

CURRICULUM FOR

B.Sc. in ANATOMY, PHYSIOLOGY & BIOCHEMISTRY

(Applicable w.e.f. academic session 2017-18)

COURSE NAME: B.Sc. (ANATOMY, PHYSIOLOGY & BIOCHEMISTRY)

DURATION OF COURSE: THREE YEARS

FULL-TIME/ PART – TIME: FULL-TIME

**SRI GURU RAMDAS UNIVERSITY OF HEALTH SCIENCES, SRI
AMRITSAR, PUNJAB**

1. Bachelor of Sciences (Anatomy, Physiology & Biochemistry)

The degree course is stepping stone to Master's specialization in Basic medical subjects i.e. Anatomy, Physiology and Biochemistry. It helps in understanding the basic concepts of research methodology and development of skills required for teaching medical students.

2. Duration of Course

The Bachelor of Science in Anatomy, Physiology & Biochemistry Course is proposed to be a 3 years integrated degree course.

3. Eligibility Criteria for Admission

The students shall be admitted as per the admission criteria and qualification prescribed in the Notification issued by the Board of Management of Sri Guru Ram Das University of Health Sciences from time to time.

4. Medium of Instructions

The Medium of instruction during the course and for the university examination shall be in English.

5. Examination Scheme

5.1 The examination for the first, second and third year shall ordinarily be held twice year in the months of May/June and November/ December by the Institute as per University rules.

5.2 Annual Examination shall be held in May/June and supplementary within 6 months of annual examination.

5.3 The examination in theory/practical shall be held at the end of the 1st academic year (1st Year) and the end of 2nd academic year (2nd Year) and third exam at the end of the 3rd academic year (3rd Year) with one internal and one external examiners.

5.4 Date of examination and appointment of examiner will be made by the Board of Management on recommendation of Faculty of Medical Sciences.

5.5 The examination for the first, second and third year of B.Sc. Anatomy, Physiology & Biochemistry Course would be held according to the prescribed syllabus.

6. Rules of Examination for Bachelor of Science in Anatomy, Physiology & Biochemistry Course:

6.1 The students shall submit his/her application for admission to the examination to Controller of Examinations SGRDUHS, Sri Amritsar through the Director Principal of the SGRDIMSAR, Sri Amritsar on the prescribed form with the required fee (the last date of which will be updated on university website after notification issued from Board of Management time to time).

6.2 The candidates will be given 20 marks for theory and 20 marks for practical as internal assessment in each subject on the basis of their performance during the year. That a candidate be eligible to appear in the examination provided he/she secured a minimum of 35% marks in internal assessment in theory and practical.

6.3 There will be fresh internal assessment and compulsory attendance for the students for

the examination in which he/she has failed at the time of subsequent examination in that subject.

- 6.4 The students will not be allowed to appear in the examination unless he/she attends 75% of the total theory and practical in each subject separately.
- 6.5 Director Principal of the college is empowered to condone the shortage of attendance of lectures to the extent of 5% lectures delivered in each course of theory and practical.
- 6.6 A student will be deemed to have passed in the examination if he/she passes in each subject separately.
- 6.7 In case of students joining late owing to the late admission with the approval of the Vice-chancellor, their lecturers are to be counted from the date of joining. Deficiency in studies should be made up by attending special classes for them at the level of Head of the Department.

7. First Year B.Sc. Anatomy, Physiology & Biochemistry Examination:

The First Year B.Sc. Anatomy, Physiology & Biochemistry examination shall be in the following subjects and candidate shall be required to pass all the subjects:-

B.Sc. Part – I

| Paper | Subject | Theory | | | Practical | | | Grand Total |
|----------------------|---|--------|---------------------|-------|-----------|---------------------|-------|-------------|
| | | Marks | Internal Assessment | Total | Marks | Internal Assessment | Total | |
| Paper-I | Anatomy | 100 | 20 | 120 | 60 | 20 | 80 | 200 |
| Paper-II | Physiology | 100 | 20 | 120 | 60 | 20 | 80 | 200 |
| Paper-III | Biochemistry | 100 | 20 | 120 | 60 | 20 | 80 | 200 |
| (Supportive subject) | Medical Statistics & Research Methodology | 50 | — | — | — | — | — | 50 |

Note. The Examination in the subject of Medical Statistics & Research Methodology will be conducted at college level and marks will be sent to University for final inclusion in the result.

8. Second Year B.Sc. Anatomy, Physiology & Biochemistry Examination:

The Second Year B.Sc. Medical Anatomy, Physiology & Biochemistry Examination shall be open to a person who has previously passed the First Year B.Sc. Medical Anatomy, Physiology & Biochemistry Examination of this University or an examination of any other recognized University/Institution in India considered equivalent for the purpose by the University.

B. Sc. Part – II

| Paper | Subject | Theory | | | Practical | | | Grand Total |
|----------------------|--------------------|--------|---------------------|-------|-----------|---------------------|-------|-------------|
| | | Marks | Internal Assessment | Total | Marks | Internal Assessment | Total | |
| Paper-I | Anatomy | 100 | 20 | 120 | 60 | 20 | 80 | 200 |
| Paper-II | Physiology | 100 | 20 | 120 | 60 | 20 | 80 | 200 |
| Paper-III | Biochemistry | 100 | 20 | 120 | 60 | 20 | 80 | 200 |
| (Supportive Subject) | Basics of Computer | 50 | — | — | — | — | — | 50 |

Note. The Examination in the subject of Basics of Computer will be conducted at college level and marks will be sent to University for final inclusion in the result.

9. Third Year

The Third Year B.Sc. Anatomy, Physiology & Biochemistry Examination shall be open to a person who has previously passed the Second Year B.Sc. Anatomy, Physiology & Biochemistry Examination of this University.

B.Sc. Part-III

| Paper | Subject | Theory | | | Practical | | | Grand Total |
|--------------------|--------------|--------|---------------------|-------|-----------|---------------------|-------|-------------|
| | | Marks | Internal Assessment | Total | Marks | Internal Assessment | Total | |
| Paper-I | Anatomy | 100 | 20 | 120 | 60 | 20 | 80 | 200 |
| Paper-II | Physiology | 100 | 20 | 120 | 60 | 20 | 80 | 200 |
| Paper-III | Biochemistry | 100 | 20 | 120 | 60 | 20 | 80 | 200 |
| Supportive Subject | Psychology | ----- | ----- | ----- | ----- | ----- | ----- | ----- |

Note. The Examination in the subject of Psychology will be conducted at college level and marks will be sent to University for final inclusion in the result.

10. Promotion and Number of Attempts allowed

- 10.1 A candidate who fails in all the subjects in the First Year B.Sc. Anatomy, Physiology & Biochemistry examination shall not be promoted to Second Year class.
- 10.2 A Candidate who fails in one more or more subjects will be given four attempts including first attempt as a regular candidate, plus one mercy chance at the discretion of the Vice

Chancellor, at six monthly intervals .However, if he/she will have to clear all these attempts within 6 years of admission to the said course.

- 10.3 The candidate who will absent himself/herself from the examination will be deemed to have been failed in that subject.
- 10.4 A candidate who passes in at least one subject of University level First Year B.Sc. Anatomy, Physiology & Biochemistry examination will be permitted to attend classes of Second Year. However, the candidate will be required to pass in all subjects of 1st Year examination at least 6 months before the final examination of 2nd Year examination.
- 10.5 A candidate who fails in all subjects in the second year B.Sc. Anatomy, Physiology & Biochemistry examination shall not be promoted to Third Year class.
- 10.6 A candidate who passes in at least one subject of University level Second Year B.Sc. Anatomy, Physiology & Biochemistry examination will be permitted to attend classes of Third Year. However, the candidate will be required to pass in all subjects of 2nd Year examination at least 6 months before the final examination of 3rd Year examination.
- 10.7 Candidate who passes in one or more subjects of Second Year B.Sc. Anatomy, Physiology & Biochemistry examination shall be exempted from appearing in these subject at a subsequent examination, but the candidate must pass the examination in a maximum of four attempts including first attempt, as a regular candidate plus one mercy chance at the discretion of the Vice Chancellor, at six monthly intervals .However, if he/she will have to clear all these attempts within 6 years of admission to the said course.
- 10.8 Candidate who passes in one or more subjects of third Year B.Sc. Anatomy, Physiology & Biochemistry examination shall be exempted from appearing in these subject at a subsequent examination, but the candidate must pass the examination in a maximum of four attempts (including first attempt, as a regular candidate), plus one mercy chance at the discretion of the Vice Chancellor, at six monthly intervals .However, if he/she will have to clear all these attempts within 6 years of admission to the said course.

11. Appointments of Examiners:

- 11.1 There shall be two examiners – One internal and one external.
- 11.2 Professor & head of the Department shall be Convener. The Examiner at least 3 years post PG teaching experience in that specification field will be appointed as Internal Examiner.
- 11.3 The external examiner shall be appointed from other Universities at least 3 years post PG teaching experience in that specification field.

12. Paper Setting and moderation of Question Papers

The questions papers for 1st Year, 2nd Year and 3rd Year will be set under the direction of Controller of Examinations.

Each Question Paper covering entire course consists of Six questions out of which six questions carry 10 Marks and one question carry 15 marks.

13. Evaluation of Answer Books

The answer books shall be got evaluated by putting fictitious roll numbers thereon or spot evaluation (Table marking) or any other method under the direction of the Controller of Examinations.

14. Minimum Pass Marks

During all the three annual examinations in each subject paper the candidate shall have to obtain 50% in theory including internal assessment 50% practical including internal assessment in each subject separately.

14.1 The successful candidates shall be classified into divisions as under:-

- a) Those who obtain 60% or more marks First Division.
- b) Those who obtain 50% or more marks but below 60% marks Second Division.
- c) A candidate who will obtain 75% or more marks of the total marks in any subject shall be declared to have obtained distinction in that subject provided he/she passed in all the subjects of the courses in all the parts in the first attempt.

A candidate is eligible to appear in the examination provided he/she secures a minimum of 35% marks in internal assessment in theory and practical separately.

15. Grace Marks

There shall be no provision for grace marks.

16. Declaration of Result

The results will be tabulated and declared by the Controller of Examination's office.

17. Award of Degree

On successfully passing the Third Year B.Sc. Anatomy, Physiology & Biochemistry examination the students shall be awarded the degree of Bachelor of Sciences in Anatomy, Physiology & Biochemistry.

**SYLLABUS AND COURSES OF READING FOR
BACHELOR OF SCIENCE IN ANATOMY, PHYSIOLOGY AND BIOCHEMISTRY**

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 correlation of organs or structures involved and the anatomical basis for the disease presentations.

SYLLABUS for 1st Year

Paper- I: Anatomy

THEORY (150 Hours)

1. Gross Anatomy of Thorax and Upper Extremity Surface Anatomy, Radiological Anatomy and Applied Anatomy of these parts is also included.
2. General Human Embryology
3. Related Special (systemic) Embryology of Cardiovascular and Respiratory systems
4. Histological Studies of the tissues of the body such as epithelial tissue connective tissue, muscle tissue and nervous tissue, skin, bone and cartilage.
5. Special (systemic) Histology of Cardiovascular, Respiratory Systems
6. Study of General Anatomy (Basic Anatomy) such as of skin, fascia, muscle, bone, cartilage, joints etc.

PRACTICAL WORK (400 Hours)

1. Practical work will include dissections of Upper extremity and thorax 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, cardiovascular system & respiratory system,.
4. The record of the practical work done (dissection, histology etc.) shall be maintained in the form of practical notebooks.
5. In the oral and practical examinations, the candidate will dissect out a part from the upper extremity or thorax. 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. 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 practical 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. BD Chaurasias's Human Anatomy- Volume 1, 2 & 3

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

PHYSIOLOGY (200 Hours)

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.

Paper-II: Physiology

THEORY

1. Introduction and General 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 (150 Hours)

1. Study of Microscope.
2. Estimation of Hemoglobin.
3. Blood film preparation and DLC, WBC & RBC counts. Reticulocyte count, Platelet counts, ESR, PCV.

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.

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 Sabyasaeh Sircar.
8. Manual of Practical Physiology by Prof AK Jain

Paper-III: Basic Principles of Biochemistry

Theory (150 hours)

1. Physio-chemical principles, concept of pH and blood buffers. Colloids, surface tension, osmotic pressure and Donnan'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, phospholipids and sterols.
4. Amino acids and Proteins – classification, general properties, structure and functions.
5. Nucleic Acid – importance, structure and properties of pyrimidines, purines, nucleotides and nucleic acids.
6. Enzymes – classification, factors affecting enzyme activity, enzyme inhibition & coenzymes.
7. Plasma Proteins
8. Detoxification mechanism
9. Radioisotopes in Medicine

Practical Work (50 hours)

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 amino acids
6. Gastric juice analysis
7. Spectroscopic examination of haemoglobin and its derivatives, preparation of Hematin

Crystals.

8. Urine – physical properties, normal and abnormal constituents
9. Colorimetry
10. Spectrophotometry

Books Recommended

1. A Review of Biochemistry by Harper
2. Biochemistry of 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, Haward 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.

Papar-IV: Research Methods & Statistics (20 Hours)

Syllabus for Theory

Research

1. Meaning and purpose of research
2. Formulation of research questions Aim, objectives, statement of problem ,hypothesis
3. Types of variables, types of sampling procedures -random, purposive, selection, stratified, quota, multistage, convenience sampling.
4. Methods of data collection and their advantages and disadvantages
5. Research design-Descriptive study, Analytical study (Case control , Cohort), Experimental study (Randomised controlled trail)
6. Documentation of research with software for reference
7. Media –Advantages & Disadvantages
8. Ethics of research

Statistics

1. Scales of measurement :nominal ,ordinal ,interval ,ratio
2. Classification of data class intervals, continuous and discrete measurement
3. Presentation of Data
4. Measures of central tendency : mean , median, mode
5. Measures of variability : range, deviation, variance

6. Construction of hypothesis
7. Statistical test of significance for Qualitative data-construction of contingency table, Chi square test
8. Statistical test of significance for Quantitative data-student -t test ,z test

Recommended Books

1. R. Beaglehole, R. Sonita, T. Kjellstorm. Basic epidemiology. World Health Organisation
2. BK Mahajan Methods in Biostatistics
3. RH Fletcher, SW Fletcher, GS Fletcher . Clinical epidemiology: The Essentials

SYLLABUS for 2nd Year

Paper-I: Anatomy

THEORY (150 Hours)

1. Gross Anatomy of Lower Extremity 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. Related Special (systemic) Embryology of Cardiovascular, Respiratory, Urogenital and Alimentary Systems.
3. Related Special (systemic) Histology of Cardiovascular, Respiratory, Urogenital and Alimentary systems.

PRACTICAL WORK (400 Hours)

1. Practical work will include dissections of Lower Extremity and Abdomen of human cadaver.
2. Study of histological slides of alimentary system and urogenital system.
3. The record of the practical work done (dissection, histology etc,) shall be maintained in the form of practical notebooks.
4. In the oral and practical examination, the candidate will dissect out a part of the lower extremity or Abdomen. 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, 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.
5. 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 practical 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. BD Chaurasia's Human Anatomy- Volume 1, 2 & 3
4. Human Embryology: Prenatal development of Form & Function (Hamilton, Boyd and Mossman): The Williams & Wilkins Co. Baltimore.
5. Hewer's Text Book of Histology for Medical Students.
6. Atlas of Human Histology by Mariano S H (LiFiore, KM Varghese Co. Bombay.
7. Histology by Leeson and Leeson: WB Saunders Company Philadelphia.
8. An Introduction to Physical Anthropology by EP Stibbe.
9. Grant's Method of Anatomy by Bassmajian: The Williams & Wilkins Co. Baltimore.
10. Grant's Atlas of Anatomy by JCB Grant: The Williams & Wilkins Co. Baltimore.
11. Anatomy of the Nervous System (Ranson and Clark) WB Saunders Co. Toronto/ London.
12. The Tissues of the Body (Sir W.E. Le Gros Clark). Oxford University Press London.
13. Text Book of Anatomy with Color Atlas Vol I, II and III (DrInderbir Singh) Jay Pee Brothers. New Delhi.
14. Surface & Radiological Anatomy by Halim & Dass. Vikas Publishing House (P) Ltd New Delhi.
15. Living Anatomy (Novelline R A and Squire L F) New' Central Book Agency (P) Ltd., Calcutta.
16. Human Embryology for Medical Students (DrInderbir Singh) Mcmillan India Ltd. New Delhi.
17. Medical Genetics- Principles & Practice by James J Nora and F Clark Fraser (Lee and Febiger, Philadelphia).
18. Basics of Human Genetics by VershaKatira, CBS Publishers and Distributors, New Delhi.
19. Clinical Anatomy by Vishram Singh BI Churchill Livingstone Pvt Ltd., New Delhi.

Paper-II: Physiology

THEORY (200 Hours)

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

PRACTICAL WORK (150 Hours)

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. 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.
4. Spirometry

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 Sabyasaeh Sircar.
8. Manual of Practical Physiology by Prof AK Jain

PAPER – III: Biochemistry

Theory (150 hours)

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
7. Enzymes : Clinical Enzymology, metalloenzymes and Isoenzymes
8. Biological Oxidation, electron transport chain, Mechanism of oxidative – Phosphorylation,
9. Inhibitors of O/P and E.T.C.

Practical Work (50 hours)

1. Blood serum –Quantitative Estimation of true blood glucose, urea, creatinine, phosphate, calcium, uric acid, serum cholesterol, bilirubin (direct and indirect) and proteins (total and differential).
2. Urine – Quantitative measurement of sugar, urea, creatinine, proteins, chloride.
3. ELISA
4. Chromatography

Recommended Books

1. A Review of Biochemistry by Harper
2. Biochemistry of 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 Smethi

Basics of Computer

Theory : 30 hours

Practicals : 30 hours

THEORY

Introduction to computer – I/O devices – memories – RAM and ROM – Different kinds of ROM – kilobytes, MB, GB their conversions – large computer – Medium, Micro, Mini computers - Different operating system – Networking – LAN, WAN, MAN (only basic ideas)

Typing text in MS word – Manipulating text – Formatting the text – using different font sizes, bold, italics – Bullets and numbering – Pictures, file insertion – Aligning the text and justify – choosing paper size – adjusting margins – Header and footer, inserting page No's in a document – Printing a file with options – Using spell check and grammar – Find and replace – Mail merge – inserting tables in a document.

Creating table in MS-Excel – Cell editing – Using formulas and functions – Manipulating data with excel – Using sort function to sort numbers and alphabets – Drawing graphs and charts using data in excel – Auto formatting – Inserting data from other worksheets.

Preparing new slides using MS-POWERPOINT – Inserting slides – slide transition and animation – Using templates – Different text and font sizes – slides with sounds – Inserting clip arts, pictures, tables and graphs – Presentation using wizards.

Introduction to Internet – Using search engine – Google search – Exploring the next using Internet Explorer and Navigator – Uploading and Download of files and images – E- mail ID creation – Sending messages – Attaching files in E- mail.

Role of Computers in the Health care: - HIS, Medical Equipment, Pharmacy in inventory management, Patient record maintenance.

PRACTICAL

- Typing a text and aligning the text with different formats using MS-Word
- Inserting a table with proper alignment and using MS-Word - Create mail merge document using MS-word to prepare greetings for 10 friends
- Preparing a slide show with transition, animation and sound effect using MSPowerpoint
- Customizing the slide show and inserting pictures and tables in the slides using MSpowerpoint
- Creating a worksheet using MS-Excel with data and sue of functions Using MSExcel prepare a worksheet with text, date time and data Preparing a chart and pie diagrams using MS-Excel
- Using Internet for searching, uploading files, downloading files creating e-mail ID

SYLLABUS for 3rd Year

Paper- I: Anatomy (150 Hours)

THEORY

1. Gross human anatomy of Head, Neck and Brain Surface Anatomy, Radiological Anatomy and Applied Anatomy of these parts 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 Genetics (Medical Genetics).

PRACTICAL WORK (400 Hours)

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. 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.
5. 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 practical 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. BD Chaurasia's Human Anatomy- Volume 1, 2 & 3
4. Human Embryology: Prenatal development of Form & Function (Hamilton, Boyd and Mossman): The Williams & Wilkins Co. Baltimore.
5. Hewer's Text Book of Histology for Medical Students.
6. Atlas of Human Histology by Mariano S H (liFiore, KM Varghese Co. Bombay.
7. Histology by Leeson and Leeson: WB Saunders Company Philadelphia.
8. An Introduction to Physical Anthropology by EP Stibbe.
9. Grant's Method of Anatomy by Bassmajian: The Williams & Wilkins Co. Baltimore.

10. Grant's Atlas of Anatomy by JCB Grant: The Williams & Wilkins Co. Baltimore.
11. Anatomy of the Nervous System (Ranson and Clark) WB Saunders Co. Toronto/ London.
12. The Tissues of the Body (Sir W.E. Le Gros Clark). Oxford 1 University Press London.
13. Text Book of Anatomy with Color Atlas Vol I, II and III (DrInderbir Singh) Jay Pee Brothers. New Delhi.
14. Surface & Radiological Anatomy by Halim & Dass. Vikas Publishing House (P) Ltd New Delhi.
15. Living Anatomy (Novelline R A and Squire L F) New' Central Book Agency (P) Ltd., Calcutta.
16. Human Embryology for Medical Students (DrInderbir Singh) Mcmillan India Ltd. New Delhi.
17. Medical Genetics- Principles & Practice by James J Nora and F Clark Fraser (Lee and Febiger, Philadelphia).
18. Basics of Human Genetics by VershaKatira, CBS Publishers and Distributors, New Delhi.
19. Clinical Anatomy by Vishram Singh BI Churchill Livingstone Pvt Ltd., New Delhi.

Paper-II: Physiology

THEORY (200 Hours)

1. Endocrine system
2. Reproductive system
3. Nervous system.
4. Special senses.

PRACTICAL WORK (150 Hours)

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. Nervous-system-General Sensations, Testing proprioceptive senses. Clinical testing of Reflexes, Clinical Examination of Cranial nerves and the Nervous system.
3. Vision-Blind Spot, Near Point, The near response, senses images, acuity of vision, perimetry, colour vision, stereoscopic vision.
4. Hearing- Tests of hearing, localization of sound.

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 SabyasaehSircar.
8. Manual of Practical Physiology by Prof AK Jain

Paper III --- Biochemistry

Theory (150 hours)

1. Biophysical chemistry – Thermodynamics of biochemical reactions, molecular weight, high energy bond, chromatography, electrophoresis, colorimetry, fluorimetry, viscosity, ultra centrifugation and dialysis
2. Principles of immunology
3. Muscle contraction
4. Liver function tests and kidney function tests
5. Molecular genetics – replication, transcription, translation, gene regulation and recombinant Technology.
6. Haem-synthesis
7. Pancreatic Function Tests
8. Liver Function Tests
9. Thyroid Function Tests
10. Kidney Function Tests

Practical Work (50 hours)

1. Urea clearance test
2. Creatinine clearance test
3. Glucose tolerance test (G.T.T.)
4. 24 Hours Urinary Proteins
5. Assay of enzymes :
 - Serum Amylase
 - Serum Acid and Alkaline Phosphatase
 - SGOT & SGPT
6. Stone analysis
7. Lipidogram
8. Electrolyte and Mineral Estimation
 - Serum and urinary calcium
 - Serum and urinary inorganic phosphates
9. Special Investigation
 - Hormonal Assay
 - Thyroid estimation (T3, T4 and TSH)
 - Infertility profile: Female sex hormone (LH, FSH, estradiol and prolactin), Male sex hormone (testosterone).
 - Special Tests for Diabetes: Insulin and glycosylated haemoglobin.
 - Cardiac Marker: CPK (MB) and troponin I/T.
 - Serum iron, TIBC and serum magnesium.
10. Analysis of CSF: Estimation of proteins, glucose, chloride (in case of viral meningitis, bacterial meningitis and tubercular meningitis).
11. Analysis of Ascitic fluid and pleural fluid

12. Stool Examination for Fat and Occult Blood
13. Quality Control of Clinical Investigations (External and Internal Quality Control)
14. Automation in Clinical Biochemistry
15. Clinical Posting – Posting in Clinical Biochemistry Lab.

RECOMMENDED BOOKS

1. A Review of Biochemistry by Harper
2. Biochemistry of 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.

REFERENCE BOOKS

Biochemistry

1. Varley – Clinical chemistry
2. TEITZ – Clinical chemistry
3. Kaplan – Clinical chemistry
4. Ramakrishna(S) Prasanna(KG), Rajna ® Text book of Medical Biochemistry Latest Ed Orient longman Bombay –1980
5. Vasudevan (DM) Sreekumari(S) Text book of Biochemistry for Medical students. Latest Ed DAS(Debajyothi) Biochemistry Latest ED Academic, Publishers, Calcutta – 1992

Syllabus B.Sc. (APB) 3rd Year

Paper-IV : Psychology

Theory (20 hours)

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 counseling of youth.

Books recommended

1. The Psychology of Adolescence by Jersild, AT, Brook, JS and Brook, DW, Macmillan Publishing Company, New York.
2. Hand book 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 Technology by Rao, SN. Tata McGraw, New Delhi
