AIMS AND OBJECTIVES OF THE COURSE

AIMS:

The aim of the 4 years degree programme in Nutrition is to equip the students with relevant professional knowledge, skills, techniques and ethical values to enable them to apply their acquired expertise at level between the doctors and the patient for efficient health service delivery.

GENERAL LEARNING OBJECTIVES:

Nutrition education and training should enable the student in:

- Develop accuracy and meticulousness to attain high levels of ethics and
- technical proficiency.
- Assess the technical and non technical skills in a standardized and reproducible environment.
- Strengthen the decision power and exercise appropriate judgment skills, to be applied especially during crisis.
- Develop good leadership, problem solving and administrative skills.
- Develop and analyze innovative strategies for effective communication with the patients and the healthcare personnel.
- Demonstrate interdisciplinary team building strategies for effective co ordination between various Allied Health Disciplines.
- Demonstrate understanding of the basic concepts of professional behavior and legal implications of the work environment
- Demonstrate the knowledge of his / her role in health care delivery system
- Establishing and maintaining continuing education as a function of growth and maintenance of professional competence

SPECIFIC LEARNING OUTCOMES

Following competencies will be expected from a student completing 4 years degree course in Nutrition. The student should be able:

- To provide a programme of study that lays a solid foundation of the principal theories and concepts of nutritional science.
- To provide a programme of study that develops a sound understanding of the social ,political, institutional and biological issues and concepts related to nutrition at the individual, community and population level.
- To demonstrate an understanding of the pathological processes and understand the available range of therapeutic dietary approaches to major clinical disorders.
- To display high levels of skill and competencies in relation to experimental techniques in nutrition.
- To extend student's repertoire of skills to include specialist skills needed by the nutritionist to practice the profession.
- To develop the ability to integrate contributory disciplines in the analysis and interpretation of factors influencing the maintenance and disturbance of the body's functions and overall health.
- To provide practical experience that enables the student to reflect on personal, professional and practical aspects of Nutrition.
- To encourage in students a sense of personal responsibility for achieving learning objectives and to develop an ability for effective self-management.
- To begin the process of developing the professional Nutritionist.
- To understand the ways in which nutritional science is developed including a knowledge of research methodologies
- To demonstrate competencies in basic skills in relation to basic laboratory techniques, use of educational technology and core information technology, interpretation of data, written and oral communication.
- To enable, support and encourage students in an active and open questioning investigation into the origins of knowledge and beliefs which guide current policies in nutrition
- To demonstrate the capabilities required to effectively apply their expertise in nutrition in specific work situations, e.g., in health promotion, research or industry.
- To demonstrate a thorough understanding of approaches, methods and skills in preventative nutrition, health promotion and health education

NOMENCLATURE AND DURATION

NOMENCLATURE:

The name of the degree programme shall be B.Sc Nutrition. The duration of the course shall be 4 years with structured training in a recognized department under a supervisor.

COURSE TITLE:

B.Sc Nutrition

TRAINING CENTERS:

Biochemistry Departments accredited by UHS for this training in the affiliated institutes of the University of Health Sciences, Lahore. Hospital Nutritionist will be incorporated in the faculty of this programme.

COURSE DURATION:

Four years structured training in a recognized department under the guidance of supervisor.

COURSE SCHEME:

The training is spread over four years with a specific component for each year of training.

FIRST YEAR:

Theoretical component:

1. Basic Anatomy
2. Basic Physiology
3. Basic Biochemistry
4. General Pathology
5. Behavioural Sciences
6. Islamiyat
7. Pakistan studies
8. Computer Education

Practical component:

Hand- on training in basic techniques related to Nutrition Science.

SECOND YEAR:

Theoretical component:

- Advanced Biochemistry
- Fundamentals Of Nutrition
- Microbiology and Genetics

Practical component:

Hand- on training in basic and advanced techniques related to Nutrition Science

THIRD YEAR:

Theoretical component:

- Clinical Nutrition
- Applied Nutrition

Practical component:

Hand- on rotational training in nutrition techniques in above mentioned disciplines.

FOURTH YEAR:

Theoretical component:

- Community Nutrition
- Biostatistics And Research Methodology

Practical component:

- Advanced training related to Nutrition Science
- Research report writing related to the subject of interest of the student

Training as Trainers

The students during final year of the programme will be involved actively in the teaching & training of the junior classes i.e. 1st year & 2nd year so that the seniors become mentors for the juniors. These educational activities will be carried out under the direction and supervision of a faculty member.

ELIGIBILITY CRITERIA FOR ADMISSION:

DOCUMENTS REQUIRED FOR ADMISSION:

- Completed B.Sc Nutrition application form
- Matriculation Certificate
- Copy of the F.Sc Premedical/ Equivalent examination Certificate with detailed marks sheet
- Copy of the entry test result card
- 3 passport size photographs

GENERAL REQUIREMENTS:

- Securing pass percentage in the entry test.
- Qualifying the interview successfully.
- Having up to the marks credentials (No. of attempts, any medal or distinction).

REGISTRATION AND ENROLLMENT:

- Total number of students enrolled must not exceed 10 per department.
- UHS will approve supervisors for the course, where needed.
- Candidates selected will be registered with the approved supervisor and enrolled with UHS.

RECOGNITION / EQUIVALENCE OF THE DEGREE AND THE INSTITUTION

After four years training and education, the candidates on successful completion of the course will be awarded a graduate degree in Allied Health Sciences by the UHS, equivalent to any other similar qualifications.

ACCREDITATIONS OF THE TRAINING INSTITUTION:

The relevant department of an affiliated institute will get accreditation for training programme based on :

- ***Faculty:*** properly qualified and trained faculty for education of the programme.
- ***Adequate space:*** including class rooms with the audiovisual aids, Biochemistry laboratory, Computer labs, Hospital Nutrition Section etc.
- ***Library:*** Departmental library should have latest editions of the recommended books, reference books and Journals related to the specialty.

METHODS OF INSTRUCTIONS

As a policy, active participation of the students will be encouraged. Following teaching modalities will be employed:

- Large group teachings (lectures)
- Small group teachings
- Seminar presentations
- Assignments
- Skills teachings
- Self study and use of internet.

In addition, to promote interactive and communication skills, following methods will be used;

MONTHLY STUDENTS MEETINGS:

- Journal club meeting
- Core curriculum meeting
- Skill development

ANNUAL GRAND MEETING:

Once a year all students enrolled at UHS from different institutes will be invited to annual meeting at UHS. The students will present their annual reports. Issues and concerns related to each discipline will be discussed. Feedback should be collected and suggestions should be sought in order to involve students in decision making. Any research or literary work done by the students will be displayed.

In the evening an informal dinner and gathering can be arranged. This will help in creating a sense of belonging and ownership by the students and the faculty.

QUALITY ASSURANCE IN EDUCATION

Quality assurance in health education is a broad spectrum of plans, policies and procedures that provides a baseline structure to achieve quality goals. The quality planning, quality improvement and quality assessment are main areas of quality assurance which need thorough intervention based on professional concepts. It is sum of the processes of assessing and stimulating the quality of health education by measuring outcome and comparing it with current criteria and demands of health care. Quality assurance should ensure that activities of health education are systematic and controlled. It should affect all levels of the health community and every professional working in health care.

Guidelines For Regional And International Standards:

- Mission and Objectives
- Educational Programme
- Assessment of Students
- Student Education and Support
- Academic Staff
- Educational Resources
- Governance and Administration
- Continuous Renewal

This educational programme has been designed and will be carried out strictly based on the above mentioned guidelines.

SKILLS TO BE LEARNT DURING NUTRITION COURSE

- Identification and Lab confirmation of carbohydrates, proteins and fat compounds.
- Quantitative assay of selected enzyme activities in blood and other body fluids that can assist diagnosis and treatment of disease
- Learn the practical use of scientific equipments
- Use & Practical demonstration of electrophoresis, spectrophotometer, ph meter
- Use & Practical demonstration of Electrolyte analyzer, Osmometer etc
- Study of slides of various tissues, e.g. Bone, heart, stomach ,intestine, spleen, kidney, liver, skin, cartilage, smooth muscles, ovary, testis, pancreas, stripped muscles and unstripped muscles.
- To prepare a pedigree tree of some traits.
- Use of microscope
- Simple staining techniques
- Morphology of micro-organisms e.g cocci, bacilli , spirochetes, motility, sterilization, media preparation,
- Isolation of micro-organisms from soil, air and water
- Total viable count of microorganism in food.
- Planning of diets e.g
    - Liquid diets.
    - Soft diets.
    - High fiber diet, low Fiber diet.
    - Bland diet.
    - High protein diet
    - High carbohydrate diet
    - Moderate fat diet
    - Fat cont rolled diet
    - Sodium restricted diet.
    - Controlled protein, potassium and sodium diet
- Research / Report writing skills

EQUIPMENTS AND GADGETS

- Laboratory equipment for the confirmation of carbohydrates, proteins and fat compounds
- Chemicals and reagents for the confirmation of carbohydrates, proteins and fat compounds in the laboratory
- Ph meter
- Electrophoresis
- Spectrophotometer
- Electrolyte analyzer
- Osmometer
- Chemistry analyzer
- Compound, Phase Contrast, Fluorescent Microscope.
- Histological Sections of various tissues of the body for morphological study
- Common staining chemicals/reagents
- Culture media, culture plates and incubators for detection of microorganisms.
- Other related equipments and instruments according to the set up of each Hospital Nutrition Section.

EXAMINATIONS

ASSESSMENT:

It will consist of action and the professional growth oriented student-centered integrated assessment, with additional components of the internal assessment formative assessment measurement based summative assessment.

STUDENT-CENTERED INTEGRATED ASSESSMENT.

It views students as decision makers in need of information about their own performance. Integrated assessment is meant to student's responsibility to decide what to evaluate as well as how to evaluate, it encourages students to "own" the evaluation and to use it as a basis for self improvement. Therefore it tends to be growth oriented, student controlled, collaborative, dynamic, contextualized, flexible and action oriented.

It will be based on,

- Self assessment by the students
- Peer assessment
- Internal assessment by the faculty

SELF ASSESSMENT BY THE STUDENTS:

Each student will be provided with a predesigned self assessment form to evaluate his/her level of comfort and competency in dealing with different types of education related situations. It will be the responsibility of the student to correctly identify his/her areas of weakness and to take appropriate measures to address to these weaknesses.

PEER ASSESSMENT:

The students will be expected to evaluate their peers after the monthly small group meetings. These should be followed by a constructive feedback according to the prescribed guidelines and should be non-judgmental in nature. This will enable students to become good mentors in the future.

INTERNAL ASSESSMENT BY THE FACULTY:

The students are encouraged to confront their weaknesses and to remove them rather to hide them from their teachers. It will be based on:

- Punctuality
- Practical work
- Participation in interactive sessions
- Regularly conducted class tests

FORMATIVE ASSESSMENT:

This will be helpful to improve the existing instructional methods and course contents in use. This will be carried out through a predesigned form filled in by the students.

SUMMATIVE ASSESSMENT:

It will be carried out at the end of the programme to empirically evaluate the cognitive, psychomotor and the affective domains in order to award the degree after successful completion of the course.

ELIGIBILITY TO APPEAR IN THE FINAL EXAMINATIONS

- Only those students who have completed four years of structured and supervised training and have passed Ist, 2nd and 3rd professional examinations will be eligible to take the final exams.
- 75% of the attendance with the certificate of the recommendation from the supervisor/ Head of the department/ Institution.
- Application for admission to the university exam duly recommended by the head of the Institution.

A panel of two examiners, one internal and one external, will be appointed by UHS to conduct the practical and the viva voce exam. Each component of the practical exam will be assessed by both the examiners awarding marks independently. The final score will be an average of both scores.

PASS PERCENTAGE AND OTHER REGULATIONS REGARDING EXAMS.

- 50% will be a passing score in each component.
- The candidates have to pass in each component separately.
- The candidate failing in one component will reappear in the same component again.
- The candidate has to pass the 1st ,2nd and 3rd professional examinations each, in a maximum of 3 attempts.
- The final examination will be cleared in a maximum of 4 attempts.
- Only those candidates will be allowed to take the practical and the oral exam, who pass in the theory exam.
- The results will be announced as per UHS rules and regulations

Annex : A

First Professional B.Sc Nutrition Examination

Total Marks = 400 **Pass Marks= 50%**

Paper **Subjects**

Paper-I **Basic Anatomy & Physiology**

Theory 90 Marks
Internal Assessment 10 Marks
(05 + 05 in each Subject)

Total Marks=100

Paper-II **Basic Biochemistry & General Pathology**

Theory 90 Marks
Internal Assessment 10 Marks
(05 + 05 in each Subject)

Total Marks=100

Paper-III **Islamic Studies / Ethics & Pakistan Studies**

Theory 90 Marks
Internal Assessment 10 Marks
(06 marks in Islamic Studies/Ethics)
(04 marks in Pakistan Studies)

Total Marks=100

Paper-IV **Behavioural Sciences & Computer Education**

Theory	90 Marks
Internal Assessment	10 Marks
	(05 + 05 in each Subject)
	Total Marks=100

FIRST PROFESSIONAL EXAMINATION
OUTLINE OF TESTS

The First Professional examination shall be held at the end of first academic year (nine months of teaching) and every candidate shall be required to take examination in the following subjects.

A candidate to pass in a subject shall have to obtain a minimum of 50% of total marks of each part of the subject separately. The minimum number of marks required to pass the examination for Islamic Studies/Ethics & Pakistan Studies shall be thirty three percent (33%) in each paper separately and thirty three percent (33%) in aggregate.

Paper-I Basic Anatomy & Physiology = 100 marks

The examination in the subject of Basic Anatomy & Physiology shall consist of one Theory Paper of three hours duration and of maximum 90 marks. Internal Assessment will be of 10 marks.The syllabus to be covered is mentioned in Appendix "B".

Section I : Basic Anatomy = 50 Marks

There will be 45 MCQs and each question will carry 01 mark.
Internal Assessment will be of 05 marks.

Section – II: Basic Physiology = 50 marks

There will be 45 MCQs and each question will carry 01 mark

Internal Assessment will be of 05 marks

Paper-II Basic Biochemistry & General Pathology = 100marks

The examination in the subject of Basic Biochemistry & General Pathology shall consist of one Theory Paper of three hours duration and of maximum 90 marks. Internal Assessment will be of 10 marks. There will be two sections in this paper.

Section – I: Basic Biochemistry = 50marks

There will be 45 MCQs and each question will carry 01 mark.
Internal Assessment will be of 05 marks.

Section – II: General Pathology = 50marks

There will be 45 MCQs and each question will carry 01 mark.
Internal Assessment will be of 05 marks.

Paper-III Islamic Studies / Ethics & Pakistan Studies =100 marks

The examination shall consist of one Theory Paper of 60+40=100 marks and 3 hours duration. The syllabus to be covered is mentioned in Appendix "B".

Section-I : Islamic Studies/Ethics =60 marks.

This section shall have question on Islamic Studies in case Muslim candidates and on Ethics in case of non-Muslim. There shall be 3 questions in this section of Theory and there will be no choice.

Each question shall carry 18 marks.

Internal Assessment will be of 06 marks.

Section-II : Pakistan Studies = 40 marks

This section shall have 3 questions on Pakistan Studies and there will be no choice. Each question shall carry 12 marks.

Internal Assessment will be of 04 marks.

Paper-IV Behavioural Sciences & Computer Education= 100 marks

The examination in the paper of Behavioural Sciences& Computer Education shall consist of one Theory Paper of 90 marks and three hours duration. Internal Assessment will be of 10 marks. The syllabus to be covered is mentioned in Appendix "B".

Section I : Behavioural Sciences = 50 marks

There will be 45 MCQs and each question will carry 01 mark.
Internal Assessment will be of 05 marks.

Section – II: Computer Education = 50 marks

There will be 45 MCQs and each question will carry 01 mark

Internal Assessment will be of 05 marks.

Second Professional B.Sc Nutrition Examination

Total Marks = 600 **Pass Marks= 50%**

Paper I Advanced Biochemistry

Theory	90 Marks
Internal Assessment	10 Marks
Practical & Oral	90 Marks
Internal Assessment	10 Marks

Total Marks=200

Paper II Microbiology and Genetics

Theory	90 Marks
Internal Assessment	10 Marks
Practical & Oral	90 Marks
Internal Assessment	10 Marks

Total Marks=200

Paper III Fundamentals Of Nutrition

Theory	90 Marks

Internal Assessment 10 Marks

Practical & Oral 90 Marks
Internal Assessment 10 Marks

Total Marks=200

SECOND PROFESSIONAL EXAMINATION
OUTLINE OF TESTS

Total marks : 600 **Pass marks : 50 %**

The Second Professional Examination shall be held at the end of second year and shall consist of the following subjects: The details of the syllabus is outlined in the Appendix B.

Paper-I:

Advanced Biochemistry **Total Marks : 200**

Theory:

The examination in the subject of Advanced Biochemistry shall consist of one Theory paper of three hours duration and of maximum 90 marks. Internal Assessment shall be of 10 Marks.

The syllabus to be covered is mentioned in Appendix "B".

There will be 09 short essay questions from the subject of Advanced Biochemistry and there will be no choice. Each short essay question will carry 05 marks.

There will be 45 MCQs and each question will carry 01 mark.

Oral/ Practical Examination in the subject of Advanced Biochemistry Physics will consist of maximum 90 marks. Internal Assessment shall be of 10 Marks.

Paper-II:

Microbiology and Genetics **Total Marks : 200**

Theory:

The examination in the subject of Microbiology and Genetics shall consist of one Theory paper of three hours duration and of maximum 90 marks. Internal Assessment shall be of 10 Marks.

The syllabus to be covered is mentioned in Appendix "B".

The Theory will consist of two sections as detailed below.

Section I : Microbiology = 50 marks

There will be 05 short essay questions from the subject of Microbiology and there will be no choice. Each short essay question will carry 05 marks.

There will be 20 MCQs and each question will carry 01 mark.
Internal Assessment will be of 05 marks

Section – II: Genetics = 50 marks

There will be 05 short essay questions from the subject of Genetics and there will be no choice. Each short essay question will carry 05 marks.

There will be 20 MCQs and each question will carry 01 mark.
Internal Assessment will be of 05 marks

Oral/ Practical Examination in the subject of Microbiology and Genetics will consist of maximum 90 marks. Internal Assessment shall be of 10 Marks.

Paper-III:

Fundamentals Of Nutrition **Total Marks : 200**

Theory:

The examination in the subject of Fundamentals Of Nutrition shall consist of one Theory paper of three hours duration and of maximum 90 marks. Internal Assessment shall be of 10 Marks.

The syllabus to be covered is mentioned in Appendix "B".

There will be 09 short essay questions from the subject of Fundamentals Of Nutrition and there will be no choice. Each short essay question will carry 05 marks.

There will be 45 MCQs and each question will carry 01 mark.

Oral/ Practical Examination in the subject of Fundamentals Of Nutrition will consist of maximum 90 marks. Internal Assessment shall be of 10 Marks.

Third Professional B.Sc Nutrition Examination

Total Marks = 600 **Pass Marks= 50%**

Paper I Clinical Nutrition

Theory	90 Marks
Internal Assessment	10 Marks
Practical & Oral	180 Marks (OSPE-Short case/ Long case)
Internal Assessment	20 Marks

Total Marks=300

Paper II Applied Nutrition

Theory	90 Marks
Internal Assessment	10 Marks
Practical & Oral	180 Marks (OSPE-Short case/ Long case)
Internal Assessment	20 Marks

Total Marks=300

THIRD PROFESSIONAL EXAMINATION

OUTLINE OF TESTS

Total marks : 600 **Pass marks : 50 %**

The Third Professional Examination shall be held at the end of third year and shall consist of the following subjects: The details of the syllabus is outlined in the Appendix B.

Paper-I:

Clinical Nutrition **Total Marks : 300**

Theory:

The examination in the subject of Clinical Nutrition shall consist of one Theory Paper of three hours duration and of maximum 90 marks. Internal Assessment shall be of 10 Marks.
The syllabus to be covered is mentioned in Appendix "B".

There will be 09 short essay questions from the subject of Clinical Nutrition and there will be no choice. Each short essay question will carry 05 marks.

There will be 45 MCQs and each question will carry 01 mark.

Practical & Oral Examination in the subject of Clinical Nutrition will consist of OSPE -Short case/ Long case with maximum 180 marks. Internal Assessment shall be of 20 Marks.

Paper II

Applied Nutrition **Total Marks : 300**

Theory:

The examination in the subject of Applied Nutrition shall consist of one Theory Paper of three hours duration and of maximum 90 marks. Internal Assessment shall be of 10 Marks.
The syllabus to be covered is mentioned in Appendix "B".

There will be 09 short essay questions from the subject of Applied Nutrition and there will be no choice. Each short essay question will carry 05 marks.

There will be 45 MCQs and each question will carry 01 mark.

Practical & Oral Examination in the subject of Applied Nutrition will consist of OSPE -Short case/ Long case with maximum 180 marks. Internal Assessment shall be of 20 Marks.

Final Professional B.Sc Nutrition Examination

Total Marks = 400 **Pass Marks= 50%**

Paper I Community Nutrition

Theory	90 Marks
Internal Assessment	10 Marks
Practical & Oral	180 Marks (OSPE-Short case/ Long case)
Internal Assessment	20 Marks

Total Marks=300

Paper II Biostatistics and Research Methods

Theory	45 Marks
Internal Assessment	05 Marks
Oral Examination on Research Report	45 Marks
Internal Assessment	05 Marks

Total Marks= 100

FINAL PROFESSIONAL EXAMINATION

OUTLINE OF TESTS

Total marks : 400 **Pass marks : 50 %**

The Final Professional Examination shall be held at the end of fourth year and shall consist of the following subjects: The details of the syllabus is outlined in the Appendix B.

Paper I

Community Nutrition **Total Marks=300**

The examination in the subject of Community Nutrition shall consist of one Theory Paper of three hours duration and of maximum 90 marks. Internal Assessment shall be of 10 Marks.
The syllabus to be covered is mentioned in Appendix "B".

There will be 09 short essay questions from the subject of Community Nutrition and there will be no choice. Each short essay question will carry 05 marks.

There will be 45 MCQs and each question will carry 01 mark.

Practical & Oral Examination in the subject of Community Nutrition will consist of OSPE -Short case/ Long case with maximum 180 marks. Internal Assessment shall be of 20 Marks.

Paper II

Biostatistics and Research Methods **Total Marks= 100**

The examination in the subject of Biostatistics and Research Methods shall consist of one Theory Paper of one & a half hours duration and of maximum 45 marks. Internal Assessment shall be of 05 Marks.
The syllabus to be covered is mentioned in Appendix "B".

There will be 05 short essay questions from the subject of Biostatistics and Research Methods and there will be no choice. Each short essay question will carry 05 marks.

There will be 20 MCQs and each question will carry 01 mark.

Oral Examination on research report will be of maximum 45 marks.
Internal Assessment shall be of 05 Marks

APPENDIX – B

First Professional B.Sc Nutrition Examination

Paper-I BASIC ANATOMY & PHYSIOLOGY

Theory Marks: 90
Internal Assessment 05 Marks in each subject
Total Marks: 100
Pass Marks: 50%
Total study hours: 200

Syllabi and Course of Reading

Note: Syllabi and course of reading is divided into two parts. 100 hours will be allocated for Sec I and 100 hours will be allocated for the Sec II. Question paper will carry 45 theory marks for each part.

Section- I BASIC ANATOMY

(1) Introduction regarding

- Anatomical Nomenclature
- Life span of a human being
- Structural and functional organization
- Terminology and body plan
- Systematic Anatomy
- Basic organization of the body

(2) Skin

- The structure of the hypodermis, dermis. and epidermis.
- Superficial fascia and deep fascia

(3) The Musculoskeletal System: Muscles, Bones and Joints

- Components of the Skeletal System
- Description of Axial & Appendicular Skeleton
- The process of bone ossification. Growth, Remodeling,and repair
- Main features of the skull including all views
- Shape and regions of vertebral column
- Important features of the regional vertebrae
- Bones of the thoracic cage, including the types of ribs.
- The bones of the pectoral girdle and upper limb

- The bones of the pelvic girdle and lower limb
- Various types of joints and types of joint movement
- connective tissue, components of the connective tissue matrix
- Description of skeletal muscle, smooth muscle and cardiac muscle
- Origin, insertion. synergist, antagonist and prime mover.
- The movements of the arm, forearm and hand and the involved muscle groups
- Muscles of the trunk and the actions they accomplish.
- Movements of the thigh, leg and foot with involved muscle groups

(4) The Nervous System

- Division of the Nervous System and the characteristics of each.
  - Central Nervous System
  - Peripheral Nervous System
  - Autonomic Nervous System
  - Special Senses
- Anatomical pathways and decription of:
    - Olfactory system---- olfactory neurons
    - Hearing and Balance , structure of the outer middle and inner ear
    - Taste ---- taste bud.
    - Visual --- chambers of the eye and structure of the rods and cones
- The structure of a neuron, nerve, nerve tract, nucleus, and ganglion.
- The components of a reflex arc and synapse
- The three meningeal layers surrounding the central nervous system,
- Cerebrospinal fluid and its circulation.
- List the various cranial nerves
- Various lobes of the brain and the cerebellum

(5) The Cardiovascular System

- Anatomy of the Heart---- the size, shape and location of the heart and

Chambers, valves and their locations

- The location of the coronary arteries
- The structure of the conduction system of the heart.
- Pulmonary and systemic circulation
- The structure of arteries, capillaries and veins.
- Major arteries and veins and the body areas, they supply
- Lymphatic system tonsils, lymph nodes, the spleen and the thymus.

(6) Respiratory System

- The anatomy of the respiratory passages, beginning at the nose and ending with the alveoli.
- The lobes of the lungs and the membranes that cover the lungs
- Pleural cavity
- The muscles of contraction of respiration

(7) The Digestive System

- The structure of the organs that make up the digestive tract and their relations to other organs in thoracic and abdominal cavity
- Blood supply of the organs of the GI tract
- Important secretory glands, the liver and pancreas (both exocrine and endocrine components).

(8) Genito-Urinary System

- The structures and organs of the urinary system and its relations with other organs
- The structure of the nephron
- Formation of Sex Cells
- Organs of the Male Reproductive System
- Organs of the Female Reproductive System

Recommended Books:

- Essentials of anatomy and physiology by Seely, Stephens, and Tate (4^{th} ed)
- Anatomy & Physiology by Ross & Wilson
- General Anatomy by Laeeq Hussain
- General Anatomy by Dr Ghulam Ahmad
- Anatomy by D. R. Johnson & K. L. Moore
- Color Atlas of anatomy by Mc Minn
- Lasts Anatomy by R.M.H Mcminn

Section- II BASIC PHYSIOLOGY

(1) Introduction To The Human Physiology

- Functional organization---relationship between structure and function of the human body
- Homeostasis – its importance-- negative and positive feedback mechanism

(2) Integumentary System

- Functions of the skin, hair, glands and nails
- Body temperature and its regulation

(3) The Musculoskeletal System:

- Functions of the bones and muscles
- Functional characteristics of Skeletal Muscle, Smooth Muscle and Cardiac Muscle
- The events of muscle contraction and relaxation in response to an action potential in a motor neuron.
- Distinguish between aerobic and anaerobic muscle contraction.
- Muscle hypertrophy and atrophy

(4) The Nervous System

Functions of the central nervous system,

- The functional areas of the cerebral cortex and their interactions.
- functions of the parts of the brainstem diencephalons, basal nuclei. Limbic system. And cerebellum.
- functions of various cranial nerves.
- **Functions of the somatic motor nervous system**
- **Functions of the autonomic nervous system**
- The function of neurons, neuroglial cells.and their components.
- Resting membrane potential and an action potential.
- The function of a synapse and reflex arc

(5) The functions of the specialized sense organs

- Eye---- physiology of site, accommodation, optic nerve and optic chiasma
- Ear---- functions of the internal, middle and external ear
- Physiology of the hearing and balance
- Smell---------- physiology of olfactory nerve
- Taste ---------physiology of taste
  Location of the taste buds
  physiology of speech

(6) The Endocrine System

- Functions of the Endocrine System
- Chemical Signals, receptors and hormones
- The Endocrine Glands and their Hormones
- Other Hormones

(7) Blood

- Composition of Blood and Plasma
- Functions of Blood

- Formed Elements
- Stages of cell development
- Blood grouping
- Coagulation mechanism

(8) The Cardiovascular system

- Functions of the Heart
- Electrical Activity of the Heart origin and propagation of cardiac impulse
- Phases of the Cardiac Cycle
- Heart Sounds
- Regulation of Heart Functions--- intrinsic and extrinsic
- Functions of the Peripheral Circulation
- The Physiology of Circulation
  - Pulmonary Circulation
  - Systemic Circulation: Arteries
    - Veins
- Local Control of Blood Vessels
- Nervous Control of Blood Vessels
- Regulation of Arterial Pressure
- The function of Lymphatic System, tonsils, lymph nodes, the spleen and the thymus.

(9) Respiratory System

- Functions of the Respiratory System beginning at the nose and ending with the alveoli.
- Ventilation and Lung Volumes
- Gas Exchange and gas transport in the blood
- Rhythmic Ventilation

(10) The Digestive System

- Functions of each organ of the Digestive System including major salivary glands
- Movements and Secretions in each organ of the Digestive System and their regulation
- Physiology of Digestion, Absorption, and Transport

(11) Genito-Urinary System

- Urine Production, Urine Movement
- Regulation of Urine Concentration and Volume
- Body Fluid Compartments
- Regulation of Extracellular Fluid Composition
- Regulation of Acid-Base Balance

- Physiology of Male Reproductive system—spermatogenesis and reproductive glands, hormones and their regulations
- Physiology of Female Reproductive system--- ovulation, hormones and their regulations

(12) Immunity

- Define immunity, Innate Immunity, Adaptive Immunity
- Antigens and Antibodies
- Primary and secondary responses to an antigen
- Antibody-mediated immunity and cell-mediated immunity
- Role of lymphocyte in immunity regulation

Recommended Books

- Essentials of Anatomy and Physiology by Seelay, Stephens and Tate. 4th edition
- Ross & Wilson Anatomy and Physiology.
- Human Physiology. Stuart Ira Fox. 7th edition
- Text Book of Medical Physiology Guyton
- Essential of Medical Physiology Vol.I & II by Mushtaq Ahmad.
- Lecture notes on human physiology by Bray JJ, Cragg, PA MacKnight

PAPER II: BASIC BIOCHEMISTRY AND GENERAL PATHOLOGY

Theory Marks: 90
Internal Assessment 05 Marks in each subject
Total Marks: 100
Pass Marks: 50%
Total study hours: 200

Syllabi and Course of Reading

Note: Syllabi and course of reading is divided into two parts. 100 hours will be allocated for Sec I and 100 hours will be allocated for the Sec II. Question paper will carry 45 theory marks for Basic biochemistry and 45 theory marks for General Pathology.

Section -I: BASIC BIOCHEMISTRY

- **Physiochemical Principles**
- Hydrogen ion conc. and pH notation
- Acidity & Alkalinity
- Indicators & Buffer solutions
- PH and its determination
- The colloidal state
- Absorption
- Structure and function of cell membrane and movement of materials across cell membrane
- Osmosis & Osmotic pressure
- Surface tension
- Viscosity

- **Carbohydrates**
- Introduction and classification of carbohydrates
- Some important monosaccharides, disaccharides and polysaccharides
- Regulation of blood glucose level
- Definition and end products of
    - Glycolysis
    - Citric acid cycle
    - Glycogenolysis
    - Glycogenoses
    - Gluconeogenesis

- **Proteins and Amino Acids**

- Introduction, importance, classification and properties of proteins
- Entry of amino acids into cells and peptide linkage
- Special sources of proteins
- **Lipids**
- Introduction, Classification and Function of lipids
- Biosynthesis of fatty acids, natural fats or triglycerides
- Fatty acid oxidation

- **Vitamins and Minerals**
- Classification of vitamins
- Fat soluble vitamins and Water soluble vitamins
- Deficiency effects

- **Enzymes**
- Introduction, Classification Chemical nature and properties of enzymes
- The mechanism of enzyme reactions
- Factors affecting the enzyme activity
- Important coenzymes and their actions
- Regulatory enzymes

- **Nutrition and Dietetics**
- Balanced diet
- Role of carbohydrates, fats and proteins, their dietary sources and uses in the body
- Quantitative and qualitative daily requirements of carbohydrates, fats, proteins, vitamins and minerals

Recommended Books

- Review of Biochemistry by Lippincott
- Essential of Medical Biochemistry Vol.I & II by Mushtaq Ahmad.
- Fundamentals of Biochemistry by D. Voet, J.G.Voet (1999)
- Text Book of Biochemistry with Clinical Correlations by T.M.Devlin.
- Modern Experimental Biochemistry by R.F.Boyer.

Section -II: GENERAL PATHOLOGY

Cell Injury and adaptation

Cell Injury

- Reversible and Irreversible Injury
- Fatty change, Pigmentation, Pathologic calcification
- Necrosis and Gangrene

Cellular adaptation

- Atrophy, Hypertrophy,
- Hyperplasia, Metaplasia, Aplasia

Inflammation

- **Acute inflammation** --- vascular changes, Chemotaxis, Opsonization and Phagocytosis
- Enlist the cellular components and chemical mediators of acute inflammation
- Differentiate between exudates and transudate
- **Chronic inflammation**
- Etiological factors, Granuloma

Cell repair and wound healing

- Regeneration and Repair
- Healing--- steps of wound healing by first and second intention
- Factors affecting healing
- Enlist the complications of wound healing

Haemodynamic disorders

- Define and classify the terms Edema, Haemorrhage, Thrombosis, Embolism, Infarction & Hyperaemia with at least two examples of each.
- Define and classify Shock with causes of each.
- Describe the compensatory mechanisms involved in shock
- Describe the possible consequences of thrombosis
- Describe the difference between arterial and venous emboli

Neoplasia

- Define the terms Dysplasia and Neoplasia with examples of each
- Enlist the differences between benign and malignant neoplasms
- Enlist the common etiological factors for neoplasia
- Define and discuss the different modes of metastasis

Recommended Books

Pocket companion to Robbins. Pathologic basis of disease Cotran, Kumar, Collins

PAPER III ISLAMIC STUDIES/ETHICS & PAKISTAN STUDIES

Total Theory Marks:100

Syllabi and Course of Reading

Note: Syllabi and course of reading is divided into two parts50 hours will be allocated for Sec I and 50 hours will be allocated for the Sec II. Question paper will carry 54 theory marks for Islamiyat and 36 theory marks for Pakistan studies. Non muslims can appear in the subject of Ethics instead of Islamiyat. Candidates can attempt paper in Urdu or English.
Internal Assessment will be of 10 Marks in total.

ETHICS (FOR NON MUSLIMS)

Theory Marks: 54
Internal Assessment :06 Marks
Total Marks : 60
Pass Marks: 33%

1. Ethical Teachings of world religious with special reference to Budhish, Judaism Christianity and Islam.
2. 100 ethical precepts from Quran and Sayings of the Prophet.

The Arabic text of Holy Quran and Ahadith would not be advisable for inclusion in the syllabus for the Non-Muslims. Instead the teachings of Holy Quran and sunnah relating to the following topic should be explained in English or Urdu, hence, questions about this portion of the syllabus should be based on the subject-matter, and not on the texts.

Virtues

Duty towards parents: respect for human life, unity of mankind, peace, justice, tolerance, beneficence, pity, contentment, chastity, meekness, repentance, social solidarity, individual accountability, moral excellence, patience and perseverance, forgiveness,

Vices

Arrogance, ostentation, extravagance, misery, greed, jealousy, suspicion, backbiting, coercion, hypocrisy, bribery, obscenity and immodesty.

1. Promotion of moral values in society.
2. Attitude of Islam Towards Minorities

ISLAMIYAT

Theory Marks: 54
Internal Assessment :06 Marks
Total Marks : 60
Pass Marks: 33%

Islamic Studies / Ethics and Pakistan Studeis

مقاصد: اس نصاب کی تدریس کا مقصد طلباء کو اس قابل بنانا ہے کہ وہ :-

۱۔ اسلام کے معنی و مفہوم کو سمجھ سکیں۔

۲۔ اسلام کی بنیادی تعلیمات کو اچھی طرح سمجھ کر ان پر عمل کر سکیں۔

۳۔ یہ حقیقت ذہن نشین کر سکیں کہ اسلام ہی واحد کی انسانی زندگی کے تمام مسائل کو بطریق احسن حل کرنے کی صلاحیت رکھتا ہے۔

نصاب:

کتاب و سنت

(ا) قرآنِ مجید

۱۔ فضائل قرآن ۲۔ سورہ الحجرات، متن اور ترجمہ کے ساتھ ۳۔ سورہ الفرقان، عباد الرحمن۔ الی آخر السجدہ، آیت ۶۷تا۷۴۔

(ب) سنت

سنت کی اہمیت۔

بیس منتخب احادیث، متن و ترجمہ کے ساتھ۔

۰۱ وَعَنْ عَبْدِاللّٰہِ ابْنِ عَمْرٍو قَالَ قَالَ رَسُوْلُ اللّٰہِ صَلَّی اللّٰہُ عَلَیْہِ وَسَلَّمَ لَا یُؤْمِنُ اَحَدُکُمْ حَتّٰی یَکُوْنَ ھَوٰہُ تَبَعًا لِّمَا جِئْتُ بِہٖ۔

۰۲ عَنْ عُثْمَانَ بْنِ عَفَّانَ رَضِیَ اللّٰہُ عَنْہُ عَنِ النَّبِیِّ صَلَّی اللّٰہُ عَلَیْہِ وَ سَلَّمَ اِنَّ اَفْضَلَکُمْ مَنْ تَعَلَّمَ الْقُرْاٰنَ وَعَلَّمَہٗ۔

۰۳ یَنْبَغِیْ لِلْمُؤْمِنِ اَنْ لَا یَمُوْتَ حَتّٰی یَتَعَلَّمَ الْقُرْاٰنَ اَوْ یَکُوْنَ فِیْ تَعْلِیْمِہٖ۔

۰۴ عَنْ عُمَرَ بْنِ الْخَطَّابِ رَضِیَ اللّٰہُ عَنْہُ قَالَ قَالَ رَسُوْلُ اللّٰہِ صَلَّی اللّٰہُ عَلَیْہِ وَ سَلَّمَ اِنَّ اللّٰہَ یَرْفَعُ بِھٰذَا الْکِتٰبِ اَقْوَامًا وَّ یَضَعُ بِہٖ اٰخَرِیْنَ۔

۰۵ عَنْ مُسَیْلِمَۃَ بْنِ قَیْسٍ رَضِیَ اللّٰہُ عَنْہُ قَالَ قَالَ رَسُوْلُ اللّٰہِ صَلَّی اللّٰہُ عَلَیْہِ وَ سَلَّمَ اِسْتَشْفِبِ الْقُرْاٰنَ فَاِنَّ اللّٰہَ یَقُوْلُ وَ شِفَآءٌ لِّمَا فِی الصُّدُوْرِ وَفِیْ رِوَایَۃٍ عَنْہُ مَنْ لَّمْ یَسْتَشْفِبِ الْقُرْاٰنَ فَلَا شَفَاہُ اللّٰہُ۔

۰۶ عَنْ مُعَاذِ بْنِ جَبَلٍ رَضِیَ اللّٰہُ عَنْہُ عَنِ النَّبِیِّ صَلَّی اللّٰہُ عَلَیْہِ وَ سَلَّمَ قَالَ ثَلَاثٌ مَّنْ کُنَّ فِیْہِ فَھُوَ مُنَافِقٌ وَاِنْ صَلّٰی وَصَامَ وَزَعَمَ اَنَّہٗ مُؤْمِنٌ اِذَا حَدَّثَ کَذَبَ وَاِذَا وَعَدَ اَخْلَفَ وَ اِذَا اؤْتُمِنَ خَانَ۔

۰۷ عَنْ اَنَسٍ رَضِیَ اللّٰہُ عَنْہُ عَنِ النَّبِیِّ صَلَّی اللّٰہُ عَلَیْہِ وَ سَلَّمَ قَالَ لَا یُؤْمِنُ اَحَدُکُمْ حَتّٰی یُحِبَّ لِاَخِیْہِ مَا یُحِبُّ لِنَفْسِہٖ۔

۰۸ عَنْ عَائِشَۃَ رَضِیَ اللّٰہُ عَنْھَا عَنِ النَّبِیِّ صَلَّی اللّٰہُ عَلَیْہِ وَ سَلَّمَ قَالَ خَیْرُ النَّاسِ اَنْفَعُھُمْ لِلنَّاسِ وَ فِیْ رِوَایَۃٍ خَیْرُ النَّاسِ مَنْ یَّنْفَعُ بِہِ النَّاسَ۔

۰۹ عَنْ اَنَسِ بْنِ مَالِکٍ رَضِیَ اللّٰہُ عَنْہُ قَالَ قَلَّمَا خَطَبَنَا رَسُوْلُ اللّٰہِ صَلَّی اللّٰہُ عَلَیْہِ وَ سَلَّمَ اِلَّا قَالَ لَا اِیْمَانَ لِمَنْ لَّا اَمَانَۃَ لَہٗ وَلَا دِیْنَ لِمَنْ لَّا عَھْدَ لَہٗ۔

۰۱۰ عَنِ الْحَسَنِ رَضِیَ اللّٰہُ عَنْہُ مُرْسَلًا حُبُّ الدُّنْیَا رَأْسُ کُلِّ خَطِیْئَۃٍ۔

۰۱۱ عَنْ اَبِیْ سَعِیْدِ الْخُدْرِیِّ رَضِیَ اللّٰہُ عَنْہُ قَالَ سَمِعْتُ رَسُوْلَ اللّٰہِ صَلَّی اللّٰہُ عَلَیْہِ وَ سَلَّمَ یَقُوْلُ مَنْ رَاٰی مِنْکُمْ مُنْکَرًا فَلْیُغَیِّرْہُ بِیَدِہٖ فَاِنْ

لَّمْ يَسْتَطِعْ فَبِلِسَانِهٖ وَ اِنْ لَّمْ يَسْتَطِعْ فَبِقَلْبِهٖ وَ ذٰلِكَ اَضْعَفُ الْاِيْمَانِ۔

۱۱۲ عَنْ عَائِشَةَ رَضِيَ اللّٰهُ عَنْهَا عَنِ النَّبِيِّ صَلَّى اللّٰهُ عَلَيْهِ وَ سَلَّمَ قَالَ اِذَا اَكَلَ اَحَدُكُمْ فَلْيَذْكُرِ اسْمَ اللّٰهِ وَ اِنْ نَسِيَ اَنْ يَّذْكُرَ اسْمَ اللّٰهِ فِيْ اَوَّلِهٖ فَلْيَقُلْ بِاسْمِ اللّٰهِ اَوَّلَهٗ وَ آخِرَهٗ۔

۱۱۳ عَنِ ابْنِ عَبَّاسٍ رَضِيَ اللّٰهُ عَنْهُ قَالَ نَهٰى رَسُوْلُ اللّٰهِ صَلَّى اللّٰهُ عَلَيْهِ وَ سَلَّمَ اَنْ يُّنَفَّسَ فِي الْاِنَاءِ اَوْ يُنْفَخَ فِيْهِ۔

۱۱۴ عَنْ مِقْدَامِ ابْنِ مَعْدِيْ كَرِبٍ رَضِيَ اللّٰهُ عَنْهُ عَنِ النَّبِيِّ صَلَّى اللّٰهُ عَلَيْهِ وَ سَلَّمَ قَالَ مَا مَلَاَ آدَمِيٌّ وِعَاءً شَرًّا مِنْ بَطْنِهٖ بِحَسْبِ ابْنِ آدَمَ اُكُلَاتٌ يُقِمْنَ صُلْبَهٗ فَاِنْ كَانَ لَا مَحَالَةَ فَثُلُثٌ لِطَعَامِهٖ وَثُلُثٌ لِشَرَابِهٖ وَثُلُثٌ لِنَفَسِهٖ۔

۱۱۵ عَنْ عَائِشَةَ رَضِيَ اللّٰهُ عَنْهَا قَالَتْ مَا شَبِعَ آلُ مُحَمَّدٍ صَلَّى اللّٰهُ عَلَيْهِ وَ سَلَّمَ مُنْذُ قَدِمَ الْمَدِيْنَةَ مِنْ طَعَامِ بُرٍّ ثَلَاثَ لَيَالٍ تِبَاعًا حَتّٰى قُبِضَ ۔

۱۱۶ عَنْ عُبَيْدِ اللّٰهِ ابْنِ مُحْصِنٍ عَنْ اَبِيْهِ اَنَّ النَّبِيَّ صَلَّى اللّٰهُ عَلَيْهِ وَسَلَّمَ قَالَ مَنْ اَصْبَحَ مِنْكُمْ اٰمِنًا فِيْ سِرْبِهٖ مُعَافًى فِيْ جَسَدِهٖ عِنْدَهٗ قُوْتُ يَوْمِهٖ فَكَاَنَّمَا حِيْزَتْ لَهُ الدُّنْيَا۔

۱۱۷ عَنِ الْحَارِثِ ابْنِ عَاصِمِ الْاَشْعَرِيِّ رَضِيَ اللّٰهُ عَنْهُ قَالَ ، قَالَ رَسُوْلُ اللّٰهِ صَلَّى اللّٰهُ عَلَيْهِ وَ سَلَّمَ الطُّهُوْرُ شَطْرُ الْاِيْمَانِ وَ فِيْ رِوَايَةٍ لِلتِّرْمَذِيِّ اِنَّ اللّٰهَ طَيِّبٌ يُحِبُّ الطَّيِّبَ نَظِيْفٌ يُحِبُّ النَّظَافَةَ۔

۱۱۸ عَنْ اَبِيْ هُرَيْرَةَ رَضِيَ اللّٰهُ عَنْهُ عَنِ النَّبِيِّ صَلَّى اللّٰهُ عَلَيْهِ وَ سَلَّمَ قَالَ لَوْ لَا اَنْ اَشُقَّ عَلٰى اُمَّتِيْ لَاَمَرْتُهُمْ بِالسِّوَاكِ عِنْدَ كُلِّ صَلٰوةٍ۔

۱۱۹ عَنْ اَبِي الدَّرْدَاءِ رَضِيَ اللّٰهُ عَنْهُ عَنِ النَّبِيِّ صَلَّى اللّٰهُ عَلَيْهِ وَ سَلَّمَ اِنَّ اللّٰهَ اَنْزَلَ الدَّوَاءَ وَالدَّوَاءَ وَجَعَلَ لِكُلِّ دَاءٍ دَوَاءً فَتَدَاوَوْا وَلَا تَتَدَاوَوْا بِحَرَامٍ۔

۱۲۰ عَنْ اَبِيْ هُرَيْرَةَ رَضِيَ اللّٰهُ عَنْهُ عَنِ النَّبِيِّ صَلَّى اللّٰهُ عَلَيْهِ وَ سَلَّمَ (فِيْ حَدِيْثٍ طَوِيْلٍ) قَالَ اِنَّ اللّٰهَ عَزَّوَجَلَّ يَقُوْلُ يَوْمَ الْقِيَامَةِ يَا ابْنَ آدَمَ مَرِضْتُ فَلَمْ تَعُدْنِيْ قَالَ يَارَبِّ كَيْفَ اَعُوْدُكَ وَاَنْتَ رَبُّ الْعَالَمِيْنَ؟ قَالَ اَمَا عَلِمْتَ اَنَّ عَبْدِيْ فُلَانًا مَرِضَ فَلَمْ تَعُدْهُ اَمَا عَلِمْتَ لَوْ عُدْتَّهٗ لَوَجَدْتَّنِيْ عِنْدَهٗ۔

۳۔ دین اسلام۔ آیات قرآنی اور احادیث کی روشنی میں:

۱۔ توحید ۲۔ رسالت ۳۔ آخرت ۴۔ نماز ۵۔ روزہ ۶۔ زکوٰۃ ۷۔ حج ۸۔ جہاد

۴۔ اسوہ حسنہ، حضور صلی اللہ علیہ وسلم کی سیرت کا مطالعہ

۱۔ رہبر مدینہ ۲۔ معلم و مجرب ۳۔ مبلغ و داعی ۴۔ سپہ سالار ۵۔ مدبر شام ۶۔ سربراہ خاندان ۷۔ تاجر ۸۔ عابد و زاہد

تعمیر کردار: تعارف و تمہید (اسلام میں تعمیر کردار کی اہمیت)

(الف) اخلاق حسنہ، تقویٰ اور اخلاص، صداقت، سخاوت، عفت، دیانتداری، رحم، عدل (سماجی، معاشی انصاف) احسان ایفائے عہد، ایثار، سادگی، رواداری، احترام آدمیت، اخوت، والدین اور بزرگوں کا احترام، کسب حلال۔

(ب) رذائل اخلاق، تعارف تمہید

تکبر، بہتان طرازی، غیبت، منافقت، خوشامد، حرص، تاپ تول میں کمی بیشی، رشوت اسراف، سود، حسد، نمائش بیجا، ذخیرہ اندوزی، ظلم، فتنہ و فساد۔

تہذیب انسانی کی تعمیر میں اسلام کا کردار، (Resurgence)۔

امت مسلمہ، احیائے اسلام کی تحریکیں اور ہمارا مستقبل۔

Section II
PAKISTAN STUDIES

Total Marks: 40
Study Hours: 50
Pass Marks: 33%

مقاصد: پاکستان کا ایسا مطالعہ جس سے طلبہ میں ماضی پر فخر، حال کے لئے جوش وخروش اور مستقبل پر مستحکم اعتماد ہو ان کا یہ پختہ عقیدہ ہو کہ قومی استحکام اور ملکی ترقی کے لئے وہ سب کچھ کرنا ہے جس کے وہ اہل ہیں۔ تعمیر وطن کے لئے یہ ایک جذباتی احساس ہی نہ ہو بلکہ نظریہ پاکستان کی علمی تعبیر اور تحریک پاکستان کو صحیح معنوں میں سمجھنا نتیجہ ہو۔

یہ کورس افراد پاکستان کی ذہنی تربیت کا ایسا درسی مواد ہو کہ جو کہ پاکستانی تشخیص، اپنی روایات پر یقین کو مستحکم بنائے اور علمی زندگی میں ایسے تعمیری رویہ کی جانب رہنمائی کرے جو کہ قوم کو اسلامی اقدار سے قریب تر کرنے میں معاون ہو۔ مختصراً یہ قومی پالیسی کے نصب العین، پاکستان کے اسلامی نظریہ کو قائم رکھنا۔ تقویت دینا اور مستحکم کرنا اور عملی تربیت کے ذریعہ اس کو انفرادی اور قومی زندگی کا شعار بنانا کی تفسیر ہو۔

یونٹ نمبر (۱) نظریہ پاکستان

۱۔ قیام پاکستان کے اغراض ومقاصد
۲۔ نظریہ پاکستان
☆ تعریف وتوضیع۔ ☆ نظریہ پاکستان اقبال اور قائداعظم کے ارشادات کی روشنی میں۔

یونٹ نمبر (۲) برصغیر میں مسلم معاشرہ کی تشکیل وارتقاء۔

یونٹ نمبر (۳) نظریہ پاکستان کا تاریخی پہلو۔

۱۔ برصغیر میں مسلم دور حکومت۔
۲۔ مسلم اقتدار کا زوال ارنشاہ کی کوشش۔
۳۔ ملی اصلاحی تحریکیں (شیخ احمد میر ہندی)۔ (شاہ ولی اللہ اور مابعد)۔
۴۔ تعلیمی کوششیں (علی گڑھ، دیوبند، انجمن حمایت اسلام اور دیگر مقامی تعلیمی ادارے سندھ مدرسہ، اسلامیہ کالج، پشاور)
۵۔ سیاسی جدوجہد۔
☆ آئینی اصلاحات ارمسلمان۔ جداگانہ انتخاب، ☆ تحریک خلافت

یونٹ نمبر (۴): تحریک پاکستان

۱۔ مسلم قومیت اور دو قومی نظریہ کا ارتقاء
۲۔ ہندوستان کی آزادی کا مسئلہ اور مسلمان۔
۳۔ علامہ اقبال کا خطبہ الہ آباد۔
۴۔ انتخاب ۱۹۳۷ء اور کانگریس حکومتوں کا رویہ۔
۵۔ قرارداد پاکستان
۶۔ ہندو انگریز کا ردعمل۔
۷۔ ۱۹۴۶ کے انتخابات اور انتقال اقتدار

یونٹ نمبر (۵): پاکستان کے حصول کے لئے جدوجہد

پاکستان کے لئے مسلم عوام کی جدوجہد

۱۔ اقلیتی صوبوں کے مسلمانوں کا کردار اور ایثار۔
۲۔ سرحد، بلوچستان، سندھ، کشمیر اور پنجاب کے مسلمانوں کا حصہ۔

یونٹ نمبر (۶): تحریک پاکستان میں:

۱۔ علماء اور مشائخ۔
۲۔ ادیب اور صحافی۔
۳۔ طلباء اور خواتین کا حصہ۔

یونٹ نمبر (۷) قیام پاکستان کے اہم واقعات

۱۔ ہندوستان میں مسلم کش فسادات، مشرقی پنجاب میں قتل۔
۲۔ نہری پانی اور اثاثوں کی تقسیم
۳۔ ریاستوں کے الحاق کا مسئلہ۔ حیدر آباد۔ جونا گڑھ اور کشمیر۔

یونٹ نمبر(۸): پاکستان میں نظام اسلام کے نفاذ کی کوشش

۱۔ قرارداد مقاصد۔

۲۔ ۱۹۵۶،۱۹۶۲اور۱۹۷۳ کے آئین کی اسلامی دفعات

۳۔ نماز شریعت، ابتدائی اقدامات۔

۴۔ ہماری منزل۔مکمل اسلامی معاشرہ کا قیام

یونٹ نمبر(۹): ارض پاکستان

(الف) جغرافیائی وحدت

محل وقوع، جغرافیائی اہمیت، دیہی وشہری علاقے۔

(ب) قدرتی وسائل

(ج) زراعت

(د) صنعت

(ر) درآمد وبرآمد

(ہ) افرادی قوت

یونٹ نمبر(۱۰): پاکستان اور عالم اسلام

Paper-IV
BEHAVIOURAL SCIENCES & COMPUTER EDUCATION

Theory Marks: 90
Internal Assessment 05 Marks in each subject
Total Marks: 100
Pass Marks: 50%
Total study hours: 200

Syllabi and course of reading

Note: Syllabi and course of reading is divided into two parts. 100 hours will be allocated for Sec I and 100 hours will be allocated for the Sec II. Question paper will carry 45 theory marks for Behavioural Sciences and 45 theory marks for Computer Education .

Section -I:
BEHAVIOURAL SCIENCES

Total Marks: 50
Pass Marks: 50%
Study hours: 100 hrs

1. Introduction to Behavioural Sciences and Its Importance In Health

Bio-Psycho-Social Model of Health Care and the Systems Approach
Normality vs Abnormality
Importance of Behavioural sciences in health
Desirable Attitudes in Health Professionals

2. Understanding Behaviour

Sensation and sense organs
Describe sensation, sense organs/special organs
Perception
Define perception, what factors affecting perception
Attention and concentration
Define attention and concentration. What factors affecting them
Memory
Define memory and describe its stages, types and methods to improving it
Thinking
Define thinking; describe its types and theories
What is cognition and levels of cognition?
Discuss problem solving and decision making strategies
Communication

Define communication. What are types, modes and factors affecting it. Describe ways to recognize non-verbal cues. Characteristics of a good communicator

3. Individual Differences

Personality

Define personality. What factors affect personality development? How personality can be assessed? Influence of personality in determining reactions during health, disease, hospitalization, stress

Intelligence.

Define intelligence and the various types of intelligence.
What factors affect it and how it can be assessed?

Emotions

Define emotions. What are the various types of emotions?
Emotional Quotient (EQ)- concept & utility

Motivation

Define motivation and what are the types of motivation?

4.Learning

Define learning, Principles of learning, modern methods and styles of learning, types of learners, Strategies to improve learning skills

5. Stress and Stressors

Define and classify stress and stressors
Relationship of stress and stressors with illness

6. Life Events

Concept of life events and their relationship with stress and illness

7. Stress Management

What is coping skills
What is conflict and frustration?
What is concept of adjustment and maladjustment?

8. Interviewing / Psychosocial History Taking

Define, types of interview and listening
Skills of interviewing and listening

9. Allied Health Ethics-Hippocratic oath

Do's and Don'ts
What is the concept of Allied Health ethics?

10. Culture and Allied Health practice

Concept of group, its dynamics
Attitude, value, belief, myths, social class, stigma, sick role and illness, health belief models

11. Psychological reactions

Grief and bereavement, Family and illness
Dealing with difficult patients
What are the psychosocial aspects of illness, hospitalization, rape, torture, terminal illness, death and dying?
Psychosocial issues in Emergency Departments, Intensive Care and Coronary Care Units, Operating Theatres, Cancer wards, Transplant Units, Anaesthesia

12. Breaking Bad News

Introduction, Models, Methods, Death of the patient, abnormal baby, intractable illness

13. Pain, Sleep, Consciousness

Concept of pain.
Physiology of pain,
Altered states of consciousness.

14. Communication Skills

Counseling,
Crisis Intervention
Conflict Resolution
Principles of effective communication, active listening, the art of questioning
The art of listening.
Good and bad listener.
Counseling: Scope, Indications and Contraindications,
Steps, Do's and Don'ts, How to deal with real life crisis and conflict situations in health settings

Section II:
COMPUTER EDUCATION

Total Marks: 50
Pass Marks: 50%
Study hours: 100 hrs

Introduction To Computers

- ***Definition***
- Usage and functionality of computers
- Limitations of Computers
- Classification of Computers
- Basic Components of Computers
- ***Hardware***
- ***Software***
- System Software
- Application Software
- Equipment's/devices in Personal computer system
- Input devices

- Output devices
- Storage devices
- The processor

- **Microsoft Windows**
- ***Introduction to MS-Windows***
- Arranging, Moving and Resizing Windows.
- Identifying the components of desktop.
- Moving, Changing and Closing Windows.
- Crating, Opening and Deleting items and folders.
- Working with My Computer
- Deleting and Resume Print Jobs.
- Using Control Panel
- Working with Accessories.

- **Microsoft Office**
- ***Microsoft Win Word***
- Microsoft Excel
- Microsoft Power Point

- **Database**

- **Internet and Email**
- Introduction To Outlook Express
- Using Internet Explorer

Second Professional B.Sc Nutrition Examination

Paper I

ADVANCED BIOCHEMISTRY

Theory Marks	90
Internal Assessment	10 Marks
Practical Marks	90
Internal Assessment	10 Marks
Total Marks:	200
Pass Marks:	50%
Theory hours:	100
Practical Hours:	200
Total study hours:	300

Course Outlines:

Acid-base, fluid and electrolyte control

- Homeostatis in human body
- Interpretation from the body chemistry
- variation of fluid ph and electrolyte composition from normal.
- Relation of ph and electrolytes to possible metabolic or respiratory imbalance.
- The relation between body fluid solutes and osmolar regulation.

Carbohydrate metabolism.

- Digestion, absorption and transport of carbohydrates.
- Basic concepts in the regulation of fuel metabolism by insulin, glucagons and other related-hormones.
- Formation and degradation of glycogen.
- Pathways of glucose metabolism; pentose phosphate pathway, fructose and galactose metabolism.
- Synthesis of glycosides, lactose, glycoproteins and glycolipids.
- Gluconeogenesis and maintenance of blood glucose levels.
- Role of carbohydrates in nutrition and homeostasis.

Protein structure, metabolism and function.

- Protein digestion and amino acids absorption.
- The structural elements of protein conformation.
- Fate of amino acids nitrogen. Urea cycle.
- Synthesis and degradation of amino acids.
- The structural properties of particular proteins such as collagen, hemoglobin and albumin to their biologic functions in health and disease.

Fats and lipids metabolism.

- Digestion and transport of dietary lipids.
- Metabolism of dietary lipids.
- Cholesterol absorption, synthesis, metabolism and fate.
- Oxidation of fatly acids and ketene bodies.
- Oxygen toxicity and free radical injury
- Metabolism of ethanol.
-

Enzymes and biologic catalysis.

- Nomenclature.
- Michaelis – menten equation.
- Inhibition of enzyme activity (competitive and noncompetitive inhibition)

Practical.

- Identification and confirmation of carbohydrates, proteins and fat compounds.
- Quantitative assay of selected enzyme activities in blood and other body fluids that can assist diagnosis and treatment of disease.

Bioenergetics and oxidative phosphorylation.

- Free energy change in a biochemical reaction.
- ATP as an energy carrier.
- Electron transport chain.
- Oxidative phosphorylation.

Water soluble and fat soluble vitamins.

- Sources.
- Chemistry.
- Deficiency symptoms.
- Required daily dietary allowance (RDA) in different physiologic conditions
- Role of vitamins as co-enzymes.

Hormonal regulation.

- The structure, biosynthesis, secretion and mechanisms of action of hormones present in the human body.
- The hormonal control of metabolism
- The biochemical basis of commonly occurring endocrine diseases.
- Gene expression and the synthesis of proteins
- Structure of the nucleic acids
- Synthesis of DNA
- Transcription: synthesis of RNA
- Translation; synthesis of proteins
- Regulation of gene expression
- Use of recombinant DNA techniques in medicine
- The molecular biology of cancer

- Minerals.
- Minerals in human nutrition, sources, biochemical actions and
- recommended daily allowance (RDA).
- Sodium, potassium, chloride, calcium, phosphorus, magnesium, sulfur, iodine, fluoride
- Trace elements as copper, manganese, molybdenum, zinc.

Practical.

- Learn the practical use of scientific equipments, use of electrophoresis,
- Electrolyte analyzer, spectrophotometer, ph meter,
- Osmometer clinical, and to give their practical demonstration.

- **Reference books.**
- Biochemistry, Lippioncott's Illustrated Reviews. By Pamela C. Champe, Rilchard A.Harvey, Denise R, Ferrier.
- Marks Basic Medical Biochemistry, A Clinical Approach By Colleen Smith, Allan D.
- Marks. Michael Lieberman.
- Essentials Of Medical Biochemistry By Mushtaq Ahmed. Volume 1 And 2.

PAPER II

MICROBIOLOGY AND GENETICS

Theory Marks	90
Internal Assessment	10 Marks
Practical Marks	90
Internal Assessment	10 Marks
Total Marks:	200
Pass Marks:	50%
Theory hours:	100
Practical Hours:	100
Total study hours:	200

Sec I
MICROBIOLOGY

Course Outlines:

- A brief account of the classification of microorganisms .
- Morphology: Identification of various shapes of bacteria and viruses under the
- microscope.
- Distribution, size, motility, reproduction and functions of bacteria and viruses.

- Effects of environment upon bacteria and viruses.
- Sterilization and disinfection. Definition, use of physical and chemical disinfectants.
- Nutrition and growth of bacteria and virus, nutritional requirements including vitamins and other growth factors, growth phase in a culture medium, respiration.
- Elementary bacteriology of soil, functions of soil microorganisms. Nitrogen cycle carbon cycle, sulfur cycle.
- Infection and immunity pathogenicty, path of infection, resistance and natural immunity, antigens and antibodies.
- Bacterial and viral diseases of man.
- Yeast and moulds.
- Cytology and multiplication of yeast, uses of yeast in the production of alcohol, glycerol, fermentation and dairy products.
- Moulds
- Structure of hyphae, structure, reproduction and economic importance of the
- following moulds.
- A, Rhizopus b, Aspergillus. C, pencillium.

Sec II
GENETICS

Course Outlines:

- Detailed study of human cell, cell structure, cell division (Mitosis, Meiosis, and Gametogenesis.)

- **Genetics**
- Mendal's law of segregation, gene hypothesis, Mendalian ratio, backcross and testoross ratio.
- Simple Mendalian traits in man. Pedigree, the inheritance of albinism, brown and blue eye colour, taste blindness, for blood groups, disputed paternity.
- Mendal's principle of independent assortment.
- Sihybrid cross and independent assortment, difference between genotype and phenotype.
- Sex linked inheritance of diseases.
- Discovery of chromosome, gene mapping on chromosome.

- **Practical.**
- A practical examination of three hours based on the following:
- Study of slides of various tissues, e.g. Bone, heart, stomach ,intestine, spleen, kidney, liver, skin, cartilage, smooth muscles, ovary, testis, pancreas, stripped muscles and unstripped muscles.
- To prepare a pedigree tree of some traits.

- Use of microscope, simple staining techniques, morphology of micro-organisms, cocci, bacilli , spirochetes, motility, sterilization, media preparation, isolation of micro-organisms from soil, air and water .Total viable count of microorganism in food.

Recommended Books:

Handbook Of Bacteriology, Rallicre Tendall & Cox London.
Bryan Bryan: Bacteriology, Principal And Practice.
Principales Of Bacteriology Mc-Graw-Hill, New York.
Principles Of Genetics By Sinott Dunn Dcszhan.
Frazier, W.C. Food Microbiology, Mcgraw-Hill Book Co.Inc. New York

PAPER III

FUNDAMENTALS OF NUTRITION

Theory Marks	90
Internal Assessment	10 Marks
Practical Marks	90
Internal Assessment	10 Marks
Total Marks:	200
Pass Marks:	50%
Theory hours:	100
Practical Hours:	100
Total study hours:	200

Course Outlines:

Introduction To The Study Of Nutrition.

- Definition of nutrition and relevant terms.
- Role of nutrition in relation to health.
- Functions of food: Physiological, psychological and social.
- Assessment of nutrition status.
- Signs of good and poor nutrition.

Choice Of Food.

- Diet and health, Dietary goals, dietary guidelines.
- Nutrient standards, recommended, daily dietary requirement (RDR).
- Nutritional labeling.
- Nutritional disorders related to food shortage.
- Health disorders related to unwise food choice.

Foods and Food Science

- To have a clear understanding of the terminology used in food science.

- To have a clear understanding of the criteria used in the evaluation of different foods.
- Food production, processing and retail

Composition, Characteristics And Nutritional Value Of The following

- Cereals, fats and oils, sugar and sweeteners, milk, cream cheese, yogurt,
- Eggs, meat fish alternative protein foods, gelatin, vegetables .pulses and
- Nuts, fruits, herbs, spices, food additives Convenience foods, fast food.

The Food Environment And Food Habits.

- Ecology of human nutrition.
- Development of food habits.
- Traditional cultural food patterns.
- Social, psychological influences on food habits.
- Current confusion influencing food habits.
- Change in food habits.

Introduction To Diet Therapy.

- Hospitalized patients: The therapeutic process.
- Nutritional assessment and analysis.
- Nutritional intervention: Care plane and management.
- Evaluation: quality patent care.

Practical.

- Planning of diets.
- Liquid diets.
- Soft diets.
- High fiber diet, low Fiber diet.
- Bland diet.
- High protein, high carbohydrate, moderate fat diet, fat cont rolled diet, sodium
- Restricted diet.
- Controlled protein, potassium and sodium diet.
- Questions and answers sessions.
- Book recommended.

Recommended Books.

1. Bogert, G.G.H, And Colloway, L, Nutrition And Physical Fitness. London, W.B. Saunders, Co.10th Ed. 1979/ Latest Edition.
2. Wilson, E.D. Fishers, K.M. And Fugua, M.E. Principals Of Nutrition, New York John Wiley And Sons, Inc., 6th Ed. 1979/ Latest Edition.
3. Maclead, G. And Taylor, C.M. Foundation Of Nutrition, New York Macmillan Pub. CO. Latest Edition.

Third Professional B.Sc Nutrition Examination

PAPER I
CLINICAL NUTRITION

Theory Marks	90
Internal Assessment	10 Marks
Practical Marks	180
Internal Assessment	20 Marks
Total Marks:	300
Pass Marks:	50%
Theory hours:	100
Practical Hours:	300
Total study hours:	400

Course Outlines:

Nutrition and weight management.
- Body composition: fatness and leanness.
- The problem of weigh management.
- The health model: A positive personal approach.

Nutrition and stress management.
- The role of stress as a risk factor.
- Physiologic response to stress: The general ad aptness syndrome.
- Life cycle stress: High risk population groups.
- The stress of physical trauma and disease, stress related to work, increased exercise, Environment, poverty, psychosocial stress, and mental health.
- High risk stress management.

Drug nutrient interactions.
- Drug nutrient problems in modern medicine.
- Effects of drugs on foods and nutrition.
- Effects of food and nutrients on drugs.

Nutrition health and prevention.

- **Dietary Fiber**
- Characteristics and sources
- Role of fiber in preventing diseases.
- **Obesity**
- Types, causes, health risks, prevention and treatment.
- **Hypertension**:

- Possible causes, consequences, prevention and treatment for Hypertension.
- **Cardiovascular Diseases**
- Risk factors for coronary heart diseases
- Stroke, hyperlipidemias prevention and treatment.
- **Osteoporosis**
- Definition, occurrence, Prevention and treatment.
- **Dental Health**
- Nutritional factors in tooth development dental caries, Etiology and prevention.
- **Cancer** .

- Possible causes of wasting with cancer treatment
- Possible effects of surgery for cancer on nutritional status.
- Anoxia and reduced food intake.
- Metabolic alterations and nutrient losses.
- Role of diet in prevention of cancer.

Nutritional Diet Therapy Related To:

- Gastrointestinal problems.
- Coronary heart disease and hypertension.
- Diabetes mellitus.
- Renal disease
- Surgery patients.
- Cancer patients
- Disabling disease.

Practical

- Nutrition education
  Planning of nutrition education programmes.
- Nutrition education in schools and professional institutions,
- education of mothers and the community, impact of nutrition on learning,
- Community sanitation.
- Food enrichment and supplementation.
- Comparison& measurement of Weight and volume of different foods.
  - Planning of diets for various pathological conditions.
  - Assessment of nutrition status
  - Anthropometric dietary intake.

Recommended Books:

- Human Nutrition And Dietetics By Davidson & Passmore
- Community Nutrition By Jessie, Craig And Other.
- World Nutrition And Nutrition Education By Sinclair And Howat..

PAPER II
APPLIED NUTRITION

Theory Marks	90
Internal Assessment	10 Marks
Practical Marks	180
Internal Assessment	20 Marks
Total Marks:	300
Pass Marks:	50%
Theory hours:	100
Practical Hours:	300
Total study hours:	400

Course Outlines:

Nutrition for growth and development.

- Human growth and development nutritional requirements for growth for different
- Needs .Pregnancy and lactation .Infancy, toddlers and young children,
- School age children, adolescents, adults, people living on low incomes, senior
- Citizens, Illness and convalescence, vegetarians, religious groups.
-

Balanced diet

- Importance of balanced diet in relation to health
- Use of daily food guide, food composition and recommended dietary requirement
- (RDR) in planning balanced diets
- Measurement of energy
- Energy requirements, BMR, factors influencing BMR
- The human energy system, respiratory quotient.

Nutrition and physical fitness.

- Physical activity and energy sources.
- Diet and exercise: basic nutrient needs.
- Nutrition and athletic performance

Family nutrition counseling:

- Food needs and costs
- The teaching learning process
- Family economic needs, food assistance programs.
- Food buying guides:

Role and responsibilities of public health nutritionist

- Effective strategies for modifying dietary behavior.

- Nutrition intervention strategies and planning nutrition Programs.
- Assessment of nutritional status of

o Individual.
o Communities.

National nutrition surveys.
Study of anthropometry.

- Biochemical analysis. Clinical evaluation. Dietary assessment.
- Planning of nutrition surveys.

Practical.

- A nutritional survey report.
- Practice in meal planning.
- One week's menu may be planned for hospitals.
- These should be based on actual need.
- Hospital visits essential for this exercise
- Blood analysis- sugar, hemoglobin, cholesterol etc.
- Urine analysis-blood, protein, vitamins, sugar.
- Assessment of nutritional status, anthropometric dietary in take
- Subjective methods of food evaluation and their application in the evaluation of foods .
- Objective methods of food evaluation and their application in evaluations of foods.

Recommended Books.

- Essential Of Nutrition And Diet Therapy By Sue Rod Well Williams.
- Latest Nutrition.
- Krause's Food Nutrition And Diet Therapy.

Final Professional B.Sc Nutrition Examination

Paper I

COMMUNITY NUTRITION

Theory Marks	90
Internal Assessment	10 Marks
Practical Marks	180
Internal Assessment	20 Marks
Total Marks:	300
Pass Marks:	50%
Theory hours:	200
Practical Hours:	300
Total study hours:	500

Course Outlines:

- A brief study of social, economical, psychological, and environmental, factors
- Affecting dietary habits.
- Role of nutrition in community development
- Ways and means of improving Community.
- A brief study of state of nutrition in Pakistan
- Critical analysis of factors responsible for malnutrition in Pakistan and suggesting measures for improvement.
- International agencies and programmes in nutrition
- Role of clinical nutritionist towards nutrition education of communities.
- Appreciation of research in nutrition.
- Brief study of current food related health issues.
- Obesity, Role Of Fiber, Saturated Fats And Heart Disease, Organic Foods.

Paper II

BIOSTATISTICS AND RESEARCH METHODS

Theory Marks	45 Marks
Internal Assessment	05 Marks
Oral Examination on Research Report	45Marks
Internal Assessment	05 Marks
Total Marks	100 Marks
Pass Marks	50% Marks
Theory Hours	100
Practical Hours:	200
Total study Hours:	300

Contents of the Course

1. **Introduction of Statistics**: Statistical data condensation of data, presentation of data by graphs, health related data, rates and their relative importance, presentation of quantitative data.
2. **Sampling:** The concept of sampling, types and methods of drawing ideal sample, sampling distribution of sample mean, error of sampling, standard error, chi square, T-test and their uses in health.
3. **Central Tendency:** Concepts of central tendency, mean, median and ode and their value in health, percentiles, measure of dispersion, coefficient of variation and skewness, normal distribution, range, standard deviation and relative deviation.
4. **Hypothesis:** Concepts of hypothesis testing, null & alternative hypothesis, two types of errors, acceptance & rejection regions, tow sided & one sided tests, general steps in hypothesis testing, test about means, confidence interval for mean, meaning of significance in statistical procedures and methods of inferential statistics.
5. **Regression & Correlation:** Scatter diagram, straight line regression model, method of least squares, sample correlation coefficient, inference about regression coefficient and correlation coefficient.
6. **Introduction to Research:** The question of legitimate knowledge, knowledge & decision making, the scientific method, quantitative vs qualitative research, application of scientific method, positivistic vs naturalistic paradigm.
7. **Classification of Research:** Basic vs applied research, evaluation research, research & development (R&D), action research.
8. **Selection & Formulation of a Problem:** From generic to a specific program, program statement, getting an access to primary and secondary resources, note taking and information to management, Review of related literature, questions and/or hypothesis of the study.
9. **Development of a Research Plan:** The ethical, legal and professional obligations, the rational of the study, the research plan, evaluation of a research plan.

10. **Selection of sample:** sample & population, basic considerations in sampling, random sampling, stratified random sampling cluster sampling, systematic sampling determination of sample size, elimination of sampling bias.
11. **Instrumentation and Data Collection:** Tests and scales, objectivity and standardization, types of tests and scales, validity and reliability of an instrument, assessment of validity and reliability, development of tests/scale.
12. **Data Analysis & Interpretation:** Preparing data analysis, types of measurement scales, descriptive statistics inferential statistics, using computer for data analysis.
13. **Preparation of a Research Report:** Format & style, citation, references & bibliography writing theses, dissertations & journal articles.

- **A Research Project Based On Clinical/Community Nutritional Survey.**
- **The research report will be submitted in the final year examination.**

Recommended Books:

1. Gay. L.R. (1987) Educational Research: Competencies for Analysis and Applications Columbus: Merrill.
2. Walpole, R.E.: Introduction to Statistic, Publishing Co. Inc, New York.
3. Spiegel, Murray R.: Theory & Problems of Statistics, Sehawm Publishing Co., New York.
4. PARK'S; Text Book of Preventive and Social Medicine