weeks
Lower extremity	5 weeks
Abdomen and Pelvis	10 weeks
Thorax	3 weeks
Head and Neck	11 weeks
Brain & Spinal cord	4 weeks

TOTAL	40 weeks

Horizontal Integration :

The preclinical departments together plan the Horizontal Integration.

To stress the importance of clinical and applied Anatomy.

1. Display study questions on the notice board weekly, pertaining to the region covered.
2. At the end of a region students be given cases of that region for study, presentation, analysis and discussion.

Example : Leprosy patients with nerve lesions of the Upper Extremity at the end of the study of Upper Extremity.

3. Invite clinicians to give guest lectures and demonstrations to highlight the anatomical basis of the clinical conditions.

Example :

- a. Importance of the venous drainage of Lower Extremity and varicose veins.
- b. Anatomical basis of transplant.
- c. Anatomical basis of hernia and repair.

EVALUATION

INTERNAL ASSESSMENT

Theory	40 marks *
Practicals	30 marks
Records	10 marks *

TOTAL	80 marks

UNIVERSITY EXAMINATION PATTERN:

THEORY

TWO PAPERS of 3 (three) hours duration 100 marks each.

PAPER I :

General / Applied Anatomy
 General Embryology
 General Histology
 Upper and Lower extremities
 Abdomen and Pelvis
 (along with essential Embryology and Special Histology)

-
- 30th Meeting of SAB held on 28/12/2005

PAPER II :**Thorax**

Head and Neck

Brain (along with Essential embryology and Special Histology)

PATTERN OF QUESTION PAPER : **

Essay Questions	-	2 x 15 Marks	= 30 Marks
Short Notes	-	10 x 5 Marks	= 50 Marks
Short Answer Questions	-	10 x 2 Marks	= 20 Marks
Total =			100 Marks

PRACTICAL EXAMINATION

-

80 Marks*

HISTOLOGY	Spotters		30 Marks	}
	Discussion	General 1]		}
		Special 1] --	10 Marks	}
				} *
GROSS ANATOMY	Spotters		30 Marks	}
	Discussion	UL/LL/ABD 1}		}
		HN/Br/Tho 1}	10 Marks	}

PRACTICAL :

Two mark for each spotter and two minutes per spotter. Each spotter may have two or more structured questions.

Gross Spotters 15	2 x 15 = 30	Discussion 10	40 Marks	}
				} *
Histology Spotters 15	2 x 15 = 30	Discussion 10	40 Marks	

Gross Spotters - Distribution

Upper Extremity	 2	}
		} *
Lower Extremity	 2	}
Thorax	 2	}
		}
Abdomen & Pelvis	 2 + 1	}
		} *
Head & Neck	 3 + 1	}
		}
Brain & Spinal Cord	 2	}

	15	

Histology Spotters - Distribution :

General Histology	3	}	
		}	*
Special Histology	12	}	

	15		

(Spotters should not be pre arranged. Marks are awarded for identification as well as discussion).

PRACTICAL EXAMINATION:

A maximum of 25 candidates per day of practical examination is desirable.

VIVA EXAMINATION :

Osteology.....	10
Radiology	10
Surface Marking	10
Embryology(including Karyotypes)	10

Total	40 Marks

MARKS QUALIFYING FOR A PASS

50% in Theory	=	100/200
50% in Theory including Viva	=	120/240
50% in Practical	=	40/80
35% in I.A.	=	28//80

Grand Total	:	200/400

* XXIX SAB held on 05.08.2005 from August 2006 onwards.

** MCQ's withdrawn from August 2008 onwards – 35th SAB held on 20.5.2008

I M.B.B.S.

PHYSIOLOGY

(2) HUMAN PHYSIOLOGY INCLUDING BIOPHYSICS

(A) PHYSIOLOGY

(i) GOAL:

The broad goal of the 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 health and disease.

(ii) OBJECTIVES:

(a) KNOWLEDGE:

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

- (1) explain the normal functioning of all the organ systems and their interactions for well coordinated total body function;
- (2) assess the relative contribution of each organ system to the maintenance of the milieu interior;
- (3) elucidate the physiological aspects of normal growth and development;
- (4) describe the physiological response and adaptation to environmental stresses;
- (5) list the physiological principles underlying pathogenesis and treatment of disease.

(b) SKILLS:

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

- (1) conduct experiments designed for the study of physiological phenomena;
- (2) interpret experimental/investigative data;
- (3) distinguish between normal and abnormal data derived as a result of tests which he/she has performed and observed in the laboratory.

(c) INTEGRATION:

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

(B) BIOPHYSICS

- (a) **GOAL AND OBJECTIVES:** The broad goal of teaching Biophysics to undergraduate students is that they should understand basic physical principles involved in the functioning of body organs in normal and diseased conditions.

Total time for teaching Biophysics	:	5 hours
Out of which		
1) Didactic lectures	:	3 hours
2) Tutorial/group discussion	:	1 hour
3) Practical	:	1 hour

(b) TOPIC DISTRIBUTION:

(1) Lectures:

- (i) Physical principles of transport across cell membrane and across capillary wall.
- (ii) Biopotentials.
- (iii) Physical principles governing flow of blood in heart and blood vessels. Also Physical principles governing flow of air in air passages.

(2) Tutorial/group discussion: on the topics covered in didactic lectures.

(3) Practicals:

Demonstration of:

- (a) Biopotential on oscilloscope
- (b) Electroencephalogram (E.E.G.)
- (c) Electromyogram (E.M.G.)
- (d) Electrocardiogram (E.C.G.)

SYLLABUS OF PHYSIOLOGY

THEORY

1. GENERAL PHYSIOLOGY

Must Learn :

1. Body Water, ECF and ICF composition.
2. Cell membrane, organelles, nucleus; Intercellular connection and matrix; Transport across cell membrane; Transmembrane electrical potential.
3. Histophysiology of different types of epithelial, fibrous, adipose, cartilage and bone tissues.
4. Nervous tissue – Neurons and neuroglia-cell types : Myelination; Excitability-strength duration curve; Generation and propagation of nerve impulse. Synapse, Neurotransmitters, their receptors. Types of nerve fibres of somatic sensory and motor nerves.
 - (a) Division of the Autonomic Nervous System – their neurons, neurotransmitters, receptors & functions.
5. Muscle : Structure innervations, excitation, contraction and relaxation of skeletal, smooth and cardiac muscle.

Nice to Know :

1. Physical and chemical properties of water.

2. Nernst equilibrium potentials, Goldman constant field equation.
3. Muco polysaccharides and protein in matrix of connective tissues.
4. Degeneration and regeneration of nerve fibres.
5. Types of muscular contraction; preload and after load; skeletal muscle fibre types – Effect of exercise on muscles, Frank Starling's Law.

II. BLOOD AND LYMPH :

Must Learn :

1. Blood volume, Haematocrit, Composition of plasma, Functional classification of plasma proteins.
2. Erythrocytes – Structure, count, formation, metabolism, functions, destruction.
3. Leucocytes – Classification, Functions, TLC & DLC, formation, fate; Plasma cells.
4. Thrombocytes – Structure and function, formation, count; Primary Haemostasis.
5. Coagulation of Blood, Fibrinolysis, Physiological anticoagulants; organization of clot, Role of Vit. K.
6. ABO and Rh blood groups – compatibility, prophylaxis.
7. Spleen – Structure and functions, Histocytic system.
8. Lymph – Formation, circulation, function lymph nodes, other lymphoid tissue.

Nice to Know :

1. Plasmapheresis; Plasma expanders; Effect of haemorrhage and IV fluids on volume, haematocrit, specific gravity and viscosity of blood.
2. Haematological indices, classification of anaemia.
3. Immunity, Interleukins, Antibody and complement.
4. Purpura, Bleeding Time.
5. Coagulation defects, Clotting time, Thrombosis, Embolism, in vitro and in vivo anticoagulants.
6. Minor blood group systems; change in stored blood; Effect of mismatched blood transfusion.
7. Monokines, Endogenous pyrogen.
8. Oedema, Lymphoedema, Effect of Vasomotor on lymph flow.

III. DIGESTION

MUST LEARN

1. Functional anatomy of the alimentary tract – glands, musculature, innervation and blood supply.
2. Mastication : Salivary glands and von Ebner's glands. Composition and functions of saliva, control of salivation. Deglutition.
3. Gastric motility and secretion – Control; Digestion and Absorption in the stomach; Duodenal mucosa; Vomiting.
4. Pancreatic juice – mode of secretion, composition and functions; control of secretion.
5. Functions of liver; composition of hepatic and gall bladder bile; Emptying of gall bladder; Bile salts, enterohepatic circulation.
6. Motility of Enteron; Crypts of Lieberkuhn composition and function of succus entericus. Digestion and absorption in the small intestine.
7. Function of the colon – motility, secretion, absorption; defecation; composition of faeces.

Nice to know :

1. Enteric Nervous System.
2. Xerostomia, Dysphagia, Achalasia cardia, Heart burn.
3. Experimental evidence for phases of gastric secretion; Psychosomatic illness; Achylia and hyperacidity; Management of peptic ulcer, Dumping syndrome.
4. Trypsin inhibitor; Pancreastatin.
5. Cholagogues, Choleretics; gall stones; Biliary colic, Obstructive jaundice.
6. Intestinal colic, Paralytic ileus, intestinal obstruction; Diarrhoea; Malabsorption; Minor GI

hormones.

7. Colitis, Megacolon, Constipation, Dyschezia.

IV. EXCRETION :

Must Learn :

1. Function anatomy of kidney and urinary tract; Nephron – types, parts; Peculiarities of Renal circulation; Juxtaglomerular Apparatus.
2. Starling forces in the Malpighian corpuscle, Glomerular filtration; Plasma load, Tubular load, Plasma Clearance.
3. Reabsorption of Nephric filtrate, Proximal tubular events – Reabsorption of Bicarbonate and glucose; Transfer maximum, Renal threshold; Action of Parahormone.
4. Role of Counter current mechanism in creating and maintaining medullary osmotic gradient. Diluting segment of nephron.
5. Distal tubular events – Action of Aldosterone; Role of kidney in homeostasis of electrolyte concentration and acid base balance.
6. Urine concentrating mechanism – action of vasopressin.
7. Motility in ureters; Filling of bladder – cystometrogram; Micturition.
8. Skin – Functions, pigmentation, hairgrowth cycle, sweat glands ; their control, sebaceous secretion, cutaneous receptors.

Nice to Know :

1. Artificial kidney, Dialysis.
2. Measurement of GFR and RBF.
3. Glucose absorption curve, Heterogeneity of nephrons; glycosuria, osmotic diuresis.
4. Tubuloglomerular feedback.
5. Action of ANP and BNP and Adrenomedullin.
6. Water diuresis, Diabetes insipidus.
7. Uretic colic, Hydronephrosis; Types of abnormal bladder.
8. Types of hair; cutaneous circulation; cholinergic sympathetics; Alpiecia; cavities; Dendritic; Langerhans cells.

V. CARDIOVASCULAR SYSTEM

Must Learn :

1. Properties of cardiac muscle and conducting tissue of the heart. Pacemaker potential. Origin and spread of cardiac impulse. Action potential in atrial and ventricular muscle – ionic basis. Nerve supply to heart – control of heart rate; sinus arrhythmia.
2. Heart as a pump – cardiac cycle – phases and events; heart sounds.
3. Electrocardiography – Principle – 12 classical leads – ECG tracing in Lead II.
4. Venous Return and Cardiac Output – Values and distribution of output – Factors affecting and regulation of output. Starling's Law of the heart – Effect of preload and after load.
5. Types of blood vessels – pressure gradient in circulatory system; Arterial pulse and jugular venous pulse; Resistance to blood flow.
6. Micro circulation – Vasomotion – formation and absorption of interstitial fluid – Local regulation of blood flow.
7. Systemic arterial blood pressure – values, factors determining, Baroreceptors, vasomotor center – short term and long term regulation of BP.
8. Regional blood flow; coronary, cerebral, pulmonary, Splanchnic and cutaneous circulations.
9. Cardiovascular changes during exercise.

Nice to Know :

1. Energy sources of cardiac muscle; Artificial pacemaker; Effect of ions and drugs on heart.
2. Pressure and volume changes in ventricles. Cardiac catheterization.
3. Correlation of ECG tracing with phases of cardiac cycle and phase of action potential.
4. Estimation of cardiac output; - failing heart.
5. Haemodynamics of blood flow.
6. Important vasodilators and vasoconstrictors.
7. Effect of gravity and posture on arterial B.P. Hypotensive shock, Hypertension.
8. Foetal circulation, congenital heart disease.
9. Effects of high altitude, aviation and space travel on CVS.

VI. RESPIRATION

Must Learn :

1. Functional Anatomy of the thoracic cage, lungs, respiratory tract and paranasal air sinuses.
2. Ventilation; Muscles of respiration, Boyle's law in ventilation, Mechanism, Surfactant, Compliance; Spirometric volumes and capacities.
3. Diffusion : Composition of atmospheric and alveolar air, partial pressures of gases in alveoli and blood; V-Q ratio, physiological shunt, dead space, Diffusion coefficient and capacity; Respiratory membrane.
4. Transport of O₂ and CO₂ in blood and tissue fluid, Hb-O₂ dissociation, Bohr effect, Haldane effect, Hamburger phenomenon.
5. Regulation – Chemoreceptors, Centres; Changes during muscular exercise.
6. Physiological effects of ascent to high altitudes – acclimatization; Dysbarism, Nitrogen narcosis.

Nice to Know :

1. Airway resistance, Bronchial tone, Asthma.
2. Asphyxia, ARD Syndrome, liquid breathing.
3. Diffusion in fibrosis, emphysema and pulmonary oedema.
4. Types of hypoxia, cyanosis, oxygen therapy; Foetal Hb.
5. Respiratory adjustments in disease states.
6. Non-respiratory functions of lung.

VII. CENTRAL NERVOUS SYSTEM :

Must Learn :

1. Parts of the brain and spinal and – Morphology; Hierarchical organization of CNS.
2. Sensory receptors – Classification, morphology; Threshold stimulus, chronaxie, generator potential; Efferent control; Grouping of sensory nerve fibres; Bell-Magendie law.
3. Spinal reflexes – Reciprocal inhibition, neuronal circuitry in the cord; Muscle tone; Motor units, power of muscles.
4. Ascending tracts of spinal cord; Pathways for different modalities of somatic sensation; perception and cognition.
5. Descending tracts of spinal cord – Upper motor neurons, their pathways & lesions; Control of muscle tone and voluntary movements.
6. Brain stem – Location and function of different centres. III to XII cranial nerves, their functions.
7. Cerebral cortex – layers; connections; types of fibres in white matter, commissures; Functional map of cortex; Inter-hemispheric communications.
8. Thalamus – Nuclei, connection and function.

9. Reticular formation; Physiology of sleep and Arousal; ECG.
10. Basal Ganglia – Connections, functions.
11. Cerebellum – morphology – deep nuclei and cortex – neuronal circuitry; connections of cerebellum; Functions.
12. Hypothalamus – Nuclei, functions.
13. Limbic system – parts, connections, functions.
14. Conditioned reflexes; Attention, Learning, Memory, Speech.
15. Cerebrospinal fluid – Formation, Circulation, Functions; Intracranial tension.

Nice to Know :

1. Encephalization, spinal shock; Hemispheric specialization.
2. Adaptation and potentiation; Weber-Fechner Law and Miller's Law; Hyperaesthesia, Anaesthesia.
3. Properties of synapses and reflexes; Laminae of Rexed; Spinal *.
4. & 5. Apoplectic Stroke; Syndrome of Hemisection and Transection of the spinal cord.
6. Central analgesic pathway; Decerebrate rigidity.
7. Brodmann's areas; Decorticate rigidity.
8. Metathalamus, Epithalamus – Circadian rhythm.
9. Disorder of sleep; Epilepsy; Effect of ions on neuronal excitability.
10. Effects of lesions in basal ganglia and related nuclei.
11. Types of tremor; Cerebellar function tests – signs of cerebellar disease.
12. Reward and punishment areas of brain.
13. Effects of lesions in amygdala, hippocampus, mammillary bodies.
14. Disorders of attention and learning; Aphasia and Amnesia, Senile dementia Learning in a case of split brain syndrome.
15. Hydrocephalus; Cause of headache.

VIII. SPECIAL SENSES

Must Learn :

VISION :

1. Functional anatomy of the eyeball and adnexa; Blinking; Lachrymation; Aqueous humour and intraocular pressure.
2. Image forming mechanism of the eye; control of the pupil and ciliary muscle; Accommodation to near vision; visual field, photoreceptors, visual pigments, transduction of light signal; Light and Dark Adaptation; Neuronal circuitry and information processing.
3. Retina – layers, photoreceptors, visual pigments, transduction of light signal; Light and Dark Adaptation; Neuronal circuitry and information processing.
4. Color vision – role of retina, tests.
5. Types of ganglion cells and optic nerve fibres; visual pathway, visual cortex; cognition of light and colour.
6. Movements of the eyeballs; types, control; stereopsis, cognition of depth.

HEARING :

7. External ear; Contents and functions of middle ear; Eustachian tube.
8. Inner ear; structure and function of cochlea – discrimination of pitch and loudness – Transduction of signal and excitation of auditory nerve.
9. Auditory pathway – processing at various levels; perception of sound.
- 10 Vestibular apparatus – Functional anatomy; Sensing of head position and movement; Transduction and sensory pathway – central connections.

SMELL TASTE:

11. Odorants olfactory mucosa, nerves and bulb; pathways to new and old areas of cerebral cortex; perception of smells.
12. Lingual papillae and taste buds – stimuli – pathways of taste – perception of tastes.

Nice to Know :

1. Ptosis, Enophthalmos; Xenophthalmia, Corneal and conjunctival reflexes; dangers of glaucoma.
2. Spherical and chromatic aberration, Leukoma and cataract; Refractory defects and there correction; Pathway for papillary light reflexes and accomadation.
3. Wald's visual cycle; Difference between peripheral and central retina; Retinal detachment.
4. Colour weakness and colour blindness – types.
5. Layers of superior colliculus and lateral geniculate body, Effect of lesions in visual pathway: Word blindness.
6. Oculokinetic nystagmus; Squint, Diplopia, Amyblyopia; Neuronal plasticity.
7. Impedance matching.
8. Cochlear microphonics; Audiogram, Presbycusis.
9. Efferent control of sense organ; Types of deafness – Tests for hearing – interpretation.
10. Vertigo after a spin, caloric test.
11. Anosmia, Parosmia; Hormonal modulation of smell perception (Exaltolide).
12. Polymorphism in taste perception (PTC); Ageusia, dysgeusia; modulation of taste (miraculin)

IX. ENDOCRINE GLANDSMust Learn :

1. General aspects of endocrine physiology; Histology and blood supply of the glands; Biosynthesis of protein and steroid hormones, transport, location of receptors, second messengers; control of secretion – hierarchy, feed forward and feed back regulation.
2. Hormones secreted, stimuli for secretion, transport, receptors, response of target organ cells and regulation of secretion in respect of each of the following endocrine glands :
 - a. Hypothalamus.
 - b. Neruohyophysis cerebri.
 - c. Adenohypophysis cerebri.
 - d. Epiphysis cerebri.
 - e. Thyroid.
 - f . Parathyroid.
 - g. Kidney.
 - h. Heart.
 - i. Adrenal cortex.
 - j. Adrenal medulla.
 - k. Islets of Langerhans.
 - l. Gastrointestinal tract.
3. Paracrine regulators : Production, mode of action and local effects of the Kinins, Histamine, Serotonin, Eicosanoids.

Nice to Know :

1. Mode of activation and mode of action of second messengers.
2. Biosynthesis, Circadian rhythm, rate of daily secretion, half life and catabolism of the hormones; Effects of hypo and hyper-secretion of each hormone – clinical syndromes; Interaction between hormones.
3. Chemistry of the autacoids.

X. REPRODUCTIONMust Learn :

1. Sexual differentiation of gonads and genitalia in utero; growth and development of the individual after birth; Puberty, Climacteric, senescence.
2. Male Sex organs, Spermatogenesis, Semen; Male sexual act, Capacitation, Fertilization.
3. Hormones secreted by testes – their actions; control of secretion.
4. Female sex organs, Oogenesis; Menstrual cycle; changes in ovary, uterus, vagina – role of hormones.
5. Female sexual act, fertilization, conception; methods of contraception.
6. Pregnancy; cause of amenorrhoea; Functions of placenta; Physiology of mother and foetus.
7. Parturition : Initiation and stages of labour; Breast development and lactation – hormonal control.

Nice to know :

1. Hermaphroditism : OX, XXY, XXX, XYY syndromes; Cryptorchidism.
2. Secretion of sertoli cells; Male sterility, Impotence.
3. Biosynthesis and catabolism of androgens; Quevedoces.
4. Biosynthesis and catabolism of oestrogens and progesterone; Premenstrual tension; Anovulatory cycles.
5. Determination of day of ovulation; infertility.
6. Foetoplacental unit; Immunological test for pregnancy.
7. Lactation amenorrhoea; Colostrum Vs Milk; Benefits of breast feeding.

N.B. : (1) SEQUENCE OF TEACHING SYSTEMS : It is recommended that the order given in the syllabus be followed.

(2) QUESTION PAPERS : Examination questions should be asked mostly from the “MUST LEARN” category. Questions asked from the “NICE TO KNOW” category should not exceed 20% of the total marks in each paper.

TEACHING HOURS - **480 HRS.**

Practical Physiology for I M.B.B.S course:

Note: Methods of performing experiments may differ from institution to institution. As far as possible contemporary methods must be used. Animal experiments must be limited to demonstration on frog tissues only. Blood counts should be preferably done on collected

blood wherever possible since finger prick methods give high variability.

Haematology Experiments:

Major

- 1) Total Leucocyte count
- 2) Erythrocyte count
- 3) Differential Leucocyte count
- 4) Absolute Eosinophil count

Minor

- 1) Estimation of haemoglobin :
- 2) Packed cell volume
- 3) Erythrocyte sedimentation rate
- 4) Blood grouping: Rh factor, ABO system
- 5) Bleeding time (preferably by the method of Ivy)
- 6) Clotting time (preferably by the method of Lee and White)

Note: The following experiments may be shown as demonstration only – specific gravity of blood, examination of blood smear, fragility of RBC, examination of bone marrow smear, Reticulocyte count, platelet count.

Cardiovascular system:

1. Demonstrate the effect of posture on blood pressure and heart rate.
2. Demonstrate the effect of mild/severe exercise on blood pressure and heart rate.
3. Examination of peripheral pulses (arterial and venous)
4. Auscultation of pericardial areas
5. Trace the limits of cardiac dullness
6. Location of apical impulse.

Demonstration only.-

1. Electro Cardiography
2. Lewi's Triple response
3. Reactive hyperaemia following occlusion
4. Demonstrating the effect of drug like adrenaline and histamine on the skin.

Respiratory system:

1. Demonstrate the effect of posture on the vital capacity.
2. Determination of Peak Expiratory Flow Rate.
3. Recording of the chest movement of the subject and demonstration of the effects of voluntary breath-holding and voluntary hyperventilation.
4. Demonstrate changes in tidal volume before and after exercise.
5. Examination of the Respiratory system by auscultation.
6. Percussion of lung fields.
7. Examination of Respiratory system by inspection and palpation.
8. Effect of hyperpnoea on breath holding time.

Demonstration only: Computerised spirometer/spirograph.

NERVOUS SYSTEM:

1. Demonstrate the pupillary reflexes on the subject provided.

2. Examine the motor system of any one upper limb/lower limb of the subject provided.
3. Examine the sensation of pain and temperature/touch, vibration and stereognosis of the subject provided.
4. Examine the first cranial nerve.
5. Assess the visual acuity and visual field of the subject.
6. Examine the cranial nerves 3,4 and 6
7. Examine the trigeminal nerve in the subject provided.
8. Examine the facial nerve in the subject.
9. Examine the 8th nerve in the subject provided.
10. Examine the cranial nerves 9 to 12 in the subject provided.
11. Demonstrate the stretch reflexes.
12. Demonstrate the superficial reflexes.
13. Do the cerebellar function tests.

Amphibian Experiments: Brief demonstration with nerve-muscle and heart preparations is recommended.

Charts: Each institution is encouraged to prepare fresh charts every year. These should be based on :

- a) Clinical problems
- b) Physiological principles.
- c) Calculations
- d) Graphs, Photographs, Diagrams.

EVALUATION:

Three clinical experiments (minor changed to clinical)

I.A.		MARKS
Theory	-	40
Practical	-	30 *
Record	-	10
Total =		80 Marks.

UNIVERSITY EXAMINATION PATTERN - PHYSIOLOGY

THEORY :

Two papers of 3 hours duration and 100 marks each

Paper – I

General physiology, Blood and Lymph, Digestion, Excretion, Endocrine Glands and Reproduction.

Paper – II

Respiration, Cardiovascular system, Central Nervous System and Special Senses.

* 30th SAB dated 28.12.2005

PATTERN OF QUESTION PAPER : **

Essay Questions	-	2 x 15 Marks	= 30 Marks
Short Notes	-	10 x 5 Marks	= 50 Marks
Short Answer Questions	-	10 x 2 Marks	= 20 Marks

Total = 100 Marks

Oral **40 Marks (10 per Examiner)**

PRACTICAL EXAMINATION **80 MARKS**

Practical – 1 (1 ½ hrs., Haematology) 40 Marks

Haematology : Major – 20

Minor - 10

Chart on Paper – I portions - 10

(Calculation or Comment)

40 Marks

Practical – 2 (1 ½ hrs., Clinical Physiology) : 40 Marks

Three minor experiment – }

One each on Respiratory, } --- 30 Marks (10x3)

Cardiovascular & Nervous Systems.

Chart on Paper – II portions --- 10 Marks

(Calculation or Comment)

40 Marks

PRACTICAL EXAMINATION:

A maximum of 25 candidates per day of practical examination is desirable.

MARKS QUALIFYING FOR A PASS :

50% in Theory	100/200
50% in Theory including Viva	120/240
50% in Practical	40/80
35% in I.A.	28/80
Grand Total =	----- 200/400 -----

**** MCQ's withdrawn from August 2008 onwards – 35th SAB held on 20.5.2008**

I M.B.B.S.
BIOCHEMISTRY

Biochemistry includes Medical Physics and Molecular Biology.

(i) GOAL:

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

(ii) OBJECTIVES:

(A) KNOWLEDGE:

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

- (1) describe the molecular and functional organisation of a cell and lies its sub-cellular components;
- (2) delineate structure, function and inter-relationship of biomolecules and consequences of deviation from normal;
- (3) summarize the fundamental aspects of enzymology and clinical application wherein regulation of enzymatic activity is altered.
- (4) describe digestion and assimilation of nutrients and consequently or malnutrition consequences of malnutrition;
- (5) integrate the various aspects of metabolism and their regulatory pathways;
- (6) explain the biochemical basis of inherited disorders with their associated sequelae;
- (7) describe mechanisms involved in maintenance body fluid and pH homeostasis;
- (8) outline the molecular mechanisms of gene, expression and regulation the principles of genetic engineering and their application in medicine.
- (9) summarize molecular concept of body defences and their application in medicine.
- (10) outline the biochemical basis of environmental health hazards, biochemical basis of cancer and carcinogenesis;
- (11) familiarize with the principles of various conventional and specialised laboratory investigations and instrumentation analysis and interpretation of a given data.
- (12) suggest experiments to support theoretical concepts and clinical diagnosis.

(B) SKILLS:

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

- (1) make use of conventional techniques/instruments to perform biochemical analysis relevant to clinical screening and diagnosis;
- (2) analyze and interpret investigative data;
- (3) demonstrate the skills of solving scientific and clinical problems and decision making.

(C) INTEGRATION:

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

THEORY**Objective I**

Describe the molecular and functional organisation of a cell:

The structure of cell and intercellular components. The structure and functions of Plasma membrane, cytosol, Endoplasmic reticulum, Organelles like Nucleus, Mitochondria, lysosomes, Ribosomes, Golgi apparatus, peroxisomes, The composition of nucleosomes.

A brief account of the sub cellular fractionation and markers for each organelle and fraction.

Objective II

Structure and function of biomolecules and the consequences of derivation from normal:
 Structure of amino acids, classification of amino acids, their properties, Peptide bond formation.
 Amino acids that are present in proteins. Amino acids that are not present in proteins.
 Structure of Proteins: General, three dimensional structure of specific proteins with their structure and the suitability of their structure to their functions. – Myoglobin, Hemoglobin, Insulin, Collagen, Elastin, naturally occurring peptides.

Clinical:

Muscle injury and myocardial infarction – Myoglobinuria

Emphysema – the Collagen and elastin changes in the lungs.

Ascorbic acid deficiency – Collagen abnormalities.

Lysyl oxidase – Lathyrism and role of copper.

Separation techniques – Electrophoresis and chromatography.

Plasma proteins and their functions. Electrophoresis of Serum proteins. Interpretation of Serum Protein Electrophoresis patterns of – Cirrhosis liver, Nephrotic syndrome.

Multiple Myeloma when compared to normal.

Structure and functions of Carbohydrates:

Glucose, Fructose, Galactose, Pentoses, Lactose, Maltose, Sucrose, Cellulose, Starch, Glycogen, Glycosamino glycans, Glycoproteins, blood group antigens.

Chromatographic separation of mono and disaccharides.

Structure and functions of Lipids.

Fatty acids – Saturated, unsaturated polyunsaturated acids.

Triacyl glycerol, cholesterol, Phospholipids, gangliosides, Eicosanoids, Membrane structure, Fluid mosaic

Model of membrane, membrane transport.

Lipoproteins

Clinical:
Surfactant, Liposomes.

Structure and functions of Nucleic acids:
Purines and pyrimidines, Nucleosides, Nucleotides, RNA, DNA.
Histones – Their role in DNA arrangement in Chromosomes GENES.

Objective III:

Fundamental aspects of enzymology and clinical application.

Enzyme – Nomenclature, Classification, structure, cofactor, Enzyme turnover (half life), Intracellular location of enzymes, General properties – effect of temperature and pH, Active site, Zymogen activation, Isozymes, specificity, K_M , its role in the activity of enzyme in different tissues. Enzyme inhibitors.
Enzyme regulation: Allosteric, feedback regulations, Product inhibition, Rate limiting enzymes. Constitutive and inducible enzymes, Covalent modifications.
Clinical: Enzymes in clinical Diagnosis.

Objective IV:

Vitamins:

Water soluble – source, absorption, metabolism and coenzyme functions of Thiamine, Riboflavin, Biotin, Niacin, Pantothenic acid, Pyridoxine.
Their deficiency manifestations. Their recommended Dietary Allowance.
Ascorbic acid: Source, coenzyme functions, its role in collagen synthesis, reducing properties, antioxidant properties, hydroxylation reactions. Deficiency manifestations, scurvy, RDA.
Folic acid, source, its role in one carbon metabolism and purine synthesis megaloblastic anemia, RDA.

Fat soluble Vitamins:

Beta carotene – its antioxidant property, its role as a provitamin.
Vitamin A – The three forms of the vitamin, conversion of carotenes to Vitamin A absorption of Vitamin A. Storage and transport in plasma. Visual pigments, the chemistry of vision and colour vision, Deficiency manifestations, night blindness, RDA.
Hypervitaminosis A.

Vitamin D – Active forms, Role of skin, liver and kidney in the synthesis of calcitriol. The role of calcitriol in calcium and phosphorous maintenance with the help of PTH. The deficiency manifestations – rickets. Hyper and hypoparathyroidism. Hypervitaminosis D.

Vitamin E – Source, RDA and functions of E – Role of selenium and Vitamin E function. Its role in glutathione peroxidase.
Vitamin K – Source, RDA, Gamma-carboxy glutamate residues and its role in calcium binding.
Vitamin K dependent proteins and coagulation factors.
Anti vitamins.

Objective V and VI:

Integrated Metabolism and inherited disorders.

Bioenergetics, the role of ATP, Biologic oxidation, the respiratory chain and oxidative phosphorylation.
Digestion and absorption of carbohydrates, absorption of sugars, Digestive enzymes.

Clinical:

Lactose intolerance. Acute pancreatitis, Osmotic diarrhoea, Cholera.

The citric acid cycle – catabolism of acetyl CoA...

Glycolysis, Gluconeogenesis, pentose phosphate pathway, metabolism of glycogen, metabolism of fructose and galactose, Maintenance of Blood glucose.

Clinical: Diabetes Mellitus, Glucose Tolerance test, Glycosuria, Essential Fructosuria, Fructose Intolerance. Galactosemias. Glycogen storage disorders.

Digestion of lipids. Role of Bile salts and bile on lipid digestion and absorption, formation of chylomicrons and lymphatic entry of lipid into circulation, absorption of fat soluble vitamins.

Fatty acid oxidation (beta, alpha and omega) Metabolism of Propionyl CoA, Fatty acid Biosynthesis, ketone bodies synthesis and breakdown. Metabolism of eicosanoids, lipoproteins metabolism, cholesterol synthesis, and its control. Compounds derived from cholesterol. Tri Glyceride Synthesis and storage.

Clinical: Diabetic ketosis, starvation ketosis, hyperlipidemias, lipid profile – values interpretation. Digestion of proteins, Mechanism of amino acid absorption.

Calcium proteins, transamination and deamination reactions, disposal of the amino nitrogen, catabolism of the carbon skeleton of tyrosine, phenyl alanine, branched chain amino acids, methionine and transmethylation reactions, tryptophan, histidine, specialised compounds derived from aminoacids.

Clinical:

Hyperammonemias, Phenyl Ketonuria, albinism, maple syrup urine disease, alkaptonuria, homocystinuria, Hartup disease.

BUN, plasma urea levels serum creatinine levels. Their use in kidney function evaluation.

Brief outline of purine synthesis and degradation.

Hemoglobin, chemistry of respiration, fetal and embryonic hemoglobin's. Role of 2, 3 biphosphoglycerate. Bohr effect, binding of Oxygen, Carbon di oxide, and hydrogen ion in the hemoglobin molecule. Forms of hemoglobins present in adults, abnormal hemoglobins, positive co-operativity, the ability of hemoglobin to accept the deliver oxygen.

Clinical:

Haptoglobins, Sickle cell disease, thalassemias, Carbaminohemoglobin, methemoglobin, heme synthesis, breakdown of hemoglobin, bilirubin metabolism, jaundice, porphyrias.

Metabolic integration

Fate of Glucose – 6 phosphate, Acetyl CoA.

Metabolic adaptations in fed state, starvation. Metabolism in specific tissues and organs RBC, liver, muscle, heart, brain, adipose tissue.

Control operating in all the metabolic pathways.

Purine – brief outline of synthesis and degradation.

Clinical: Gout, HGPRT deficiency.

Objective VII:

Maintenance of body fluids and pH:

Intracellular and extracellular electrolytes, maintenance of body water, electrolyte balance, maintenance of pH – the role of blood buffers, respiratory control, role of the kidney, acidosis, alkalosis. Their diagnosis. The compensatory mechanisms. Osmolality, anion gap and blood gas measurements – their clinical use.

Objective VIII:**Nutrition:**

Major nutrients, BMR, energy derived from carbohydrates, fats and proteins, SDA, Dietary fibres.

Clinical:

Protein calorie malnutrition, protein malnutrition – kwashiorkor and Marasmus. Their diagnosis and dietary correction.

Obesity.

Mineral metabolism: Iodine, Zinc, Iron, copper, Magnesium, selenium and other trace minerals.

Objective IX:

Hormones:

Mechanism of hormone action.

Objective X:

Molecular mechanisms of gene expression:

DNA organisation, replication and repair. Histone, nucleosomes, chromosomes, mutations. RNA – different RNA's their synthesis, processing and modification. Exons and introns, Ribozymes.

Protein synthesis and the genetic code. Mutations – point mutations, frame shift, missence. Nonsense mutation.

Suppressor RNA molecules and their role on mutations.

Post translational modifications with examples.

Antibiotics and their effect on translation.

Regulation of GENE expression: Enhancers, repressors, binding of regulatory proteins to DNA.

Operon hypothesis.

Recombinant DNA technology and its application, blot techniques and their application.

Polymerase chain reaction, prenatal diagnosis, restriction fragment length polymorphism, gene therapy, transgenic animals, reverse transcription.

Objective XI:

Molecular concept of defence

Immunoglobulins – structure, different types, their major functions, monoclonal antibodies, synthesis – hyper and hypo gammaglobulinemias. Immune deficiency.

Objective XII:

Environmental health hazards, biochemistry of cancer and carcinogenesis:
Occupational hazards, environmental pollutants.

Xenobiotics – Detoxification.

Carcinogens, DNA repair, Cell cycle control, oncogenes, mutagenesis, tumor markers.

Anticancer agents.

Objective XIII:

Specialised laboratory investigations:

Liver function tests, kidney function tests.

PRACTICAL SYLLABUS**Teaching Hours – 240 Hrs.****Exercise:**

1. Reactions of carbohydrates to identify – Mono, di and polysaccharides. Tests – Molisch, Benedict's Barfoeds, Foulger's, Seliwanoff's, Bial's.

Starch – Iodine test, Benedict's, hydrolysis – followed by benedict's and iodine tests.

2. Reactions with proteins – Precipitation with half and full saturation salt solutions. Heat coagulation test, colour reactions for amino acids – albumin, casein.

Milk analysis to record calcium, Phosphorus, Lactose.

3. Spectroscopy and derivatives of Hemoglobin.

4. Constituents of normal urine.

5. Abnormal constituents of urine, protein, reducing sugar, blood, acetone, bile salts, bile pigments.

6. Quantitative experiments

Estimation of:

Plasma glucose

Plasma urea

Serum total proteins

Serum creatinine

Urine creatinine

Serum Uric Acid

Serum Phosphorous

Serum Alkaline phosphatase

Fluid proteins estimation

Clinical Exercise:

- Diabetes Mellitus : Plasma Glucose, Urine Glucose and acetone.
GTT – Plasma Glucose and Urine Glucose.
- CSF analysis : CSF – Glucose and Proteins.
- Nephrotic Syndrome : Serum Total proteins, 24 – hour urine proteins.
- Renal Functions tests : Creatinine clearance – Serum and 24 – hour urine creatinine estimation.
Plasma Urea and Urine Albumin and Blood
- Liver Function Tests : Serum Bilirubin, Urine Bile salts and pigments.
Serum Total Proteins
- Pancreatic Function Tests: Plasma glucose, Urine glucose (Serum amylase values given by the skilled assistant for interpretation)
- Galactosemia : Galactose in Urine.
- Essential Fructosuria : Serum and 24-hours urine phosphorous.
- Nutrition : To identify the essential amino acids in proteins.

SPOTTERS

1. Serum protein electrophoresis pattern.
Normal, Nephrotic syndrome, cirrhosis liver, multiple myeloma.
2. Identification of Hemoglobin Derivatives using Spectroscope.
Oxy, reduced and Methemoglobin.
3. Identification of – Hemin crystals, Osazones of glucose, fructose, Maltose, Lactose.
4. Nutrition:
Identify source for Beta carotene, Ascorbic acid, Iron, Folic acid.
5. Egg and Milk: The biological values for the proteins present in these.
6. Chromatogram of Phenyl Ketouria.
7. Electrophoretic patterns – Normal serum proteins, Nephrotic syndrome, (Serum proteins) Cirrhosis liver, Multiple myeloma.
8. Urinometer.
9. Colorimeter.
10. pH meter.
11. Centrifuge.

12. Charts: Acidosis – Metabolic and Respiratory.
Alkalosis – Metabolic and Respiratory.

Myocardial infraction – The enzyme levels immediately after the onset of Pain, after 6 hour, 24 hours, one week.

Lactate Dehydrogenase Isoenzymes (Electrophoretic pattern)

Multiple Myeloma (with Electrophoretic pattern)

Cirrhosis liver (with Electrophoretic pattern)

Nephrotic syndrome (with Electrophoretic pattern)

EVALUATION

Internal Assessment :

Theory :	40 marks
Practical :	30 marks
Record :	10 marks

Total : 80 marks

UNIVERSITY EXAMINATION PATTERN – BIO - CHEMISTRY

THEORY:

TWO Papers of 3 hours duration and 100 marks each.

PAPER -I

1. Molecular and functional organisation of the cell and its subcellular components.
2. Chemistry, Digestion and absorption of carbohydrates, Metabolism of Carbohydrates and disorders of carbohydrate metabolism.
3. Chemistry, Digestion and absorption of lipids, Metabolism of lipids and disorders of lipid metabolism.
4. Enzymes.
5. Vitamins.
6. Electron transport chain and Biological oxidation.
7. Citric acid Cycle and Metabolic integration.
8. Nutrition.
9. Heme synthesis, Porphyrins, hemoglobin and metabolism of Bilirubin.

PAPER - II

1. Chemistry, Digestion, absorption and metabolism of proteins, inborn errors in Protein metabolism.
2. Chemistry of purines, metabolism of Purines, Hyperuricemias.
3. Molecular Biology.
4. Maintenance of Fluid and Electrolytes.
5. Maintenance of pH and acid base disorders.
6. Xenobiotics and cancer chemistry.
7. Minerals.
8. Hormones.
9. Laboratory instrumentation, investigation and interpretation.

PATTERN OF QUESTION PAPER : **

Essay Questions	-	2 x 15 Marks	= 30 Marks
Short Notes	-	10 x 5 Marks	= 50 Marks
Short Answer Questions	-	10 x 2 Marks	= 20 Marks
Total =			100 Marks

ORAL..... 40 Marks

PRACTICALS: 80 MARKS

Practical exercise – I 90 minutes.	Major experiment with case discussion	40 marks
Practical exercise – II	Minor experiment	20 marks
Spotters.....		10 marks
Charts		10 marks
Total		80 Marks

PRACTICAL EXAMINATION:

A maximum of 25 candidates per day of practical examination is desirable.

**** MCQ's withdrawn from August 2008 onwards – 35th SAB held on 20.5.2008**

MARKS QUALIFYING FOR A PASS

50% in Theory	=	100/200
50% in Theory including Viva	=	120/240
50% in Practical	=	40/80
35% in I.A.	=	28/80

Grand Total	:	200/400

I M.B.B.S.**COMMUNITY MEDICINE**

It would be desirable to ensure that teaching of Community Medicine is community oriented and community based learning experience will be more rewarding if problem solving opportunities are incorporated and teaching is carried out in an integrated fashion.

LIST OF TOPICS**60 Hrs.**

1. Introduction to Community Medicine.
2. Concept of Health and disease.
3. Seminar on above topic.
4. Mode of transmission of disease and dynamics of diseases.
5. Natural history of disease and concept of prevention.
6. Seminar on above topics.
7. Introduction to health delivery system in rural and urban area in India, social factors related to health, disease & disability in context of urban and rural area.
8. Concept of primary health care – compounds of primary health care – Health for all.
9. Seminar on above topics.
(Dynamics of community behaviour).
10. Demography and demographic level in India and other countries.
11. National demographic goal.
12. Seminar on the above topics.
(Principles of Sociology including demographic population dynamics).
13. Social factors and morbidity pattern in rural area and urban area.
14. Seminar on the above topic.
15. Behavioural Science and Psychology

I &II Semester – List of visits to Institutions

- 1-3 Primary Health Centres – 3 centres
- 4-6 Urban Health Posts - 3 centres
- 7. Water works
- 8. Sewage farming
- 9. Water & Food analysis Laboratory
- 10. Institute/Department of Mental Health
- 11. Institute of Rehabilitation
- 12. Milk Diary
- 13. Nutrition Rehabilitation Centre

Suggtested Time-Table

As per Medical Council of India

- (i) Theory, Seminars, Practicals - 30 Hours
- (ii) Visits to Institutions of Health - 30 Hours
(Field Visit)

Adapted Time /Table

Starting from August,. Two continuous Hours of classes per week (11.00 A.M. to 1.00 P./M.) on any day of the week for 15 weeks (2 Hours x 15 weeks = 30 Hours as per recommendation of Medical Council of India) should be conducted upto the end of November. Also 5 field visits of 6 Hours duration (7.00 A.M. to 1.00 P.M.) Forenoon should be organized once in a month from September to January.
