DPU

Dr. D. Y. PATIL VIDYAPEETH, PUNE
(Deemed to be University)

Regulations and Syllabus for I – MBBS (Pre - Clinical Subjects)

2014 - 15
(Amended / Revised upto July 2019)

DPU

Dr. D.Y. PATIL VIDYAPEETH, PUNE
(Deemed to be University)
(Re-accredited by NAAC with a CGPA of 3.62 on a four point scale at 'A' Grade)
(An ISO 9001 : 2015 Certified University)

Dr. A. N. Suryakar
Registrar

Ref. No. : DPU/875-VII/2019
Date : 11/09/2019

NOTIFICATION

Whereas in pursuance of the following decisions taken by the Board of Management, it is hereby notified to all concerned that the **"Syllabus for I-M.B.B.S. (Pre-Clinical Subjects) – 2014-15"** is **revised upto July 2019** and hereby published.

- Changes in syllabus for UG and PG in Anatomy, Biochemistry, Community Medicine, vide **Resolution No. BM-07-(iii)-4 dated 28th January, 2014.**
- Updation in UG syllabus of Biochemistry vide **Resolution No. BM-04(i)-15, dated 31st March, 2015.**
- Adoption of **"Double Evaluation System"** for UG Answer Papers **vide Resolution No. BM-07-15 dated 31st March, 2015.**
- Inclusion of one lecture on Physiology of Yoga and two lectures on Sports Physiology in the Physiology subject, **vide Resolution No. BM-26(ii)-15, dated 29th December, 2015.**
- Introduction of Bioethical aspects in various chapters of all subjects vide **Resolution No. BM-26(xi)-15, dated 29th December, 2015.**
- Modifications in I MBBS University Practical Examinations schedule vide **Resolution No. BM-17(i)-16, dated 22nd September, 2016.**
- Inclusion of Curriculum of Bioethics in UG Anatomy, Physiology and Biochemistry subjects **vide Resolution No. BM-17(viii)-16, dated 22nd September, 2016.**
- Introduction of Sectional Anatomy and Sonographic Anatomy, an Integrated approach towards Radiology and Imaging Sciences in first year in the Subject of Anatomy UG curriculum, **vide Resolution No. BM-20(ii)-17, dated 29th July, 2017.**
- Inclusion of Lectures in Aviation and Space Physiology in Physiology subject of the first year MBBS curriculum vide **Resolution No. BM-20(iii)-17, dated 29th July, 2017.**
- Inclusion of theory lectures in cross sectional and ultrasound anatomy in the syllabus of first year of MBBS curriculum vide **Resolution No.BM-38(i)-17, dated 27th December, 2017.**
- Introduction of one of the questions as MCQ test in continues assessment examinations in Pre-Clinical subjects vide **Resolution No.BM-38(ii)-17, dated 27th December, 2017.**
- To replace spotting in Anatomy practical examination of UG examinations by clinical work stations like objective structured practical examination **vide Resolution No. BM-38(iii)-17, dated 27th December, 2017.**
- Introduction of surface anatomy on mummified bodies along with living anatomy in Anatomy practical examinations **vide Resolution No. BM-38(v)-17, dated 27th December, 2017.**
- Inclusion of a lecture on study and practice of Yoga on 2nd and 4th Saturday of every month for First Year MBBS students, **vide Resolution No. BM-38(vi)-17, dated 27th December, 2017.**

Dr.D.Y.PATIL VIDYAPEETH PIMPRI, PUNE-18.

Sant Tukaram Nagar, Pimpri, Pune - 411018, Maharashtra (India)
Tel. : +91-20-27805000, 27805001 ▪ Fax : +91-20-27420010 ▪ Email : info@dpu.edu.in

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- Changes in the syllabus of Ist year MBBS practical examinations of Biochemistry subject **vide Resolution No. BM-35(i)-18, dated 12th October, 2018.**
- Implementation of competency based curriculum for first year MBBS students as per guidelines of MCI **vide Resolution No.BM-10(i)-19, dated 12th April, 2019.**
- Interdisciplinary subjects of M.B.B.S, M.D./M.S. and Super-specialty (D.M./M.Ch.) Programs under the Faculty of Medicine **vide Resolution No. BM-10(viii) dated 12th April, 2019.**
- University Practical Examination Patten as per Competency Based Medical Education (**CBME**) curriculum of MCI vide Resolution **No. BM-27(i)-19, dated 30th July, 2019.**
- Graduate Attributes, Programme Outcomes (POs), Course Outcomes (Cos) outcome analysis of POs and COs and mapping with objectives for all courses of UG and PG Programmes of Pre-Clinical and Medicine Subjects under the Faculty of Medicine **vide Resolution No. BM-27(x)-19 dated 30th July, 2019.**
- Interdisciplinary subjects of M.B.B.S, M.D./M.S. and Super-specialty (D.M./M.Ch.) Programs under the Faculty of Medicine **vide Resolution No. BM-27(xi) dated 30th July, 2019.**

The **Syllabus for I-M.B.B.S. (Pre-Clinical Subjects) – 2014-15 Revised upto July 2019** will be useful to all the concerned. This will come into force with immediate effect.

Dr. D. Y. PATIL VIDYAPEETH PIMPRI, PUNE-18. Deemed to be University

(Dr. A. N. Suryakar)
Registrar

Copy to:

1. PS to Chancellor for kind information of Hon'ble Chancellor, Dr. D. Y. Patil Vidyapeeth, Pune.
2. PS to Vice Chancellor for kind information of Hon'ble Vice Chancellor, Dr. D. Y. Patil Vidyapeeth, Pune.
3. The Dean, Dr. D. Y. Patil Medical College Hospital & Research Centre, Pimpri, Pune
4. The Controller of Examinations, Dr. D. Y. Patil Vidyapeeth, Pune.
5. Director (IQAC), Dr. D. Y. Patil Vidyapeeth, Pune.
6. Web Master for uploading on Website.

REGULATIONS AND SYLLABUS FOR M.B.B.S. DEGREE COURSE

1. SHORT TITLE AND COMMENCEMENT

These regulations may be called "The Regulations for the Bachelor of Medicine and Bachelor of Surgery Degree Course of Dr. D. Y. Patil Vidyapeeth, Pune (Deemed to be University)

These regulations shall come into force from the academic year 1997 - 1998 and amendments notified by MCI from time to time.

2. ELIGIBILITY FOR ADMISSION TO M.B.B.S

DEGREE COURSE QUALIFICATION FOR ADMISSION:

No candidate shall be allowed to be admitted to the first year Bachelor of Medicine and Bachelor of Surgery (MBBS) Course until:

He/She has completed the age of 17 years on or before 31st December of the year of admission to the MBBS course.

He / She has passed 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 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 of 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 recognised examining body with **Physics, Chemistry and Biology / Bio-technology** 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/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

(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, 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/Bio-technology** including practical test in each of these subjects and English.

3. PROCEDURE FOR SELECTION TO MBBS COURSE

1] There shall be a uniform entrance examination to all medical educational institutions at the undergraduate level namely 'National Eligibility-cum-Entrance Test for admission to MBBS course in each academic year and shall be conducted under overall supervision of the Ministry of Health & Family Welfare, Government of India.

2] The "designated authority" to conduct the 'National Eligibility-Cum-Entrance Test' shall be the Central Board of Secondary Education or any other body/organization so designated by the Ministry of Health & Family Welfare, Government of India, in consultation with the Medical Council of India.

3] The language and manner of conducting the 'National Eligibility-Cum-Entrance Test' shall be determined by the "designated authority" in consultation with the Medical Council of India and the Ministry of Health and Family Welfare, Government of India.

4] In order to be eligible for admission to MBBS Course for a academic year, it shall be necessary for a candidate to obtain minimum of marks at 50th percentile in 'National Eligibility-cum-Entrance Test to MBBS course' held for the said academic year. However, in respect of candidates belonging to Scheduled Castes, Scheduled Tribes, Other Backward Classes, the minimum marks shall be at 40th percentile. In respect of candidates with benchmark disabilities specified under the Rights of Persons with Disabilities Act, 2016, in terms of Clause 4(3) above, the minimum marks shall be at 45th percentile. The percentile shall be determined on the basis of highest marks secured in the All-India common merit list for admission in 'National Eligibility-cum-Entrance Test for admission to MBBS course.

Provided when sufficient number of candidates in the respective categories fail to secure minimum marks as prescribed in National Eligibility-cum-Entrance Test held for any academic year for admission to MBBS Course, the Central Government in consultation with Medical Council of India may at its discretion lower the minimum marks required for admission to MBBS Course for candidates belonging to respective categories and marks so lowered by the Central Government shall be applicable for the said academic year only.

4. REGISTRATION/ Eligibility Certificate

A candidate admitted to the course shall register with this University by remitting the prescribed fees along with the prescribed application form for registration duly filled in, within the stipulated date.

5. DURATION OF THECOURSE

The period of certified study and training for the course of Degree of Bachelor of Medicine and Bachelor of Surgery shall extend over a period of four and half academic years and one year of Compulsory Rotatory Resident Internship before the award of the Degree.

6. CURRICULUM

The curriculum and the syllabus for the course shall be as prescribed from time to time by the appropriate bodies.

COMMENCEMENT OF THECOURSE

The first year MBBS Course shall begin on or before 1st August of every academic year.

7. TRAINING PERIOD AND TIME DISTRIBUTION

(a) Every student shall undergo a period of certified study extending over four and half academic years divided into 9 semesters, (i.e. of 6 months each) from the date of commencement of study for the subjects comprising the medical curriculum to the date of completion of examination and followed by one year Compulsory Rotatory Residential Internship. Each semester will consist of approximately 120 teaching days of 8 hours duration including one hour for lunch.

(b) The period of four and half years is divided into three phases as follows:

- Phase - I (two semesters) consisting of pre-clinical subjects (Anatomy, Physiology, Biochemistry and introduction to Community Medicine including Humanities). Sixty hours are allocated for introduction to Community Medicine including Humanities, and rest of the time shall be and again divided between Anatomy and Physiology (2/3) plus Biochemistry (1/3)combined.

- Phase - II (three 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 allotted time for para-clinical teaching, approximately equal time be allotted to Pathology, Pharmacology, Microbiology and Forensic Medicine, Community Medicine combined (1/3 for Forensic Medicine and 2/3 for Community Medicine).

- Phase - III (four semesters) Continuation of study of clinical subjects for seven semesters after passing Phase -I

The clinical subjects to be taught during Phase II and III are Medicine and its allied specialities, Surgery and its allied specialities, Obstetrics and Gynaecology and Community Medicine.

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

(c) The first 2 semesters (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. No student will be permitted to join the Phase II (Para - clinical) group of subjects until he has passed in all the PhaseI.

(d) After passing pre-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 will be integrated into the teaching of clinical subjects where relevant.

(e) Supplementary examination will be conducted as follows:
Supplementary examination may 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.

8. PHASE DISTRIBUTION AND TRAINING OFEXAMINATIONS:

6 Months	6 Months	6 Months	
1	2		I[st] Professional examination (during 2[nd]semester)
3	4	5	II[nd] Professional examination (during 5[th] semester)
6	7		III[rd] Professional Part I examination (during 7[th] semester)
8	9		III[rd] Professional Part II (Final Professional) (during 9[th] semester)

(a) Passing in I[st] Professional examination is compulsory before proceeding to Phase II training.

(b) A student who fails in the II[nd] Professional examination, shall not be allowed to appear for III[rd] Professional Part I examination unless he/she passes all subjects of II[nd] Professional examination.

(c) Passing in III[rd] Professional (Part I) is compulsory for being eligible for III[rd] Professional (Part II) examination.

During third to ninth semesters, clinical postings of three hours duration daily as specified is suggested for various departments, after introductory course in Clinical Methods in Medicine and Surgery of two weeks each for the whole class.

9. ACADEMICTERMS

First M.B.B.S
Part-I & Part II - 1[st] August to June 15[th]

10. CUT OFFDATES

As decided by the appropriate bodies from time to time.

11. EXAMINATIONDATE

There shall be two sessions of University examinations in an academic year, viz., June and December.

12. WORKING DAYS IN AN ACADEMICYEAR

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

13. ATTENDANCE REQUIRED FOR ADMISSION TO EXAMINATION

(a) No candidate shall be permitted to any one of the parts of MBBS Examinations unless he/she attended the course in the subject for the prescribed period and produces the necessary certificate of study, attendance and progress from the Head of the Institution.

(b) A candidate is required to put in minimum 75% of attendance in a subject for appearing in the examination, inclusive of attendance in non-lectures teaching, i.e. seminars, group discussions, tutorials, demonstrations, practicals, Hospital (Tertiary, Secondary, Primary) postings and bed side clinics, etc.

(c) A candidate lacking in the prescribed attendance and progress in any one subject in theory and practical / clinical in the first appearance shall not be permitted for admission to the university examination in that subject only.

14. MIGRATION/TRANSFER OF CANDIDATES

The Medical Council of India Regulations relating to Migration will be followed by the University as reproduced below:

(1) Migration of students from one medical college to another medical college may be granted on any genuine ground subject to the availability of vacancy in the college where migration is sought and fulfilling the other requirements laid down in the Regulations. Migration would be restricted to 5% of the sanctioned intake of the college during the year. No migration will be permitted on any ground from one medical college to another located within the same city.

(2) Migration of students from one College to another is permissible only if both the colleges are recognized by the Central Government under section 11(2) of the Indian Medical Council Act,1956 and further subject to the condition that it shall not result in increase in the sanctioned intake capacity for the academic year concerned in respect of the receiving medical college.

(3) The applicant candidate shall be eligible to apply for migration only after qualifying in the first professional MBBS examination. Migration during clinical course of study shall not be allowed on any ground.

(4) For the purpose of migration an applicant candidate shall first obtain "No Objection Certificate" from the college where he is studying for the present and the university to which that college is affiliated and also from the college to which the migration is sought and the university to it that college is affiliated. He / She shall submit his application for migration within a period of 1 month of passing (Declaration of result of the 1st Professional MBBS examination) along with the above cited four "No Objection Certificates" to: (a) the Director of Medical Education of the State, if migration is sought from one college to another within the same State **or** (b) the Medical Council of India, if the migration is sought from one college to another located outside the State.

(5) A student who has joined another college on migration shall be eligible to appear in the IInd professional MBBS examination only after attaining the minimum attendance in that college in the subjects, lectures, seminars etc. required for appearing in the examination prescribed under Regulation 12 (1)

Note-1: The State Governments / Universities / Institutions may frame appropriate guidelines for grant of No Objection Certificate or migration, as the case may be, to the students subject to provisions of these regulations.

Note-2: Any request for migration not covered under the provisions of these Regulations shall be referred to the Medical Council of India for consideration on individual merits by the Director (Medical Education) of the State or the Head of Central Government Institution concerned. The decision taken by the Council on such requests shall be final.

Note-3: The College/Institutions shall send intimation to the Medical Council of India about the number of students admitted by them on migration within one month of their joining. It shall be open to the Council to undertake verification of the compliance of the provisions of the regulations governing migration by the Colleges at any point of time."

15. SUBMISSION OF LABORATORY RECORD NOTEBOOKS

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

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 material, handwritten, cyclostyled or printed guides is allowed for reference during the practical examinations.

In respect of failed candidates, the marks awarded for records at previous examinations will be carried over for the subsequent examination or the candidates shall have the option to improve his performance by submission of fresh records.

16. INTERNAL ASSESSMENT

1] A minimum of three written and practical examinations shall be conducted in each subject during an academic year and the average marks of three best performances shall be taken into consideration for the award of sessional marks.

2] Day to day records and logbook (including required skill certifications) should be given importance in internal assessment. Internal assessment should be based on skills and competencies. Students must have completed the required certifiable competencies and completed logbook appropriate for each phase of training to be eligible for appearing at the final university examination of that subject.

3] Learner must secure at least 50% marks of total marks (combined in theory / Practical, not less than 40% in theory and practical separately) assigned for internal assessment in a particular subject in order to be eligible for appearing at the final university examination of the subject. Internal assessment marks will not be added to university examination and reflected as a separate head of passing at the summative examination.

4] The results of Internal Assessment should be displayed on notice board within 1-2 weeks of the test. Formulate remedial measures for students who are either not able to score qualifying marks or have missed some assessment due to any reason by forming committee under the Chairmanship of Dean, Dr. D. Y. Patil Medical College, Hospital and Research Center, Pune and three more members.

There shall be one additional examination after third internal assessment (Prelim) examination as per recommendation by institutional grievance committee before the submission of IA marks sheet to University.

17. CLASSIFICATION OF SUCCESSFULCANDIDATES

A successful candidate

i. Who secures not less than 75% in the aggregate marks shall be declared to have secured, **FIRST CLASS WITH DISTINCTION'** provided he/she passes the whole examination in the FIRSTATTEMPT;

ii. Who secures not less than 65% in the aggregate marks and completes the course within the stipulated course period shall be declared to have passed the examinations in the **'FIRSTCLASS'**;

iii. Who secures above 50% marks and completes the course within the stipulated course period shall be declared to have **PASSED** the examinations

18. EXEMPTION FROM RE-EXAMINATION IN ASUBJECT

Where a candidate obtains pass marks in a subject (or) subjects but fails in other subject (s) he / she shall be exempted from reexamination in the subject (s) he / she has passed.

MAPPING OF PROGRAMME OUTCOMES [POs] AND COURSE OUTCOMES [COs] OF MBBS PROGRAMMES

Programme Outcomes	
Programme Name: MBBS	
Programme Code: MB	
Sr.No.	**By the end of the programme, the MBBS Graduate will have /be:**
PO 1	Knowledge and Skills
PO 2	Planning and Problem-solving abilities
PO 3	Communication
PO 4	Research Aptitude
PO 5	Professionalism and Ethics
PO 6	Leadership
PO 7	Societal Responsibilities
PO 8	Environment and Sustainability
PO 9	Lifelong Learner

Course Outcomes and Mapping with Programme Outcomes	
Year I	
Course Code	**Course Title**
MB101	Human Anatomy
MB102	Human Physiology
MB103	Human Biochemistry

Human Physiology (MB 102)		
CO No.	**At the end of the course, the learner should be able to:**	**Mapped Programme Outcomes**
MB102.1	Describe structure & functions of normal & sick cell, cell death & repair	PO1, PO2, PO3, PO4, PO5, PO8, PO9
MB102.2	Explain concept of homeostasis & its maintenance. Describe normal function of organ systems.	PO1, PO2, PO3, PO5, PO8, PO9
MB102.3	Explain pathophysiological basis of treatment of common disease conditions.	PO1, PO2, PO3, PO4, PO5, PO9
MB102.4	Perform and describe various procedure of laboratory tests and interpret their results.	PO1, PO2, PO3, PO4, PO5, PO9
MB102.5	Describe the scheme of investigations required for diagnosis and management of common disease conditions.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO9

PHYSIOLOGY

HUMAN PHYSIOLOGY

1) GOAL :

The broad goal of the teaching of undergraduate students in physiology aims at providing the student comprehensive knowledge of the normal functions of the organ systems of the body to facilitate an understanding of the physiological basis of health and diseases.

2) EDUCATIONAL OBJECTIVES :

2.1) At the end of the course, the student will be able to: describe the normal functions of all the organ systems, their regulatory mechanisms and interactions of the various systems for well-coordinated total body function.

2.2) Understand the relative contribution of each organ system in the maintenance of the milieu interior (homeostasis).

2.3) Explain the physiological aspects of normal growth and development. Analyze the physiological responses and adaptation to environmental stresses.

2.4) Comprehend the physiological principles underlying pathogenesis and treatment of disease.

2.5) Correlate knowledge of physiology of human reproductive system in relation to National Family Welfare Program.

3) SKILL :

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

3.1) Conduct experiments designed for study of physiological phenomena.

3.2) Interpret experimental/investigative data.

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

4) INTEGRATION :

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

5) COURSE CONTENT :

Theory List of topics.

5.1) GENERAL PHYSIOLOGY. (5 hours)

- Introduction to Physiology
- Branches of Physiology
- Functional organization of human body
- External and internal environment
- Homeostasis, Biofeedback mechanisms
- Cell Physiology
- Transport across cell membrane

5.2) HEMATOLOGY : (15 hours)

- Composition and physical properties of blood
- Functions of blood
- Plasma proteins: Types, concentration, functions
- Erythrocytes: Morphology, functions, normal count physiological variations in
- Normal count & anemia, polycythemia.
- Hemopoiesis: general concepts
- Erythropoiesis: stages, Sites, regulation, reticulocyte & its clinical significance.
- Haemoglobin: Functions, normal values, physiological variations.
- Fate of erythrocytes: life span, Catabolism of Hb, bilirubin metabolism, jaundice
- Physiological basis of anemia, nutritional anemia
- Polycythemia: Primary & secondary
- Leukocytes: differences between R.B.C. and W.B.C., types of W.B.C.s normal

- Count and differential W.B.C. count, physiological variations, properties,
- Functions of W.B.C.s,
- Granulopoiesis – stages, regulation,
- Lymphopoiesis.
- Pathological variations in total & differential W.B.C. count.
- Immunity: definition, concept of antigen & antibody, types of immunity-Innate & Acquired, & their mechanism, cell mediated & humeral immunity, B lymphocytes, T lymphocytes & their types. Primary & secondary response, basis of vaccination.
- Blood groups: Landsteiner's law, ABO System – type A & B antigen, ABO system & inheritance, relation to transfusion, cross matching major & minor. Rh System – inheritance, Rh incompatibility & blood transfusion, Erythroblastosis foetalis.
- Blood transfusion: indications, storage of blood & changes during storage, transfusion reactions.
- Monocyte - macrophage system: Classification, functions, functions of spleen.
- Hemostasis: definition, basic mechanisms of Hemostasis.
- Platelets: structure, normal count & variations, functions, role in platelet plug formation, Hemostasis & clot retraction.
- Blood coagulation: Coagulation factors in plasma, basic mechanism of blood clotting, intrinsic & extrinsic pathways & difference between two pathways, role of calcium in coagulation, role of vitamin K, fate of clot.
- Anticoagulants – commonly used & their mechanism of actions, blood coagulation tests – bleeding time, clotting time. Anticoagulants used in vivo and in vitro, Plasmin system. Haemophilia.
- Body fluid compartments: role of water in body & its distributions, different body fluid compartments & composition of their fluid.

- Blood volume: normal value, physiological and pathological variations, blood volume regulation in detail (To be taken at end of lectures on C.V.S, kidney and endocrines)
- Physical properties of blood.
- Plasma proteins: Plasmapheresis, role of liver in plasma protein synthesis, relationship of diet & plasma protein synthesis.
- R.B.C.: advantages of biconcave shape.
- Bone marrow structure and cellular elements.
- Common Haemoglobinopathies (Hbs, Hbc, Thalassaemia)
- Method of determination of life span of R.B.Cs.
- Types of jaundice.
- Polycythemia – effects on haemodynamics,.
- Immunity: Antibody structure & types, antigen – antibody reactions.
- Blood group: M. N. system, other blood groups.
- Thrombocytosis, thrombocytopenia purpura.
- Anticoagulants: used in vitro & in vivo.
- Other blood coagulation tests.
- Classification of haemorrhagic diseases, D.I.C.
- Measurement of: total body water, blood volume, plasma volume, I.C.F. volume.
- Blood component therapy.
- Effects of splenectomy.

5.3) NERVE (5 hours)

- Distinctive histological features relevant to functions of nerve fibers.
- Classification of nerve fibers: based on structure, diameter, functions and only for sensory nerves.
- R.M.P. definition, production & maintenance, method of measurement, significance.
- Action potential: definition, Phases – depolarization, repolarization, ionic basis of depolarization & repolarization. Production & propagation of A.P., Properties of A.P., significance.
- Experimental techniques to study the mechanism of production of R.M.P. & A.P.: patch clamp, voltage clamp.
- Methods of recording of A.P.
- Properties of nerve fibers.
- Strength duration curve: chronaxie and factors affecting it.
- Factors affecting conduction in a nerve.

5.4) MUSCLE (7 hours)

- Classification of muscles,
- Structure of skeletal muscle: Electronomicroscopic structure, muscle proteins – contractile, regulatory, structural & enzymatic. Sarcoplasmic tubular system: concept of sarcoplasmic triads & their functions.
- Neuromuscular transmission: Physiologic anatomy, events, N-M blocking & its clinical significance, applied aspect – myasthenia gravis.
- Excitation – contraction coupling.
- Molecular basis of skeletal muscle contraction: sliding filament theory, power stroke – cross bridge cycle, role of calcium.

- Energetics: fuel used by skeletal, muscle at rest & in exercise, metabolic pathways involved to yield A.T.P., Oxygen debt: definition, types (lactic, alactic), incurring of debt, repaying the debt, significance.
- Properties of skeletal muscle: excitability, refractory period (absolute, relative), conductivity, contractility – types (isometric, isotonic), effects of summations (multiple motor unit summation, frequency summation & tetanizibility), all or none law, extensibility & elasticity, fatiguability.
- Factors affecting development of tension in the muscle:
    a) number of motor units contracting- type of muscle, number of muscle fibers in each unit activated, supraspinal influences.
    b) length – tension relationship
    c) frequency of stimuli, duration of stimulation
    d) load
    e) type of contraction
    f) chemical composition of muscle fibers and ions.
- E.M.G. (in brief)
- Skeletal muscle circulation.
- Smooth muscle: structure, distribution, types molecular mechanism of contraction, properties, regulation and disorders.
- Heat liberated during various phases of contraction, Fenn effect.
- Recording of muscle activity.

5.5) RESPIRATORY PHYSIOLOGY (15 hours)

- Physiologic anatomy
- Functions of respiratory system, non respiratory functions of lung
- Mechanics & mechanics of respiration:
- Ventilation :

- Inspiratory and expiratory muscles, intra-plural pressure, lung and thoracic compliance, factors affecting compliance, work of breathing, surface tension forces and role of surfactant, airway resistance, elastic resistance.
- Lung volumes and capacities Measurement, physiological and significance (tidal volume, vital capacity, forced vital capacity – details)
- Pulmonary ventilation, alveolar ventilation, alveolar dead space, - applied aspect,
- Maximum breathing capacity & breathing reserve.
- Diffusion of Gases :
- Exchange of respiratory gases at alveolar – capillary membrane, factors affecting diffusion.

GAS TRANSPORT:

- Transport of oxygen, role of Haemoglobin, oxygen dissociation curve & factors affecting it.
- Transport of carbon dioxide
  Control of Breathing:
  Neural control – higher centers, reflexes.
  Chemical control – central & peripheral chemoreceptors role of CO2, O2, H+
  Pulmonary Circulation – Characteristics
- Ventilation perfusion ratio
- Respiratory adjustment in exercise.
- Hypoxia: types & high altitude hypoxia.
- Artificial respiration:
- Pulmonary function tests - principles
- Method of determination of dead space, residual volume, functional residual capacity.
- Oxygen therapy: indications, hazards of hyperbaric oxygen & use.
- Concept of P50
- Positive pressure breathing.

5.6) CARDIOVASCULAR PHYSIOLOGY (20 hours)

- Introduction, functions & importance of the system.
- General organization.
- Structure of heart, pericardium, myocardium, endocardium, nerve supply, Histology, details of cell junctions, syncytium, contractile & conducting fibers.
- Properties of cardiac muscle: excitability, conductivity, contractility, autorhythmicity, all or none law, long refractory period.
- Junctional tissues of heart, pacemaker potential, action potential of cardiac muscle.
- Generation & conduction of cardiac impulse.
- ECG: lead arrangement, normal waves & their significance with reference to lead II
- Cardiac cycle: pressure – volume changes, heart sounds & their clinical significance, correlation of pressure, volume, ECG, heart sounds in cardiac cycle.
- Heart rate & its regulation.
- Haemodynamics - def., blood flow, resistance
- Cardiac output: normal values, physiological variations, factors affecting cardiac output – details, regulation, measurement – principles.
- Blood pressure:
- Normal levels, measurement, determinants, short term & long term regulation - details.
- Capillary circulation, tissue fluid formation.
- Lymphatic system: Anatomy & structure, formation of lymph, composition of lymph , functions of lymphatic system, lymphflow & factors affecting it.
- Regional circulation: Physiologic anatomy, factors affecting, special features: coronary, cerebral, skin, portal

- Adaptation of cardiopulmonary system to various grades of exercise.
- Hemorrhagic shock – stages & compensatory mechanisms, effects on body, physiological basis of treatment in brief.
- Ion channel & receptors (physiological, pharmacological & clinical significance)
- E.C.G. – electrical axis of heart, heart blocks, arrhythmias, ischaemia, infarctions.
- Heart sounds: murmurs & their clinical significance.
- Experimental methods of studying cardiovascular physiology,
- Patho physiology of oedema

5.7) RENAL PHYSIOLOGY (10 hours)

- General introduction, structure & functions of kidney.
- Renal circulation: special features from functional point of view.
- Concept of clearance: to study renal physiology, for: GFR – Inulin, Creatinine, basic principle of radioisotope method. renal blood flow–PH concentration & dilution of urine – free water.
- Formation of urine:

  1) Glomerular stage – GFR (definition, dynamics, factors affecting and measurement)

  2) Tubular stage – Reabsorption & secretion.
     a) Sodium, potassium, glucose : details

     b) pH & handling of water – concentration & dilution of urine.

     c) Secretion of H^+

  3) Role of kidney in acid – base balance.

- Physiology of micturition: basic reflex & control, cystometrogram, disorders.
- Artificial kidney: basic principles of dialysis.
- Experimental studies for renal functions.

5.8) BODY TEMPERATURE REGULATION: (2 hours)

- Homeothermia – Balance between heat gain & heat loss.
- Regulation of body temperature,
- Hyperthermia, Hypothermia.

5.9) ALIMENTARY SYSTEM: (12 hours)

- General introduction & organizational plan, innervations and blood supply.

Salivary secretion :

- General principles & basic mechanisms of secretion composition, and functions of saliva, mechanism & regulation of salivary secretion.
- Mastication and deglutition:
- Three phases of deglutition- physiologic anatomy, mechanism and control.

Gastric secretion:

- Functional anatomy, histology, functions of stomach, composition of gastric juice, cellular mechanism of gastric secretion of acid, pepsin, intrinsic factor, other enzymes, phases of gastric secretion, regulation of gastric secretion.

Gastric Motility:

- Electrical activity of stomach, pylorus, emptying of the stomach-pyloric pump, regulation & factors promoting & inhibiting emptying.

Pancreatic secretion:

- Structure, composition & mechanism of secretion of electrolytes & enzymes, regulation of secretion.

Liver & gall bladder:

- Microscopic structure, functions of liver, composition of bile, cellular mechanism of bile formation, enterohepatic circulation of bile salts, control of secretion, concentration & storage of bile in gall bladder. filling & evacuation of gall bladder functions of gall bladder.

Intestinal secretion:

- Structure, innervations.
- Composition & mechanism of secretion of small intestinal juice, regulation of secretion.
- Secretion of large intestine: mucous, water, electrolyte.
- Motility of small intestine:

  Structure & innervation electrical activity of smooth muscle, resting membrane potential, slow waves, spike potentials, rhythmic segmenting contractions, peristalsis, control – neural & hormonal, functions of ileocecal valve.
- Motility of large intestine:
- Structure & innervation,' mixing & mass movements, defecation reflex' and its control
- G. I. hormones: in brief.
- Digestion & absorption of
  - Carbohydrate,
  - Proteins
  - Fats

  Absorption of water, electrolytes and vitamins.
- Gastric mucosal barrier, experiments to study regulation of gastric juice secretion, disorders of secretion, peptic ulcer., inhibitors of gastric secretion
- Effects of vagotomy, abnormal gastric motility vomiting.
- Barium meal studies, endoscopy, biopsy.
- Pathophysiology of small intestinal motility, paralytic ileus, diarrhea, obstruction.
- Pathophysiology of colonic motility, irritable bowel syndrome, drugs, constipation.
- Pancreatic function tests.
- Gall stone, effects of removal of gall bladder
- disturbances of esophageal motility, spasm, achalasia, hiatus hernia.
- Methods for study of intestinal absorption.
- Effects of hepatectomy.

5.10) NUTRITION: (2 hours)

- concept of balanced diet
- factors affecting caloric requirements
- requirements of various nutrients, sources, daily needs.
- nutrition under special conditions – pregnancy, lactation, growing child.

5.11) ENDOCRINE SYSTEM (14 hours)

- Introduction
- Endocrine functions of Hypothalamus – releasing hormones, Mechanism of hormone action
- Anterior pituitary hormones:
  functions, regulation, disorders.
  posterior pituitary hormones, ADH, Oxytocin. functions, regulation, disorders.

Thyroid:
hormone: synthesis, fate, functions, regulation, disorders.

- Parathyroid:
  hormone: synthesis, functions, regulation, disorders – tetany.
- Adrenal cortex: and medulla.
  hormone: secretion, functions, regulation, disorders
- Pancreatic hormones:
  secretion, functions, regulation, disorders.
- Radio immuno assays.
- Experimental studies.

5.12) REPRODUCTIVE PHYSIOLOGY: (8 hours)

- Sex chromosomes, sex determination, sex differentiation
- Functional anatomy of reproductive system.
- Puberty: changes in males & females and its control-delayed & precocious puberty.
- Spermatogenesis: stages & regulation
  Semen analysis.
- Testosterone: actions & regulation.
- Male sexual act.
- Menstrual cycle & ovarian cycle: Phases & hormonal regulation.
- Menopause.
- Ovulation: indicators & importance
- Fertilization, implantation of ovum.
- Functions of placenta
- Physiology of pregnancy;
- Maternal changes during pregnancy
- Parturition: in brief – stages and mechanism.
- Lactation: initiation & maintenance and control.
  advantages of breast-feeding.
- Contraception: to be taken as integrated topic.

5.13) SPECIAL SENSES (8 hours)

- **Eye:**
  Functional anatomy of eye, optics, microscopic structure of retina with retinal circuits, image formation, Photochemistry of vision (photopic & scotopic vision, dark & light adoption)

- Pupillary reflexes, Accommodation reaction, Errors of refraction and their correction, Colour vision – physiological & neural basis, accepted theory of colour vision, classifications, basis of colour blindness and tests of colour blindness, significance.

- Visual pathway – processing of information at different levels in visual pathway, organisation of visual cortex. Effects of lesion at different levels in visual pathway, Movements of eyeballs: functions & control.

- **Ear:**
  Physics of sound, decibel system, Functions of external ear, Functional anatomy of middle ear, functions of middle ear in detail, assessment of functions of middle ear, Functional anatomy of cochlea, functions of inner ear, place principle, theories of hearing.

- **Audiometry,**
  Auditory pathway & important features, auditory cortex (role in hearing & speech development)

- **Taste:**
  Functional anatomy of taste buds, different taste modalities, pathway, factors affecting taste sensation,

- **Smell:**
  Functional anatomy of receptors, primary olfactory sensations, pathway, factors affecting smell sensation,

- Resolution of images,

- Electrophysiology of internal ear: cochlear micro phonics.

- Electrophysiology of retina.

- Theories of hearing.

5.14) CENTRAL NERVOUS SYSTEM: (50 hours)

- **Outline of nervous system.**

  General nervous system: Evolution of methods of study of CNS.
  Synapse: definition, physiological anatomy, sequence of events of synaptic transmission, properties, (state the property & its significance), significance of synaptic transmission, applied aspect.
  Neurotransmitters – in brief.
  Receptors: definition, classification (basis of each classification with example), properties (state each property with underlying mechanism & significance), Sensations: different modalities, classification with examples and significance.
  Sensation of touch, pain proprioception : details of each
  Reflexes: definition, classification (basis of classification with example), reflex arc & its components, properties (state each property with basis & importance)
  Stretch reflex – definition, muscle spindle (details with innervation, role of gamma motor neurons) role of supra spinal control – in brief, functions of stretch reflex (regulation of muscle tone) inverse stretch reflex.
  Polysynaptic reflexes: withdrawal reflex.

- **Tracts:**
  Ascending & descending tracts: details of each tracts – (situation and extent in spinal cord, origin, course & termination, collaterals, somatotopic arrangement, functions, applied aspect, tests)
  Ascending tracts: Basic plan of somato sensory pathway for conscious Sensation, pathway from head, face region.
  Descending tracts: pyramidal tracts – details., extra pyramidal tracts, differences between UMN & LMN lesions.

- **Sections at various levels in CNS :**

  i) Spinal transection – spinal animal.
  Complete – 3 stages – spinal shock, stage of recovery, stage of reflex failure – details of each stage.
  Incomplete. Transection Hemisection

  ii) Low midbrain section – decerebrate animal : Decerebrate rigidity. (Classical and ischaemic with mechanisms, characteristics features, physiological significance)
  Decorticate animal.

- **Posture and Equilibrium.**
  Definition, classification of postural reflexes.
  (Details of each reflex and its function.)
  regulation of posture (integrating centers at various levels of CNS)
  vestibular apparatus : Physiologic anatomy, mode of function of utricle & saccule and semicircular canals, vestibulo occular & vestibulo spinal reflexes.

- **Thalamus :**
  Functional classification of Thalamic nuclei, with connections of different nuclear groups, functions of thalamus, thalamic syndrome.

- **Hypothalamus :**
  Functional classification of different hypothalamic nuclei, connections in brief, functions in details.

- **Limbic system :**
  Parts of limbic system, connections in brief, functions.

- **Reticular formation :**
  Introduction, anatomy in brief, functional divisions.

  i) Ascending reticular activating system – details with connections & role in sleep wakeful cycle, applied aspect.

  ii) Descending reticular system – role in regulation of muscle tone by pontine & medullary regions.

  iii) Visceral centres.

- **E. E. G. :**
  Definition, different waves, characteristics & functional significance of each wave, physiological variation, clinical application in brief.

- **Sleep and Wakefulness :**
  Concept of alertness & wakefulness with their physiological basis, Definition of sleep, stages of sleep correlated with EEG, sleep cycle – types of sleep, salient features of NREM & REM sleep, physiological effects of sleep on different systems of the body, Neurophysiological mechanisms of sleep, functions of sleep.

- **Cerebellum :**
  Introduction, functional classification, intracortical circuit, deep cerebellar nuclei, connections of different lobes, functions of cerebellum, cerebellar function tests, effects of lesion in brief.

- **Basal Ganglia :**
  Introduction, classification of nuclei, connections, intracortical circuits, functions, lesions - Parkinsonism.

- **Cerebral Cortex :**
  Gross anatomy & divisions, concept of Broadmann's mapping with diagram, Parietal lobe – anatomical & functional divisions, details of each functional part as regards connections, topographic organisation, functions. Frontal lobe – excitomoter Cortex – anatomical & functional parts, details of each part as regards connections, topographic organisation, functions. Prefrontal Cortex–different areas, connections in brief, functions, effects of lobectomy.

- **Speech :**
  Afferent and efferent mechanisms and role of cortical centers in speech, concept of cerebral dominance, development of speech, vocalization.

- **Memory :**
  Definition, stages, types, physiological basis, factors affecting, applied – amnesias in brief.

- **Learning :**
  Definition, types with examples, stages, factors influencing, role of motivation (positive & negative reinforcement, reward & punishment), physiological basis – role of different parts of CNS, structural, biochemical changes.

- **Conditioned reflexes :**
  Definition, difference between unconditioned & conditioned reflexes, development of conditioned reflexes, properties, significance.

- **Autonomic nervous system:**
  Organization and functions of Parasympathetic & Sympathetic and their control.

- **CSF :**
  Introduction, composition, normal CSF pressure, formation and circulation, functions, applied aspect – brief, blood brain barrier, blood CSF barrier.

5.15) SPORTS PHYSIOLOGY – (2 HOURS)

- Sports Physiology I
- Sports Physiology II :

Topics - Muscle in Exercise, Strength, Power, Endurance, Athletic Training / performance, Energetic and Nutrition, Respiration and CVS Body Heat, Body fluids and salt, Drugs & Athletes, body fitness prolongs life.

5.16) YOGA AND PRANAYAMA – (1 HOUR)

a) Yoga in Physiology (one lecture): Introduction, Yoga Training programme, Yoga in daily life, Yogic Practices, Physiological effects, Yoga in health & diseases.

b) Yoga Session: 2nd & 4th Saturday (1 hr.) of every month.

5.17) LECTURES: CURRICULUM OF BIOETHICS
(2 topics in 6 hrs.)
i) Indian ethos & tradition
ii) Role of family & society in bioethics

5.18) LANGUAGE & SKILLS

5.19) AVIATION & SPACE PHYSIOLOGY – (2 HOURS)

i) Aviation: - Introduction, Environmental impact, Effect of acceleratory (Linear) forces on the body, Decelerative forces during parachute jumps

ii) Space: - Introduction, Measurement of acceleratory force-G, Effect of centrifugal acceleratory force on the body, Protection against centrifugal acceleration, Artificial Climate in sealed spacecraft, Weightless in space –Microgravity, Cardiovascular, skeletal muscle and bone deconditioning during Prolonged exposure.

6) BOOKS RECOMMENDED :

Textbooks of Physiology :

1) Guyton - Textbook of Medical Physiology
2) Indu Khurana - Textbook of Medical Physiology
3) A.K. Jain - Textbook of Medical Physiology Vol. 1 & 2

Reference books :

1) Berne and Levy - Principles of Physiology
2) Ganong - Review of medical Physiology

7) PRACTICALS :

7.1) Haematology

Hb% R. B. C. W. B. C. Differential, B.T.C.T. Blood group, ABO system Rh typing, Blood Indices

7.2) Clinical examination and Human experiments

Stethography, Spirometry, Ergography, Perimetry, Tests for physical fitness, Clinical examination of all systems.

7.3) Demonstrations

Reticulocyte count. Platelet count, P. C. V., E. S. R, fragility, peripheral blood smear, bone marrow slides, E.M.G. S.D. curve, conduction velocity of nerve (Human), E.C.G. E.E.G., Audiometry, reaction time, pregnancy test, Family planning, body. temperature, colour vision Visit to blood bank, wards to show common disorders or video tapes (list given in appendix I), X-rays (list given in appendix I)

7.4) Animal experiments on frogs (Study & interpret the recorded graphs) by animal simulation software.

7.4.1) Skeletal muscle:

effect of graded stimuli, simple muscle twitch genesis of tetanus, effect of load on skeletal muscle fatigue.

7.4.2) Cardiac muscle.

Normal cardiogram, effect of temperature, properties of cardiac muscle, effect of vagal stimulation and phenomenon of vagal escape. Effect of drugs (Acetyl choline, Adrenaline, Nicotine) on frog's heart. Perfusion of isolated frogs heart with effects of Na^{+} , K^{+} and Ca^{++}, - and demonstration of Starling's law The journal should be scrutinized by the teacher concerned and presented during university examination.

APPENDIX

APPENDIX - I
List of common disorders to be shown during ward visits or using video tapes.
1. Generalised Oedema
2. Anaemia
3. Jaundice
4. Hepatomegaly
5. Splenomegaly
6. Ascites
7. Myxoedema
8. Cretinism
9. Hyperthyroidism
10. Dwarfism
11. Acromegaly
12. Facial nerve paralysis
13. Hemiplegia
14. Paraplegia
15. Parkinsonism
16. Cerebellar dysfunction.
17. Bronchial asthma
18. Valvular diseases
19. Hypertension

APPENDIX - II
Topics to be asked as applied questions in theory. A brief history and diagnosis to be provided.
1. Erythroblastosis foetalis
2. Haemophilia, purpura
3. Myasthenia gravis
4. Peptic ulcer
5. Oedema
6.Jaundice and anemia, mismatched transfusion
7. Myxoedema
8. Cretinism
9. Hyperthyroidism
10. Tetany
11. Acromegaly, Gigantism
12. Respiratory distress syndrome
13. Parkinsonism
14. Asthma

APPENDIX - II
15. Hemiplegia
16. Spinal cord injury
17. Deafness
18. Hypovolemic shock
19. Cushing's syndrome
20. Dwarfism
21. Signs of cerebellar disease
22. Family planning

UNIVERSITY EXAMINATION PATTERN

EVALUATION :
Theory – systems to be included are (Marks distribution in brackets)

PAPER I (TOTAL MARKS - 50)
Cardiovascular system, Respiratory system, Gastrointestinal system, Endocrinology, Reproduction, Environmental physiology: Acclimatization to hypoxia; Temperature regulation. Exercise physiology

PAPER II (TOTAL MARKS -50)
General Physiology, Cell membrane; Transport systems, Homeostasis, Nerve muscle physiology, Blood, Excretory system, CNS and Special senses.

TIME ALLOWED: - 2.30 HOURS FOR EACH PAPER

PAPER I				
			Marks	**Total**
SECTION **A**	Question **1**	One Sentence Answer Questions (10 Out of 12)	10x1 =10	26
	Question **2**	Long Answer Questions (2 Out of 3)	8x2 = 16	
SECTION **B**	Question **3**	a) Problem based Learning (Compulsory)	1x3 = 03	03
		b) Short Answer Questions (7 Out of 9)	7x3 = 21	21
			Total =	**50**

PAPER II				
			Marks	**Total**
SECTION **A**	Question **1**	One Sentence Answer Questions (10 Out of 12)	10x1=10	**26**
	Question **2**	Long Answer Questions (2 Out of 3)	8x2 = 16	
SECTION **B**	Question **3**	a) Problem based Learning (Compulsory)	1x3 = 03	03
		b) Short Answer Questions (7 Out of 9)	7x3 = 21	21
			Total =	**50**

PATTERN OF VIVA VOCE

There shall be separate batches of students for viva and Practicals.		
(i) Viva examination (orals)	**Total Marks =20**	Duration – 20 minutes

FOUR EXAMINERS (5 minutes with each examiner)

a) Two Examiners for topics of paper I systems to be distributed for viva
b) Two Examiners for topics of paper II systems to be distributed for viva

PATTERN OF PRACTICAL EXAMINATION (Total Marks – 40)
FOUR EXERCISES: CLINICAL EXAMINATION :

1) Clinical I	**10 marks**
a) C.V. S.	05 marks
b) R.S.	05 marks
2) Clinical II	**10 marks**
a) C.N.S / Special senses	05 marks
b) Abdomen	05 marks
3) Haematology	**10 marks**
4) Spots	**10 marks**
5 Spots 2 marks each	(2 X 5 = 10)

DISTRIBUTION OF 5 SPOTS :

1) Animal experiments graphs
2) Endocrine system
3) Calculations
4) Human Physiology practical graphs
5) Clinical Physiology

INTERNAL ASSESSMENT:

Pattern of Examination for formative evaluation (internal assessment)

1) First semester will have two (2) Continuous Internal Assessment Exam each carrying 20 marks each in Theory/ Practicals/ oral.
2) There will be Terminal examination at the end of 1st Semester. The Terminal examination will include one theory paper of 60 marks & practical of 40 marks and viva 20 marks.
3) Similarly second semester will have one (1) Continuous Internal Assessment examination carrying 20 marks in Theory/ Practicals/ oral.
4) There will be Preliminary examination at the end of 2nd Semester. It will have Theory 100 marks (2 papers of 50 marks each), Viva 20 marks & Practicals of 40 marks.