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ORDINANCES

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SYLLABUS

FOR

B.Sc. (Anatomy, Physiology & Biochemistry)

(to be effective from admission 2004)

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT - 151 203

Baba Farid University of Health Sciences, Faridkot
Faculty of Medical Sciences

Ordinances
for the Degree of Bachelor of Science
(Medical Anatomy, Physiology & Biochemistry)

The duration of the course spreads over a period of three years including the period of examination. The course carries 2100 marks out of which 1800 marks are earmarked for three main subjects of Anatomy, Physiology & Biochemistry which are studied throughout the course and the remaining 300 marks are allocated to the papers on Medical Statistics & Research Methodology (100 marks) studied in B.Sc. Part I, Computer and Computer Applications (100 marks) studied in B.Sc. Part II and Psychology & Education (100 marks) studied in B.Sc. Part III.

Admission

1. The course is a full time course and open to regular students only.
2. The admission to the course shall be made from amongst the candidates appearing in the Common Entrance Test (PMET) conducted by this University on behalf of the Punjab Govt. and shall be made on basis of their inter-se-merit.

Duration of Course

1. The course will commence in the month of July/August.
2. The duration of course of instruction for the degree of Bachelor of Science in Medical Anatomy, Physiology & Biochemistry shall extend over a period of three years including the period of examinations.
3. The period of three years for this course shall be divided in three parts - B.Sc. Part-I, B.Sc. Part-II and B.Sc. Part-III.
4. The examination for the degree shall be held annually (in three parts) - B.Sc. Part-I at the end of 1st year, B.Sc. Part-II at the end of 2nd year and B.Sc. Part-III at the end of 3rd year.
5. The annual examination for this course shall be held ordinarily in the month of June and the supplementary examination in the month of November or such other dates as may be fixed by the Vice-Chancellor.

Fees

Every candidate enrolled for the course shall pay such fees to the University as decided and prescribed by the University from time to time.

Schedule for submission of examination admission forms

The last date by which the examination admission forms along with examination fee of Rs.1500/- to be submitted to the Registrar, shall be as follows:

Examinations B.Sc.	without late fee	with late fee of Rs.200/-	with late fee of Rs.500/-	with late fee of Rs.1500/-
May/June	March 1	March 15	March 31	April 15
Nov./Dec.	Sept. 15	Sept. 30	Oct. 15	Oct. 31

Vice-Chancellor may permit acceptance of admission form and fee ten days before the commencement of examination with a late fee of Rs.2000/-

Medium of Instruction

The medium of instruction during the course and for the University examinations shall be English.

University Examinations

1. A candidate for admission to this course should have passed +2 (Medical) with the same eligibility conditions as prescribed from time to time for being eligible to apply and appear in the Common Entrance Test (PMET).
2. The examinations for the various parts of the course shall be held at the end of each part of the course in the month of June or on such dates as may be fixed by the Vice-Chancellor and shall be open to the student who:-
 - (a) has his name submitted to the University by the Head of the concerned College
 - (b) produces a certificate signed by the Head of the College of having a good moral character.
 - (c) produces a certificate signed by the Head of the College of having attended atleast 75% lectures in theory and 80% practicals separately in the subject of Anatomy, Physiology and Biochemistry

Provided that if a candidate fulfills the conditions laid down for one subject and not for the other, he may be allowed to appear in the examination in that subject only in which he fulfills the prescribed requirements.

- (d) produces a certificate of having undergone successfully the required courses for not less than one year (including the examination period) separately for B.Sc. Part-I, B.Sc. Part-II or B.Sc. Part-III, as the case may be.
3. A candidate who has completed the required number of lectures and practical but does not appear in the University examination or having appeared has failed, may be allowed to appear in the next three consecutive examinations to qualify in that examination.
4. A candidate who obtains pass marks in one or more subjects but fails in the other subject/s shall be exempted to appear in such subjects in which pass marks have been obtained, and allowed to appear to qualify in the subjects in which he failed in the next three consecutive examinations failing which:
- (a) he shall not be allowed to continue his studies in this course if he is a candidate for B.Sc. Part-I examination and be removed from the course.
 - (b) he shall have to repeat the whole examination if he is a candidate for B.Sc. Part-II or B.Sc. Part-III examination.

Provided if a candidate is unable to appear in one or more chances owing to illness, he will be given the next succeeding one or more chances on his application accompanied by a medical certificate and duly recommended by the Principal of the College but this permission shall be limited to the number of chances missed on account of illness and will be available only to a candidate who has submitted his admission form and fee for the University examination.

5. The University examination for B.Sc. Part-I shall be open to those students who have undergone the course of B.Sc. Part-I and have the requisite attendance.
6. The examination of B.Sc. Part-II shall be open to those candidates who have passed the B.Sc. Part-I examination of this University and have undergone the course of B.Sc. Part-II and possess the requisite attendance.
7. The examination of B.Sc. Part-III shall be open to those students who have passed the B.Sc. Part-II examination of this University and have undergone the course of B.Sc. Part-III and possess the requisite attendance.

8. A candidate who is granted exemption under ordinances of this University to qualify in the failed subjects in the next University examinations of that course shall be eligible to join and continue in the next higher class till the result of supplementary examination of that year is declared. He shall be allowed to continue further only if he clears the remaining subject/subjects, in which he failed, in the supplementary examination of that year.

NOTE: The results of all University examinations shall be declared before the start of teaching for the next class.

Appointment of Examiners

There will be one internal and one external examiner. The terms and conditions for the appointment of examiners in the subject of Anatomy, Physiology & Biochemistry for the B.Sc. course shall be the same as for appointment of examiners in the subject of Anatomy, Physiology and Biochemistry in the MBBS course. Appointment of examiners in the subjects of Medical Statistics & Research Methodology, Computer & Computer Applications and Psychology & Education is detailed along with in syllabus.

Subjects and Distribution of Marks

B.Sc. Part-I

Every candidate shall be required to offer the following subjects:

1. Anatomy
2. Physiology
3. Biochemistry
4. Medical Statistics & Research Methodology

1. Anatomy

Theory (one paper)	100 marks
Practical examination	40 marks
Oral (viva)	20 marks
Internal Assessment Theory	20 marks
Internal Assessment Practical	20 marks
Total	200 marks

2. **Physiology**

Theory (one paper)	100 marks
Practical examination	40 marks
Oral (viva)	20 marks
Internal Assessment Theory	20 marks
Internal Assessment Practical	20 marks
Total	200 marks

3. **Biochemistry**

Theory (one paper)	100 marks
Practical examination	40 marks
Oral (viva)	20 marks
Internal Assessment Theory	20 marks
Internal Assessment Practical	20 marks
Total	200 marks

4. **Medical Statistics & Research Methodology**

Theory (one paper)	80 marks
Internal Assessment Theory	20 marks
Total	100 marks

Note: There will be no practical examination on this paper

B.Sc. Part-II

Every candidate shall be required to offer the following subjects:

1. Anatomy
2. Physiology
3. Biochemistry
4. Computer & Computer Applications

1. **Anatomy**

Theory (one paper)	100 marks
Practical examination	40 marks
Oral (viva)	20 marks
Internal Assessment Theory	20 marks
Internal Assessment Practical	20 marks
Total	200 marks

2. **Physiology**

Theory (one paper)	100 marks
Practical examination	40 marks
Oral (viva)	20 marks
Internal Assessment Theory	20 marks
Internal Assessment Practical	20 marks
Total	200 marks

3. **Biochemistry**

Theory (one paper)	100 marks
Practical examination	40 marks
Oral (viva)	20 marks
Internal Assessment Theory	20 marks
Internal Assessment Practical	20 marks
Total	200 marks

4. **Computer & Computer Applications**

Practical examination	80 marks
Internal Assessment Practical	20 marks
Total	100 marks

Note : There will be no theory examination for this paper.

B.Sc. Part-III

Every candidate shall be required to offer the following subjects:

1. Anatomy
2. Physiology
3. Biochemistry
4. Psychology & Education

1. **Anatomy**

Theory (one paper)	100 marks
Practical examination	40 marks
Oral (viva)	20 marks
Internal Assessment Theory	20 marks
Internal Assessment Practical	20 marks
Total	200 marks

2. **Physiology**

Theory (one paper)	100 marks
Practical examination	40 marks
Oral (viva)	20 marks
Internal Assessment Theory	20 marks
Internal Assessment Practical	20 marks
Total	200 marks

3. **Biochemistry**

Theory (one paper)	100 marks
Practical examination	40 marks
Oral (viva)	20 marks
Internal Assessment Theory	20 marks
Internal Assessment Practical	20 marks
Total	200 marks

4. **Psychology & Education**

Theory (one paper)	80 marks
Internal Assessment Theory	20 marks
Total	100 marks

Note: There will no practical examination for this paper.

Provided that the internal assessment shall be based on class work which includes day-to-day work and the periodic class examinations, both written and practical and viva-voce examinations.

Provided further that internal assessment shall be certified by the Head of the Department concerned and countersigned by the Head of the Institution.

Provided further that the marks of Oral (viva) examination shall be added to theory marks.

Provided further that there will be fresh internal assessment for all failed or reappear candidates in each subsequent examination.

Provided further that the theory papers will be prepared by the examiners as prescribed. Nature of questions will be short answer type/ objective type and marks for each part indicated separately.

Provided that the practical examinations should be aimed at assessing proficiency in skills, conduct of experiments, interpretation of data etc. It should be aimed at ascertaining whether the candidate has the necessary knowledge, minimum skills and clear concepts of the fundamentals of the subject.

Qualifying Marks

For B.Sc. Part-I, B.Sc. Part-II and B.Sc. Part-III examinations, a candidate will have to procure 50% marks in internal assessment in the various subjects separately failing which that candidate will be detained in that particular subject and not allowed to appear in examination for that subject in University examination.

The minimum number of marks to pass in the subject of Anatomy, Physiology and Biochemistry of B.Sc. Part-I, B.Sc. Part-II and B.Sc. Part-III examination of this University, shall be 50% in aggregate with a minimum of 50% in theory including Oral (viva) and a minimum of 50% in practical in each subject.

A candidate who obtains 80% marks in any subject shall be declared to have passed with distinction in that subject provided he passes in all the subjects of B.Sc. Part I, or B.Sc. Part II or B.Sc. Part III, as the case may be, in the first attempt.

A candidate who obtains 50% marks or above but less than 60% , shall be declared to have passed the said examination in second division.

A candidate who obtains 60% marks or above, shall be declared to have passed the said examination in first division.

Grace Marks

There shall be no provision for grace marks.

Declaration of Result and issuance of Degree

1. The Registrar shall publish the result of examination as soon as possible after the completion of the said examination.
2. A successful candidate in B.Sc. Part I, B.Sc. Part II or B.Sc. Part III examination, as the case may be, shall be granted a certificate to that effect with detail of marks obtained by him.
3. A successful candidate on completion of the course and having passed the said examinations of the course shall be granted a degree.

Syllabus and courses of reading for Bachelor of Science in Anatomy, Physiology and Biochemistry

Anatomy

The broad goal of the teaching of the subject of Anatomy for B.Sc. course should be to provide to the students a comprehensive knowledge of the gross and microscopic structure and development of human body to provide basis for understanding the clinical co-relation of organs or structures involved and the anatomical basis for the disease presentations.

B.Sc. Part I

Outline of Tests

Theory Paper (Time 3 Hours)	100 Marks
Practical Examination	40 Marks
Viva (Oral)	20 Marks
Internal Assessment (Theory)	20 Marks
Internal Assessment (Practical)	20 Marks
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Total	200 Marks
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Syllabus

Theory

1. Gross Anatomy of Lower Extermity and Abdomen including their osteology, Arthrology, Myology, Blood Supply, Lymphatic, Drainage and nerve supply. Surface Anatomy, Radiological Anatomy and Applied Anatomy of these parts is also included.
2. Histological Studies of the tissues of the body such as epithelial tissue, connective tissue, muscle tissue and nervous tissue, skin, bone and cartilage.
3. General Human Embryology
4. Study of General Anatomy (Basic Anatomy) such as of skin, fascia, muscle, bone, cartilage, joints etc.

Practical Work

1. Practical work will include dissections of lower extremity and abdomen of a human cadaver.
2. Study of General Embryology models.
3. Study of Histological slides of epithelial tissue, connective tissue, muscle tissue, nervous tissue, skin, bone and cartilage.
4. The record of the practical work done (dissection, histology etc.) shall be maintained in the form of practical note books.
5. In the oral and practical examinations, the candidate will dissect out a part from the lower extremity or abdomen. There will be a viva on the dissected regions, bones, other soft parts relating to the above mentioned regions of the body. Viva on embryology models and identifications of histological slides as mentioned above. Examinations of X-ray films from the above regions.
6. The candidates will have to submit a certificate signed by the Head of the Department showing that the candidate has done the practical work and has the requisite attendance in theory and practicals to the satisfaction of the Head of the Department.

B.Sc. Part II**Outline of Tests**

Theory Paper (Time 3 Hours)	100 Marks
Practical Examination	40 Marks
Viva (Oral)	20 Marks
Internal Assessment (Theory)	20 Marks
Internal Assessment (Practical)	20 Marks
Total	200 Marks

Syllabus**Theory**

1. Gross Anatomy of Thorax and Upper Extremity. Surface Anatomy, Radiological Anatomy and Applied Anatomy of these parts is also included.
2. Special (systemic) Embryology of Cardiovascular, Respiratory, Urogenital and Alimentary Systems.
3. Special (systemic) Histology of Cardiovascular, Respiratory, Urogenital and Alimentary system.
4. Elements of Physical Anthropology

Practical Work

1. Practical work will include dissections of Upper Extremity and Thorax of human cadaver
2. Study of histological slides of cardiovascular system, respiratory system, alimentary system and urogenital system.
3. Study of anthropological instruments.
4. The record of the practical work done (dissection, histology etc.) shall be maintained in the form of practical note books.
5. In the oral and practical examination, the candidate will dissect out a part of the upper extremity or thorax. There will be viva on the dissected regions, bones, other soft parts relating to the above mentioned regions of the body. Viva on Special Embryology and Anthropology, Identification of histology slides of the systems noted above. Surface and Radiological Anatomy of the regions dissected will also be a part of the practical examination.
6. The candidates will have to submit a certificate signed by the Head of the Department showing that the candidate has done the practical work and has the requisite attendance in theory and practicals to the satisfaction of the Head of the Department.

B.Sc. Part IIIOutline of Tests

Theory Paper (Time 3 Hours)	100 Marks
Practical Examination	40 Marks
Viva (Oral)	20 Marks
Internal Assessment (Theory)	20 Marks
Internal Assessment (Practical)	20 Marks
Total	200 Marks

Syllabus**Theory**

1. Gross human anatomy of Head, Neck and Brain. Surface Anatomy, Radiological Anatomy and Applied Anatomy of these parts is also included.
2. Special (systemic) Embryology of special senses, nervous system, Ductless glands, face and branchial arches.
3. Microscopic Anatomy of endocrine glands, Salivary glands, Nervous system and special senses.
4. Modern concepts of Human Evolution and Human Genetics (Medical Genetics).

Practical Work

1. Dissection of Head, Neck and Brain
2. To study the models of special (systemic) Embryology of special senses, nervous system, Ductless glands, face and branchial arches.
3. To study histology slides of Endocrine glands, Salivary glands, Nervous system and special senses.
4. Study of Anthropological instruments and Models.
5. In the Oral and Practical examinations, the candidate will have to dissect a part of head and neck or brain. There will be viva on this and also on bones and soft parts relating to the regions mentioned in the theory syllabus. Viva on special embryology and identification and viva on histology slides as mentioned in the theory syllabus. Surface Anatomy and Radiological Anatomy of the parts dissected will also be part of examination.
6. The candidates will have to submit a certificate signed by the Head of the Department showing that the candidate has done the practical work and has the requisite attendance in theory and practicals to the satisfaction of the Head of the Department.

Books Recommended

1. Gray's Anatomy, Latest edition,
2. Cunningham's Manual of Practical Anatomy. Vol. I, II, III, Oxford University Press
3. Human Embryology: Prenatal development of Form & Function (Hamilton, Boyd and Mossman): The Williams & Wilkins Co, Baltimore
4. Hewer's Text Book of Histology for Medical Students.
5. Atlas of Human Histology by Mariano S.H. diFiore. KM Varghese Co. Bombay
6. Histology by Leeson and Leeson: WB Saunders Company, Philadelphia
7. An Introduction to Physical Anthropology by EP Stibbe.
8. Grant's Method of Anatomy by Bassmajian: The Williams & Wilkins Co. Baltimore
9. Grant's Atlas of Anatomy by JCB Grant: The Williams & Wilkins Co. Baltimore
10. Anatomy of the Nervous System (Ranson and Clark). WB Saunders Co. Toronto/ London
11. The Tissues of the Body (Sir W.E.Le Gros Clark). Oxford University Press London.
12. Text Book of Anatomy with Color Atlas Vol. I, II and III (Dr Inderbir Singh). Jay Pee Brothers, New Delhi
13. Surface & Radiological Anatomy by Halim & Dass. Vikas Publishing House (P) Ltd. New Delhi
14. Living Anatomy (Novelline R.A. and Squire L.F.). New Central Book Agency (P) Ltd., Calcutta
15. Human Embryology for Medical Students (Dr Inderbir Singh) Mcmillan India Ltd. New Delhi
16. Medical Genetics- Principles & Practice by James J Nora and F Clark Fraser (Lee and Febiger, Philadelphia)
17. Basics of Human Genetics by Versha Katira, CBS Publishers and Distributors, New Delhi
18. Clinical Anatomy by Vishram Singh: BI Churchill Livingstone Pvt. Ltd., New Delhi

Physiology

The broad goal of the teaching of the subject of Physiology for B.Sc. course should be to provide to the students a 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.

B.Sc. Part I

Outline of Tests

Theory Paper (Time 3 Hours)	100 Marks
Practical Examination	40 Marks
Viva (Oral)	20 Marks
Internal Assessment (Theory)	20 Marks
Internal Assessment (Practical)	20 Marks
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Total	200 Marks

Syllabus

Theory

1. Introduction and history of Physiology
2. The Internal Environment of the body
3. The cell and its function.
Structure of cell membrane and transport across it.
4. Digestive system
5. Blood
6. Body Water
7. Excretory system
8. Temperature Regulation

Practical Work

1. Study of Microscope
2. Estimation of Haemoglobin
3. Blood film preparation and DLC, WBC & RBC counts. Reticulocyte count, Platelet counts. ESR., P.C.V.
4. Calculations and interpretation of MCH, MCHC, MCV, Color Index
5. BT & CT.
6. Blood grouping and matching
7. Demonstrations-specific gravity, bone marrow smear, Prothrombin Time and Index
8. Observation of Body Temperature

B.Sc. Part II**Outline of Tests**

Theory Paper (Time 3 Hours)	100 Marks
Practical Examination	40 Marks
Viva (Oral)	20 Marks
Internal Assessment (Theory)	20 Marks
Internal Assessment (Practical)	20 Marks
Total	200 Marks

Syllabus**Theory**

1. Nerve-muscle Physiology and Bio-potentials
2. Respiratory System
3. Cardiovascular System
4. Nutrition and Vitamins
5. Ageing and Growth

Practical Work

1. Experiments of frog's nerve-muscle preparation, simple muscle twitch, effect of temperature, Velocity of nerve impulse, effect of load, two successive Stimuli
2. Genesis of Tetanus
3. Spirometry

B.Sc. Part III**Outline of Tests**

Theory Paper (Time 3 Hours)	100 Marks
Practical Examination	40 Marks
Viva (Oral)	20 Marks
Internal Assessment (Theory)	20 Marks
Internal Assessment (Practical)	20 Marks
Total	200 Marks

Syllabus**Theory**

1. Endocrines
2. Reproduction
3. Nervous system
4. Special senses

Practical Work

1. Frog's heart. Cardiogram. Effect of temperature. Effect of drug. Properties of Heart. Refractory period. Vago-sympathetic stimulation. Vagal escape. Stannius ligatures. Perfusion of heart. Spinal frog and decerebrate frog.
2. Cardiovascular system. Heart sounds. Examination of arterial pulse. Jugular venous pulse, ECG Recording on Polygraph. Carotid Sinus Reflex. Recording of Blood Pressure, Effect of Exercise on CVS and Respiratory system, Triple Response, Clinical Examination
3. Nervous-system-General Sensations, Testing proprioceptive senses, Clinical Testing of Reflexes, Clinical Examination of Cranial nerves and the Nervous system
4. Vision-Blind Spot, Near Point, The near response, senses images, acuity of vision, perimetry, colour vision, stereoscopic vision
5. Hearing- Tests of hearing, localization of sound
6. Mammalian Experiments
7. Demonstrations:- Perfusion of isolated heart, Experiments on Anaesthetized dog Intestinal movements.

Books recommended

1. Text book of Medical Physiology by Arthur C. Guyton, latest edition
2. Review of Medical Physiology by WF Ganong latest edition
3. A Text Book of Practical Physiology by CL Ghai
4. Best & Taylor's Physiological basis of Medical Practice. Edited by John B West- latest edition
5. Samson Wright's. Applied Physiology-latest edition.
6. Text book of Physiology Vol. I and Vol. II by Prof. AK Jain
7. Medical Physiology Vol. I, II by Dr Sabyasachi Sircar
8. Manual of Practical Physiology by Prof AK Jain

Biochemistry

The broad goal of the teaching of the subject of Biochemistry for B.Sc. course should be to provide to the students an understanding of the scientific basis of the life processes at the molecular level and to orient them towards the application of the knowledge required in solving clinical problems.

B.Sc. Part I

Outline of Tests

Theory Paper (Time 3 Hours)	100 Marks
Practical Examination	40 Marks
Viva (Oral)	20 Marks
Internal Assessment (Theory)	20 Marks
Internal Assessment (Practical)	20 Marks
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Total	200 Marks
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Syllabus

Theory

1. Physio-chemical principles, concept of pH and blood buffers. Colloids, surface tension, osmotic pressure and Donann's equilibrium
2. Carbohydrates- importance, classification, general reactions of monosaccharides, oligosaccharides and polysaccharides and Mucopolysaccharides
3. Lipids-importance, classification, general reactions of fatty acids, glycerol, neutral fats, phospholoids and sterols
4. Aminoacids and Proteins-classification, general properties, structure and functions.
5. Nucleic Acid-importance, structure and properties of pyrimidines, purines, nucleotides, and nucleic acids
6. Enzymes
7. Vitamins
8. Plasma proteins
9. Detoxification mechanism
10. Radioisotopes in medicine

Practical work

1. Preparation of buffer solutions and determination of pH with the help of standards and pH meter
2. Reactions and qualitative tests for carbohydrates
3. Reactions and qualitative tests for fats
4. Reactions and qualitative tests for proteins
5. Reactions and qualitative tests for aminoacids
6. Gastric juice analysis
7. Spectroscopic examination of haemoglobin and its derivatives, preparation of Hematin crystals.
8. Urine- physical properties, normal and abnormal constituents

B.Sc. Part II**Outline of Tests**

Theory Paper (Time 3 Hours)	100 Marks
Practical Examination	40 Marks
Viva (Oral)	20 Marks
Internal Assessment (Theory)	20 Marks
Internal Assessment (Practical)	20 Marks
Total	200 Marks

Syllabus**Theory**

1. Metabolism of carbohydrates
2. Metabolism of lipids
3. Metabolism of amino acids
4. Metabolism of purines and pyrimidines
5. Water and mineral metabolism
6. Hormones - chemistry and functions

Practical work

1. Urine-quantitative measurement of chloride, creatinine, sugar, urea, proteins
2. Blood serum- estimation of true blood glucose, urea, creatinine, phosphate, calcium, uric acid, serum cholesterol, bilirubin(direct and indirect) and proteins(total and differential).

B.Sc. Part III**Outline of Tests**

Theory Paper (Time 3 Hours)	100 Marks
Practical Examination	40 Marks
Viva (Oral)	20 Marks
Internal Assessment (Theory)	20 Marks
Internal Assessment (Practical)	20 Marks
Total	200 Marks

Syllabus**Theory**

1. Biological oxidation, electron transport chain, Mechanism of oxidative-Phosphoylation, Inhibitors of O/P and E.T.C.
2. Biophysical chemistry-Thermodynamics of biochemical reactions, molecular weight, high energy bond, chromatography, electrophoresis, colorimetry, fluorimetry, viscosity, ultracentrifugation & dialysis
3. Principles of immunology
4. Muscle contraction
5. Liver function tests and kidney function tests
6. Molecular genetics-replication, transcription, translation, gene regulation and recombinant technology
7. Haem-synthesis

Practical work

1. Urea clearance test
2. Creatinine clearance test
3. Glucose tolerance test (G.T.T.)
4. Assay of enzymes:
 - (i) serum Amylase
 - (ii) serum acid and alkaline phosphatase
 - (iii) SGOT & SGPT
5. Stone Analysis
6. Lipidogram

Books recommended

1. A Review of Biochemistry by Harper
2. Biochemistry by A Lehinger
3. Practical Clinical Biochemistry by Harold Varley
4. Practical Biochemistry by VK Malhotra
5. Biochemistry by Satyanarayan
6. Biochemistry by Dr Dinesh Puri
7. Clinical Biochemistry (Medical Laboratory Techniques for routine diagnostic tests) Vol VII by G. Rury (Project Co-ordinator) NCERT
8. Text Book of Biochemistry by Edward S. West, Wilbert R. Todd, Howard S. Mason and John J. Van Druggson
9. Hawk's Physiological Chemistry by Bernard L. Oser
10. Biochemistry of nucleic Acids by Adams, Burdon, Campbell Leader and Smethie

Medical Statistics & Research Methodology

(B.Sc. Part-I)

The broad goal of the teaching of the subject of Medical Statistics and Research Methodology in B.Sc. Course is to provide to the students the necessary knowledge and skills to enable them to learn the research methods and treat the research data statistically to arrive at accurate and logical conclusions.

Outline of Tests

Theory Paper (Time 3 Hours)	80 Marks
Internal Assessment (Theory)	20 Marks
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Total	100 Marks

Note: No Practical examination in the subject.

Syllabus

Theory

1. Statistical Treatment of Data
-Mean, Average, mode, median, confidence limits, percentiles, standard deviation, standard error, test of significance, correlation and regression analysis
2. Preparation of Scientific Reports
3. Experimental design
-Construction of hypothesis, sample design, census method of investigation
-Sampling Method: random, purposive, selection, stratified, quota, multistage, convenience sampling, problems of representative sample.
4. Collection of Data
- Participant, non-participant, controlled and non-controlled observations, interview, questionnaire and schedule.

Notes:

1. The paper will be in B.Sc. Part I and the syllabus will be covered in 100 teaching hrs.
2. The students will be examined by way of one theory paper of 80 marks. There will be no practical examination for this paper.
3. The theory paper will be set by the external examiner who will also evaluate the answer sheets in the University examination.
4. The Theory paper will have both full length and short answer type of questions. Marks for each question shall be indicated separately.
5. Students will have to have a minimum of 75% attendance in the theory classes to qualify for the University examination.

6. Teaching of the syllabus for the subject for B.Sc. Part I students shall be undertaken by Lecturer (Statistics) and/ or other suitable teacher from the Medical College itself who shall also be responsible for conducting house tests for the students and submission of the Internal Assessment out of 20 marks well in time as and when directed by the Principal of the College. The Internal assessment will be countersigned by the Principal of the College.
7. Pass marks in the subject shall be 50% of the total marks earmarked for the subject.
8. The internal assessment should be based on overall performance of the students in the house tests.
9. Students must have a minimum of 50% marks in the internal assessment to be eligible to appear in the University examinations.

Books Recommended

1. Statistical Methods in Biology by Bailey
2. Methods in Social Research by William J Goode and Paul K Hatt.
3. Statistical Methods by George W. Snedecor and William G Cochran
4. Methods of Social Survey of Research by Bajpai
5. Statistical Calculations for Beginners by Chambers
6. Statistical Methods for Medical and Biological Studies by Dahlbarg
7. Research Methodology: Methods & Techniques by CR Kothari
8. Methods in Biostatistics by JP Mahajan

Computer and Computer Applications (B.Sc. Part-II)

The broad goal of the teaching of the subject of Computer and Computer Applications in B.Sc. Course is to provide to the students the necessary training to enable them to learn the working of Computer and its applications so that the student is equipped suitably to work with computer as applied to the field of Medical Education and Research.

Outline of Tests

Practical Examination	80 Marks
Internal Assessment (Practical)	20 Marks
Total	100 Marks

Note: No Theory examination in the subject.

Syllabus

Practical Work

1. Anatomy of a Computer and Basic Structural Components
2. Physiology of a Computer: Operating Systems
 - Basic/brief knowledge about the various operating systems used in a computer (Windows, Linux, Mac, etc.)
3. Microsoft Power Point
4. Microsoft Word
5. Microsoft Excel
6. Microsoft Access
7. Basic knowledge of utility of Multi Media
8. Internet and its applications

Notes

1. The practical examination on the subject will be in B.Sc. Part II. The syllabus for the practical work of the subject will be covered in 100 practical teaching hrs.
2. The Practical examination will carry 80 marks. There will be no theory paper on the syllabus.
3. The students will learn & have the practical training in the IT Cell of the Medical College under supervision of the Prof. In-charge of the IT Cell. Students will have to have 80% attendance to be eligible for the University practical examination.
4. The students will have periodic practical tests, the results of which will be maintained in the IT Cell. The Internal Assessment out of 20 marks, based on student performance, will be submitted by Prof. In-charge of the IT Cell as and when directed by the Principal.
5. The internal assessment will be countersigned by the Principal.
6. The students must have a minimum of 50% marks in the internal assessment to be eligible to appear in University practical examination.
7. The Practical examination will be conducted by the External Examiner as appointed by the University.
8. Pass marks in the subject will be 50% of the total marks earmarked for the subject.

Books Recommended

1. Computers in Medicine by Dr Naval Kishore, Vikas Publishing House P. Ltd., New Delhi
2. A Beginners Guide to Computers by Alexis Leon and Mathews Leon, Vikas Publishing House P Ltd. New Delhi
3. Computers Our Future by Gurpreet Singh Grewal, Nova Publications, Darya Ganj, New Delhi (Set of 5 books for 6th to 10th class of Punjab State Education Board)

Psychology & Education
(B.Sc. Part- III)

The broad goal of the teaching of the subject of Psychology & Education in B.Sc. Course is to acquaint the student with the type of problems faced by a college/university going student and their possible solutions and to enable him to learn some educational technologies so that he utilizes these skills later on in the field of teaching and research .

Outline of Tests

Theory Paper (Time 3 Hours)	80 Marks
Internal Assessment (Theory)	20 Marks
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Total	100 Marks
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Note: No Practical examination in the subject.

Syllabus

Theory

1. Adolescence: Characteristics of adolescence, Socio-Psychological development of adolescent and young adults, crises of adolescent
2. Cognitive development among youth
3. Problems of Indian youth in different areas such as education, home life, social life, future, money, religion and health.
4. Aggression and violence amongst Indian youth
5. Drug use and abuse amongst students, its causes and treatment and rehabilitation of drug addicts
6. Guidance and counselling of youth
7. Student evaluation and evaluation of knowledge
8. Viva-voce examination- its conduct, merits and demerits
9. Role and use of library in education
10. Role of media in education- information about OHP, Slide projectors and slides (35 mm), videos, digital recording cameras, digital projectors etc.
11. Role of Computers in Medical Education and importance of Internet and Websites.

Notes:

1. This syllabus will be studied in B.Sc. Part III. The study of the syllabus will be completed in 100 teaching hours.
2. The students will be examined by way of one theory paper in the University examination carrying 80 marks. There will be no practical examination for this paper.
3. The theory paper will be set by the external examiner who will also evaluate the answer sheets of the students in University examination.
4. The theory paper will have short answer type questions and marks for each question shall be indicated separately.
5. Teaching of the syllabus for this paper will be undertaken by the part time faculty of the Medical Education Unit of the Medical College and the Lecturer / Psychologist from the Psychiatry Department of the Medical College. Student will have to have 75% attendance to be eligible for University examination.
6. The internal assessment out of 20 marks shall be submitted by Prof. Incharge of Medical Education Unit as and when directed by the Principal. The Internal assessment will be countersigned by the Principal.
7. The internal assessment is to be based on the student performance in the periodic house test conducted by Medical Education Unit.
8. Students must have a minimum of 50% marks in the internal assessment to be eligible to appear in the University examination.
9. Pass marks in the subject will be 50% of the total marks earmarked for the subject.

Books Recommended

1. The Psychology of Adolescence by Jersild, AT, Brook, JS and Brook, DW, Macmillan Publishing Company, New York
2. Handbook of Developmental Psychology by Wolman, BB. Prentice Hall, Englewood Cliffs, N.U.
3. The Growth of Logical Thinking from Childhood to Adolescence by Inhelder, B and Piaget, J. Basic Books, New York
4. Drug Abuse in India- a report (1977) Ministry of Health & Family Welfare, Govt. of India
5. Guidance and Counselling in Colleges and Universities by Kochhar S.K. Sterling Publishers, New Delhi
6. Counselling and Guidance by Rao, SN. Tata McGraw, New Delhi
7. Educational Technology by Kulkarni, S.S. Oxford, New Delhi
8. Better Pediatric Education by Tejinder Singh, Madhav V Natu, Daljit Singh & Vinod K Paul., Education Centre, IAP, AIIMS, New Delhi
9. Computers in Medicine by Naval Kishore. Vikas Publishing House, Pvt. Ltd., New Delhi