

CURRICULUM

FOR
B.S ALLIED HEALTH SCIENCES
(OPTOMETRY)



BASHIR INSTITUTE OF HEALTH SCIENCES ISLAMABAD

Affiliated with

Shaheed Zulfiqar Ali Bhutto Medical University

NOMENCLATURE AND DURATION

The name of the degree program will be B.S. Optometry Technology. The duration of the course shall be 4 years with structured training in a recognized eye care facility under supervision.

COURSE SCHEME (Total credit hours: 129)

1st Semester

Credit Hours: 15+3 =18

Course Code	Subject	Credit hour
OPT-101	Anatomy I	4(3+1)
OPT-102	Physiology I	4(3+1)
OPT-103	Biochemistry I	4(3+1)
OPT-104	English I	2(2+0)
OPT-105	Pakistan Studies	2(2+0)
OPT-106	Computer Skills	2(2+0)

2nd Semester

Credit Hours: 15+3 =18

Course Code	Subject	Credit hour
OPT-107	Anatomy II	4(3+1)
OPT-108	Physiology II	4(3+1)
OPT-109	Biochemistry II	4(3+1)
OPT-110	English-II	2(2+0)
OPT-111	Islamiyat / Ethics	2(2+0)
OPT-112	Histology	2(2+0)

3rd Semester**Credit Hours: 12+5 =17**

Course Code	Subject	Credit hour
OPT-113	Ocular Anatomy & Physiology I	4(3+1)
OPT-114	Ocular Diseases & Therapeutics I	4(3+1)
OPT-115	Pathology-I	3(2+1)
OPT-116	Pharmacology-I	3(2+1)
OPT-117	Physical & Geometrical Optics	3(2+1)

4th Semester**Credit Hours: 11+5 =16**

Course Code	Subject	Credit hour
OPT-118	Ocular Anatomy & Physiology II	4(3+1)
OPT-119	Pathology-II	3(2+1)
OPT-120	Pharmacology-II	3(2+1)
OPT-121	Visual Optics	3(2+1)
OPT-122	Ocular Diseases & Therapeutics II	3(2+1)

5th Semester**Credit Hours: 13+5 =18**

Course Code	Subject	Credit hour
OPT-123	Clinical Refraction	3(2+1)
OPT-124	Instrument Optics I	3(2+1)
OPT-125	Clinical Skills & Ocular Pharmacology I	4(3+1)
OPT-126	Contact Lens & Dispensing Optics I	4(3+1)
OPT-127	Basic Orthoptics	4(3+1)

6th Semester**Credit Hours: 14+4 =18**

Course Code	Subject	Credit hour
OPT-128	Neuro-optometry	2(2+0)
OPT-129	Instrument Optics II	3(2+1)
OPT- 130	Clinical Skills & Ocular Pharmacology II	3(2+1)
OPT-131	Contact Lens & Dispensing Optics II	4(3+1)
OPT-132	Clinical Orthoptics	4(3+1)
OPT-133	Behavioral Sciences	2(2+0)

7th Semester**Credit Hours: 11+1 =12**

Course Code	Subject	Credit hour
OPT-134	Community Medicine I	3(3+0)
OPT-135	Low Vision	4(3+1)
OPT-136	Investigative Ophthalmology	3(3+0)
OPT-137	Biostatistics & Research Methodology I	3(3+0)

8th Semester**Credit Hours: 15**

Course Code	Subject	Credit hour
OPT-138	Research Project	6(0+6)
OPT-139	First Aid & Ocular Emergencies	2(2+0)
OPT-140	Pediatric Optometry	3(2+1)
OPT-141	Biostatistics & Research Methodology II	3(3+0)
OPT-143	Community Medicine II	3(3+0)

FIRST SEMESTER

Subjects

- **Anatomy I**
- **Physiology I**
- **Biochemistry I**
- **English I**
- **Pakistan Studies**
- **Computer Skills**

ANATOMY-I

Course Objectives

- To understand the basic concepts of general anatomy including skeleton and musculoskeletal.
- To understand the anatomy of Thorax, Abdomen and Pelvis.

Course Detail:

- **Musculoskeletal system** (Axial and appendicular), Axial Skeleton, Different bones of human body, Axial and appendicular skeleton, Classification on the basis of development, region and function, General concept of ossification of bones, parts, young bones, blood supply of long bones,
Joints, Structural, regional and functional classification of joints. Characteristics of synovial joints, classification of synovial joints, movements of synovial joints.
Muscular system, parts of muscle, classification of muscles (cardiac, skeletal, smooth).
- **Thoracic wall:** Muscles of thorax, Surface anatomy, Bones of thorax, diaphragm.
- **Thoracic cavity:** mediastinum, trachea, lungs, bronchi, blood supply and lymphatic's, heart and thoracic vessels, thoracic duct, esophageal part of thorax, thymus.
- **Abdominal wall:** skin, nerve and blood supply, Muscles of anterior abdominal wall and posterior wall.
- **Abdominal cavity:** General arrangement of the abdominal viscera, peritoneum, Omenta, mesenteries, stomach, liver, pancreas, spleen, gall bladder, intestines, kidneys, arteries and veins of abdomen, lymphatic's and nerve supply.
- **The pelvic wall:** Anterior and posterior wall.
- **Pelvic cavity:** viscera's, ureters, urinary bladder, Male genital organs, female genital organs, muscles of pelvic region, blood supply, nerve supply.

Practicals:

- Study Axial and Appendicular skeleton on human skeletal model.
- Study musculoskeletal system on human musculoskeletal model.
- Study and understand anatomy of Thorax, Abdomen and Pelvis through:

- Human models.
- Video demonstration.

Recommended Books

- I. Essentials of anatomy and physiology by Seely, Stephens, and Tate (4thed)
- II. Anatomy & physiology by Ross & Wilson
- III. General Anatomy by Ghulam Ahmed/ LaeeqHussain.
- IV. Anatomy by D.R Johnson & K.L. Moore.
- V. Regional Anatomy by Snells.

PHYSIOLOGY-I

1) INTRODUCTION TO HUMAN PHYSIOLOGY

- Relation between structure and function of human body

2) Homeostasis

- Negative and positive feedback mechanism
- Nervous and hormonal control
- Body temperature and its regulation

3) Integumentary system

- Function of skin, hair, glands and nails

4) Muscle physiology

- Function of bone and muscle
- Functional characteristics of skeletal, smooth and cardiac muscles
- Muscles contraction and relaxation to action potential of motor neurons
- Aerobic and anaerobic muscle contraction
- Muscle hypertrophy

5) Endocrinology

- Introduction/types of glands and hormones
- Function of endocrine system and all hormones
- Chemical signals and their receptors/hormones

6) Digestive system

- Different parts of digestive system
- Accessory organs and their functions
- Function of G.I.T. all organs and their secretions
- Saliva, properties, glands ,functions, physiological and pathological conditions
- Stomach and its wall, function and gastric glands
- Absorption, transport and physiology of digestion

7) Physiology of respiration

- Different parts and functions of respiratory system
- Lungs volumes and capacities

- Respiratory capacity and its types
- Transport of gases and their exchange
- Control on rhythmic ventilation

8) Genitourinary system

- Urine production, movements and regulation
- Body fluid compartments
- Regulation of extracellular fluids
- Regulation of acid-base balance

9) Reproduction system

- Male reproduction system, spermatogenesis
- Functions of hormones, glands and regulation
- Female reproductive system
- Effects of progesterone and estrogen.

Practicals:

1. Introduction to microscope
2. Bleeding time
3. Clotting time
4. WBC's count
5. RBC's count
6. Platelets count
7. Reticulocytes count

Recommended Books

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

BIOCHEMISTRY-I

1. Cell

- Introduction to Biochemistry
- Cell: (Biochemical Aspects)
- Cell Membrane Structure
- Membrane Proteins

2. Body Fluids

- Structure and properties of Water
- Weak Acids & Bases
- Concept of pH & pK
- Buffers, their mechanism of action
- Body buffers

3. Amino Acids, Peptides & Proteins

- Amino acids: Classification
- Functions & Significance
- Acid-Base Properties
 - Identification techniques (electrophoresis)
 - Isomerism in proteins
 - Amphoteric properties
- Classification of Proteins
- Protein Structure, Primary, Secondary & Super secondary. &, Structural Motifs
- Tertiary & Quaternary Structures of Proteins
- Fibrous proteins (collagens and elastins) & Globular proteins
- Classification of proteins based on physiochemical properties

4. Enzymes

- Introduction
- Mechanisms of Action
- Classification & Properties of Enzymes
- Coenzymes
- Isozymes & Proenzymes

- Factors affecting enzyme activity
- Regulation & Inhibition of Enzyme activity & enzymes inhibitors
- Clinical Diagnostic Enzymology

5. Carbohydrates

- Definition
- Classification
- Biochemical Functions & Significance of Carbohydrates
- Isomers of monosaccharides
- Structure & Properties of Monosaccharides & Oligosaccharides
- Structure & Properties of Polysaccharides

6. Lipids

- Classification of Lipids
- Fatty Acids: Chemistry
- Classification occurrence & Functions
- Structure & Properties of Triacylglycerols and Compound lipids
- Cholesterol: Chemistry, Functions & Clinical Significance
- Bile acids/salts

7. Nucleic Acids

- Structure, Functions & Biochemical Role of Nucleotides
- Structure of nucleotide
- Structure & Functions of DNA
- Structure & Functions of RNA

8. Minerals & Trace Elements

- Sources
- RDA
- Biochemical Functions & Clinical Significance of Calcium & Phosphorus
- Sources
- RDA
- Biochemical Functions & Clinical Significance of Sodium Potassium & Chloride
- Metabolism of Iron, Cu, Zn, Mg, Mn, Se, I, F

9. Vitamins

- Sources
- RDA
- Biochemical Functions & Clinical Significance of Fat Soluble Vitamins
- Sources
- RDA
- Biochemical Functions & Clinical Significance of Water Soluble
- Vitamins

10. Nutrition

- Dietary Importance of Carbohydrates, Lipids & Proteins
- Balanced Diet
- Calorie requirements of body

Lab Work

- 1- Good lab practices
- 2- Preparation of solutions
- 3- Principles of Biochemistry analyzers(spectrophotometer, flame photometer)
- 4- SOP of Centrifuge, Water Bath and Microscope
- 5- **Lab Hazards and safety**

COMPUTER SKILLS

1. INTRODUCTION OF COMPUTER

- Definition
- Hardware
- Software

2. MICROSOFT WINDOW

- Arranging and moving an resizing window
- Identify the computer of desktop
- Moving ,changing and closing window
- Creating, opening and deleting items form windows
- Working with my computer
- Deleting and resume print jobs
- Using control panel
- Working with accessories

3. MICROSOFT OFFICE 2007, WIN XP/7 WORD, EXCEL POWER POINT

4. DATABASE

5. INETRNET AND E.MAIL

- Introduction to outlook express using internet explorer

ENGLISH-I

COURSE DESCRIPTION:

This course covers the all aspects of English Grammar like The Basics of Grammar , Analysis of Phrases, Clauses and Sentences and their lot of practice, Parts of Speech, Active and Passive Voice, Punctuation ,Spelling, Practice in Unified sentences ,Comprehension ,Discussion ,Listening Skills, Paragraph Writing Skills, Translation skills, and Presentation skills.

BASICS OF ENGLISH GRAMMAR

- Definition of Grammar
- Parts of Speech in detail
 - Noun, its kinds and usage
 - Pronoun and its kinds
 - Adjective and its kinds
 - Verb and its kinds
 - Adverb and its kinds
 - Conjunction and its kinds
 - Interjection and its kinds
 - Determiners (Articles) and its kinds and usage
 - Sentence correction in the use of noun and articles
- Analysis of phrases, clauses and sentence structure
- Practice in unified sentence: A sentence having the quality of oneness that results when all the words and sentences contribute to a single main idea. It must have a single focus and it must contain no irrelevant facts
- Tenses (present ,past and future)
- Change the Voices
 - Active Voice
 - Passive Voice
- Punctuation rules and it usages

- Spelling rules
- Comprehension: Answers to the questions on a given text.
- Vocabulary building skills
- Antonyms
- Synonyms
- Homonyms
- One word substitute
- Prefixes and suffixes and phrasal verbs
- Idioms and phrasal verbs
- Logical connectors
- Check spellings

IMPORTANT SKILLS

- Discussion Skills: General topics and every-day conversation.
- Listening Skills
- Translation Skills: From Urdu to English.
- Paragraph writing skills: topics to be chosen at the discretion of the teacher.
- Four Essential Elements of Paragraph Writing
 - **Unity**
 - **Order**
 - **Coherence**
 - **Completeness**
- Presentation Skills: Introduction
- Extensive Reading

RECOMMENDED TEXT BOOKS:

1. Practical English Grammar by A. J. Thomson and A. V. Martinet. Exercise 1, Exercise 2, Exercise 30, Exercise 37 Third edition. Oxford University Press. 1997. ISBN 0194313492
2. Study skills for the students of English by Richard C. Yorkey. Chapter 3 Learning the vocabulary of English pg 47 to 76, Chapter 5 , Improving your Reading pg 95 to 138.

PAKISTAN STUDIES

Historical perspective:

- Ideological rationale with special reference to Sir Syed Ahmad Khan, Allama Iqbal & Quaid e Azam Muhammad Ali Jinnah
- Factors leading to Muslims separation, People and land, Indus Civilization, Muslims Advent, Location & Geo physical Features.

Governments & Politics in Pakistan

- Politics and constitutional phases:
1947-58, 1958-71, 1971-77, 1977-88, 1988-99, 1999 to onwards
Contemporary Pakistan
- Economics institutions and issues
- Society and social structure
- Ethnicity
- Foreign policy of Pakistan and challenges
- Futuristic outlook of Pakistan

Pakistan and Islamic Word

مطالعہ پاکستان
*نظر یہ پاکستان
تعریف و توضیح
قیام پاکستان کے اغراض و مقاصد
نظر یہ پاکستان علامہ اقبال اور قائد اعظم کی شاد اتکیر و شنیمیں
*نظر یہ پاکستان کاتار یخپیہلو
حضر تمجد الفثانی
حضر تنشاہو لیا اللہ
سید احمد شہید (تحریک مجاہدین)
سر سید احمد خان (تحریک علی گڑھ)
فرانسس ٹھریک
نیتو میر کیتھریک
تحریک یشمیر و مال
دار العلوم دیوبند
ندو تہ العلماء
انجمن جماعت اسلام

سندھ مدرسہ الاسلام
اسلامیہ کالجیٹا اور
تحریک خلافت
سوڈیشی تحریک

*تقسیم ہنگال / تنسیخ ہنگال

شملہ وفد
مسلم لیگ کے قیام اور مقاصد
منٹو مارے اصلاحات
میثاق لکھنؤ
روٹائی گٹا اور حادثہ جلیانوالہ پبھاغ
دہلی تجاویز
سائمن کمیشن
نہرو رپورٹ
قائد اعظم محمد علی جناح کے چودہ نکات
علامہ اقبال کا خط پہلے بادی (تصور پاکستان)
گول میز کانفرنس (پہلی، دوسری، تیسری)
قراداد لاہور
کرپیشن اور کابینہ مشن
شملہ کانفرنس
تقسیم ہند کا منصوبہ
حد بندی کمیشن

*پاکستان کے ابتدائی مشکلات کا جائزہ

انتظامی امور کا مسئلہ
مہاجرین کا مسئلہ
اٹانوں کی تقسیم
افواج اور فوجیہ ساز و سامان کی تقسیم
نہر بیانیہ کا مسئلہ
ریاستوں کے الحاق کا مسئلہ
(حیدرآباد، جونا گڑھ، جموں و کشمیر)

*پاکستان میں نفاذ اسلام کیلئے کی گئی کوششیں

• آئین ساز یکمختصر تاریخ (1947-1956)

قرار داد مقاصد، 1949 (12 مارچ)

علماء کرام کے بائیس نکات (جنوری 1951)

1956 کے آئین کے اسلامی دفعات (23 مارچ 1956)

1962 کے آئین کے اسلامی دفعات (8 جون 1962)

1973 کے آئین کے اسلامی دفعات (14 اگست 1973)

نفاذ شریعت کے لئے موجودہ اقدامات بعد (1977)

تجویز کر دہ کتب :-

اسلامی پبلسرز مطالعہ پاکستان (B.A. پارٹ II)

قریشی پبلسرز مطالعہ پاکستان (B.Sc)

SECOND SEMESTER

Subjects:

- 1. Anatomy II**
- 2. Physiology II**
- 3. Biochemistry II**
- 4. English II**
- 5. Histology**
- 6. Islamiyat**

ANATOMY - II

Course Objectives

- To understand the anatomy of upper limb, lower limb and head and neck

Course Detail:

- 1. The upper limb:** Bones of shoulder girdle and arm, Muscles, Axilla, Brachial plexus, Cubital fossa, The fore arm, hand bones, muscles, Blood supply, nerve supply, lymphatics, Hand bones, muscles, blood supply, nerve supply.
- 2. The lower limb:** Fascia's, bones, muscles, femoral triangle, gluteal region, thigh bones, muscles, blood and nerve supply, knee joint, limb bones, muscles, blood supply and nerves, foot bones, muscles nerve and blood supply, lymphatic supply of lower limb.
- 3. Head and neck:** skull, Mandible, Cranial nerves, Brain, meninges, cranial cavity, orbit, neck, endocrine system: classification of endocrine glands, pituitary glands, thyroid glands, adrenal gland, differences between the cortex and medulla.

Practical:

- Study and understand anatomy of upper limb, lower limb, head and neck through:
- Human models
- video demonstration
- study radiographs

Recommended Books

- i. Essentials of anatomy and physiology by Seely, Stephens, and Tate (4thed)
- ii. Anatomy & physiology by Ross & Wilson
- iii. General Anatomy by Ghulam Ahmed/ Laeeq Hussain.
- iv. Anatomy by D.R Johnson & K.L. Moore.
- v. Regional Anatomy by Snells.

PHYSIOLOGY-II

1. Nervous System physiology

- Functions of cerebral cortex, brainstem, basal muscles, limbic system, cerebellum
- Functions of cranial nerves, somatic and motor neurons
- Autonomic nervous system
- Neuroglia: functions and types
- Synapse; functions and Classification
- Action potential and Reflex Arch

2. Functions of specialized sense organs:

- Eye: physiology of site
- Ear: physiology of hearing and balance
- Smell: physiology of olfactory nerve
- Taste: physiology of taste buds and speech

3. Physiology of Blood

- Composition/Properties and count of blood cells
- Stages of development
- Blood Coagulation in presence of blood clotting factors
- ABO blood group system

4. Cardiac physiology

- Functions of heart, propagation of cardiac impulse,
- Cardiac cycle, heart sounds and regulation of functions
- Intrinsic and extrinsic functions of peripheral circulation
- Pulmonary circulation
- Systemic circulation:
- Local/ nervous control of blood vessels
- Regulation of arterial pressure
- Functions of lymphatic system
- Spleen, thymus, lymph nodes and tonsils

5. Immunity

- Innate/adoptive immunity
- Antigens (Types of antigen and functions) Antibodies
- Primary and secondary response
- Cell mediated/humoral immunity
- Lymphocytes in immunity

Practicals:

1. Spirometry
2. Electrocardiography
3. Blood Pressure Measurement
4. Normal and abnormal ECG interpretation
5. Pulse rate measurement
6. Heart sounds

Recommended Books

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

BIOCHEMISTRY- II

1. Amino Acids, Peptides & Proteins

- Digestion of Proteins & Absorption of Amino Acids
- Transamination & Deamination of Amino Acids, deamidation, methylation, decarboxylation, interconversion of amino acids
- Urea cycle
- Specialized products formed from Amino Acids
- Metabolic disorders

Molecular Biology

- Replication of DNA
- Transcription in Prokaryotes
- Transcription in Eukaryotes
- Translation: (Genetic Code) Protein Synthesis in Prokaryotes
- Translation: (Genetic Code) Protein Synthesis in Eukaryotes
- Structural organization of chromosomes, DNA & gene
- Polymerase Chain Reaction

2. Carbohydrates

Metabolism of Carbohydrates

- Digestion & Absorption of Carbohydrates
- Glycolysis & its Regulation
- Fate of pyruvate
- Factors affecting tissue content of glycogen
- Citric Acid Cycle
- Interconversion of carbohydrates, lipids and proteins
- Calculation of ATP moles formed in glucose utilization
- Gluconeogenesis and regulation of blood glucose
- Pentose Phosphate Pathway & its Significance
- Glycogenolysis

3. Lipids

- Digestion & Absorption of Lipids

- Metabolism & Clinical Significance of Lipoproteins
- Fatty acid oxidation biosynthesis and metabolism of Triacylglycerols
- Metabolism & clinical Significance of Cholesterol
- Ketone bodies

4. Hormones

- Classification & Mechanism of Action of Hormones
- Steroid Hormones: Glucocorticoids and Mineralocorticoids
- Insulin & Glucagon

5. Nucleic acids

- Metabolism of Nucleic acids
- Gout

6. Bioenergetics

- Law of thermodynamics
- Energy rich compounds
- Electron transport chain
- Oxidative phosphorylation

Practicals:

- Determination of enzymes
- Urine examination (chemical examination)
- CSF examination
- Examination of pleural, pericardial, synovial fluids

Recommended Books

- I. Review of Biochemistry by Lippincott.
- II. Essentials of Medical Biochemistry Vol I & II by Mushtaq Ahmed
- III. Fundamentals of Biochemistry by D. Voet, J.G. Voet (1999)
- IV. Text Book of biochemistry with Clinical correlations by T.M Devlin.
- V. Modern Experimental Biochemistry by R.F.Boyer.
- VI. Harper's Biochemistry.

ENGLISH II

COURSE DESCRIPTION:

This course covers practical aspects of English Usage like Essay writing skills, Presentation Skills, Academic Writing Skills, Proposal Writing Skills for research, Research Paper, writing Skills, Technical Report writing Skills and Progress Report Writing skill

➤ **Essay Writing**

- **Process of writing (pre writing, first draft, final draft, editing)**

➤ Format of traditional essay

- Different ways: how to introduce , how to explain detail in body paragraph and how to conclude
- Types of Essay
- How to make an outline
- Descriptive Essay
- Narrative Essay
- Argumentative Essay.
- Cause and effect Essay

➤ **Presentation Skills**

- Introduction
- Body of the Presentation
- Conclusion

Technical Writing skills

- Technical Report Writing
- Key features of reports
- Title page
- Summary
- Table of Contents
- Introduction
- Middle sections with numbered headings (i.e., the body of the report)
- Conclusions

- References
- Appendices
- **Progress Report Writing review of all targets**
- Target
- Outline of Activities
- Accomplishment during the time
- Output
- **Academic Writing Skills**
- What is a proposal?
- Types of proposals
- Parts of a proposal
- How to write a proposal for research
- How to write a research paper
 - Introduction
 - Methodology
 - Conclusion and suggestion

RECOMMENDED BOOKS:

Grammar 1. Practical English Grammar by A. J. Thomson and A. V. Martinet. Third edition. Oxford University Press 1986. ISBN 0 19 431350 6.

Writing 1. College Writing Skills by John Langan. Mc-Graw-Hill Higher Education. 2004.

2. Patterns of College Writing (4th edition) by Laurie G. Kirszner and Stephen R. Mandell. St. Martin's Press

ISLAMIC STUDIES

- Fundamental beliefs of Islam, Belief of Tawheed, Belief in Prophet Hood, Belief in the day of judgment
- Salaat/ Prayer, Zakaat/Obligatory Charity, Saum/Fasting, Hajj/Pilgrimage, Jihaad
- Importance of Paramedics in Islam, Ethics, Religion & Ethics, Higher Intentions/Objectives of Islamic sharia & Human health
- Importance & virtues of medical profession, contribution & Achievements of Muslim doctors.
- Knowledge of the Rights, Wisdom & Prudence, Sympathy/ Empathy, Responsible life, Patience, Humbleness, Self-respect, Forgiveness, Kindhearted, Beneficence, self-confidence, Observing Promise, Equality, Relation among the Doctors, Jealousy, Backbiting, Envy, Etiquettes of Gathering, Relation between a Doctor & a patient, Gentle speaking, Mercy & affection, Counseling the patient, to ensure the patient, character building of the patient, responsibilities of doctor.

اسلامیات
* اسلام کے بنیادی عقائد
توحید، رسالت، آخرت
* نماز
روزہ
حج
جہاد
حالت جنگ میں اور قدرتی آفات میں معالج کی ذمہ داریاں
اسلام میں نرسنگ کی اہمیت
زکوٰۃ
* علم الاخلاق کی تعریف و اہمیت
انسان کی صفات و خواص
مذہب اور اخلاق کا تعلق
* پیشہ طلب کیا ہو تو فضیلت
پیغمبر ﷺ کی طبیعت
مسلمان طباء کی خدمات اور ان کے اہم کارنامے
* معالج کی صفات
حقوق اللہ اور حقوق العباد کا علم
حکمت و دانائی
ایثار و ہمدردی
ذمہ دارانہ زندگی
صبر

نرم گفتاری
تواضع
راز کی حفاظت
عزت نفس

عفو و درگزر

رحمدلی

احسان

خود اعتمادی

عهد و پیمان

مساوات

* معالجہ کا معاملہ سے تعلق

نیک کے کاموں میں تعاون

حسد

غیبت

بغض و کینہ

امر نامر و فوہینا المنکر

آداب مجلس

* معالجہ اور مریض کا تعلق

خوشگامی

عیب و شہی

رحم و شفقت

مریض کو تسلی دینا

مریض کی عیادت

مریض کی اخلاقی تربیت اور دعا

حرمتوں اور نئی سے پرہیز

مریض کی اجازت

تجویز کر دہ کتاب :-

اسلامیات (لازمی)

(برائے میڈیکل کالج و ملحقہ ادارہ ہجرت)

HISTOLOGY

Course Objective:

- Learn about the basic techniques of Histology

Course Contents

Structure of Animal Cell: Cytoplasmic Inclusion & Organelles. Appearance of nucleus in resting & dividing cells, Tissues of body, Concept of tissues, Organs & System, Structure of cell as anatomical & functional unit. The four basic types of Tissues, Specialized morphological & functional characteristics of each type. The Epithelial Tissue: Classification of Epithelial. Location of Epithelia with examples, Microscopic appearance of different epithelia. The Connective Tissue: Classification of connective tissue, Connective tissue proper, Cellular and fibrous elements of C.T. proper, Cartilage, its types and microscopic structures. Microscopic structure of Bone. The Muscular Tissue: Microscopic feature of muscle tissue, Differences between the microscopic structure of smooth, skeletal & cardiac muscles. The nervous Tissue: Microscopic structure of Nerve Cells and fibrous tissue.

Practicals:

- Related with theory course
- Microscopic Study of Human Tissue.

THIRD SEMESTER

Subjects:

- 1. Ocular Anatomy & Physiology I**
- 2. Physical & Geometrical Optics**
- 3. Ocular Diseases & Therapeutics I**
- 4. Pharmacology I**
- 5. Pathology I**

Ocular Anatomy & Physiology I

Ocular Anatomy:

- **The Orbit**
 - Salient structural features i.e.; its position, shape, margins & walls
 - Important relations of the orbit
 - Important openings of the orbit
 - Contents of the orbit
 - The paranasal sinuses
- **Eyelid:**
 - Structure, glands, tarsal plate
- **Conjunctiva**
 - Structure, types
- **Lacrimal Apparatus**
 - Structure , applied aspects (various tests to detect watering/ epiphora)
- **The Eyeball**
 - Introduction & dimensions
 - Stability of the eyeball
 - Coverings of the eyeball
 - Blood supply of the eyeball
 - Nerves supply of the eyeball
- **Fibrous layer of the eyeball**
 - Structure of Cornea
 - Structure of Sclera
 - Limbus and the related structures

Ocular Physiology

- **The Orbit**
 - Functions of the eyelids
 - Functions of the lacrimal system
- **Fibrous layer of the eyeball**
 - Functions of Cornea and factors responsible for its transparency
 - Functions of Sclera
- **Aqueous Dynamics**
 - Synthesis, composition and outflow of aqueous humor

Physical & Geometrical Optics

Physical Optics

- **Light**
- Nature of light
- Properties of light
- Interference, Coherence & Polarization
- Diffraction, Scattering, Transmission & Absorption
- LASERs
- Radiometry & Photometry

Geometrical Optics

- **Reflection of Light**
- Definition
- Laws of Reflection
- Types
- Reflection from Plane & Spherical mirrors
- **Refraction of Light**
- Definition, Laws, Refractive Index, Refraction at plane & spherical surfaces
- Vergence and Surface power
- Coaxial system of Spherical lenses
- Critical Angle & Total Internal Reflection
- **The Lenses**
- Types & Nomenclature
- Lens shape, Front & Back Vertex Power
- Effective lens power
- Spherical & Cylindrical Lenses
- **Optics of Prisms**
- Refraction by Prisms
- Detection & Measurement
- Types
- Prentice position & position of minimum deviation
- Notation of Prisms
- Unit of Prism

Ocular Diseases & Therapeutics I

- **Diseases of the Orbit**
 - Common signs and symptoms associated with orbital diseases
 - Common orbital diseases
 - Infections – Orbital Cellulitis
 - Space occupying lesions
 - Orbital Traumas – blowout fracture
- **Diseases of the Eyelids**
 - Congenital diseases
 - Ptosis
 - Distichiasis
 - Entropion
 - Coloboma
 - Abnormalities of the shape and position
 - Entropion
 - Ectropion
 - Ptosis
 - Diseases of the lid margins
 - Stye
 - Blepharitis
 - Chalazion
 - Tumors of the eyelids
 - Benign tumors
 - Malignant tumors
- **Diseases of the Lacrimal system**
 - Obstructive disorders
 - Dacryocystitis
- **Diseases of the Conjunctiva**
 - Conjunctivitis
 - General causes, risk factors & clinical presentation
- **Bacterial conjunctivitis**
 - Specific causes
 - Risk factors
 - Clinical presentation
 - Management
- **Viral conjunctivitis**
 - Specific causes
 - Risk factors
 - Clinical presentation

- Management
- **Allergic and vernal conjunctivitis**
 - Specific causes
 - Risk factors
 - Clinical presentation
 - Management
- **Trachoma**
 - Epidemiology
 - Clinical features
 - Staging
 - Complications
 - Trachoma blindness and its prevention
- **Ophthalmia Neonatorum**
 - Etiology
 - Clinical presentation
 - Complications
 - Management
 - Prevention
- **Diseases of the sclera**
 - Scleritis
 - Episcleritis

PHARMACOLOGY- I

Course contents:

1. General pharmacology
2. Pharmacology of Autonomic Nervous System
3. Cardiovascular system
4. Respiratory system
5. Drugs-related blood disorders

Recommended Books:

- Pharmacology by Lippincott.
- General pharmacology by Multi-author.
- Review of pharmacology by Katzung.

PATHOLOGY - I

Course contents:

- 1) **Cell injury & adaptation**
 - Cell injury
 - Cellular adaptation
- 2) **Inflammation**
 - Acute inflammation
 - Chronic inflammation
- 3) **Cell repair & wound healing**
 - Regeneration & repair
 - Healing
 - Factors affecting healing
- 4) **Hemodynamic disorders**
 - Define & classify term Edema, Hemorrhage, Thrombosis
 - Embolism, infarction & hyperemia with two examples
 - Define & classify Shock
 - Describe compensatory mechanism of shock
 - Describe the possible consequences of thrombosis & difference b/w arterial & venousemboli
- 5) **Neoplasia**
 - Define the terms dysplasia & neoplasia
 - Difference b/w benign & malignant neoplasia
 - Enlist the common etiological factors for neoplasia, Define & discuss different modes of metastasis.

Practical

- I. Components and setting of the Compound microscope.
- II. Focusing of object.
- III. Use of low and high power objectives of microscope.
- IV. Use of oil immersion lens.
- V. Care and maintenance of the microscope.
- VI. Different types of microscope.
 - i. Dark field microscopy
 - ii. Fluorescence microscopy.
- VII. Electronic Microscope in brief.

Recommended Books:

- a. Pocket companion to Robbins. Pathologic basis of Disease Cotran, Kumar, Collins.

FOURTH SEMESTER

Subjects:

- 1. Ocular Anatomy & Physiology II**
- 2. Visual Optics**
- 3. Ocular Diseases & Therapeutics II**
- 4. Pharmacology II**
- 5. Pathology II**

Ocular Anatomy & Physiology II

Ocular Anatomy:

- **Vascular layer of the eyeball (The Uveal Tract)**
 - Structure of Iris
 - Structure of Ciliary body
 - Structure of Choroid
- **The lens and chambers**
 - Structure of the lens and its capsule
 - Chambers of the eye
- **Retina and vitreous**
 - The layers of retina
 - Important elements in retinal image capturing
 - Structure of the retina as seen by an ophthalmoscope
- **Neuro-ophthalmology and the pupil**
 - The optic nerve
 - The visual pathway
- **Extraocular Muscles**
 - Anatomy of the EOM, their names, insertions, origin and innervations

Ocular Physiology

- **Vascular layer of the eyeball (The Uveal Tract)**
 - Functions of the Uveal tract
- **The Lens & Chambers**
 - Basic physiology of the lens
 - Process of accommodation
- **Retina & Vitreous**
 - Important elements in retinal image capturing; photoreceptors, bipolar & ganglion cells
 - Photochemistry of vision
 - Adaptation by the eye
- **The Extra-ocular muscles**
 - Physiology of EOM
 - Various extra ocular movements
 - Cardinal positions of gaze

Visual & Clinical Optics

- **Optical system of the Eye- Schematic & Reduced Eye**
 - Eye as a Camera
- **Physiological Optics**
 - Optical Axis & Visual Axis
 - Angle Alpha, Gamma and Kappa
 - Formation of Retinal Images
 - Optical Aberrations
- **Advanced Visual function Assessment**
 - Visual Acuity
 - Contrast Sensitivity
 - Color Vision
 - Visual Fields
- **Errors of Refraction**
 - Prevalence of Refractive Errors
 - Types
 - **Hypermetropia**
 - Causes
 - Optics
 - Types
 - Correction
 - **Myopia**
 - Causes
 - Optics
 - Types
 - Correction
 - **Astigmatism**
 - Causes
 - Optics
 - Types
 - Correction
 - **Presbyopia**
- **Aphakia & Pseudophakia**
 - Optics of Aphakia & its disadvantages
 - Treatment options
 - Optics of Pseudophakia
 - Calculations & Biometry
 - Reading correction with Pseudophakia
- **Anisometropia**

Ocular Diseases & Therapeutics II

- **Diseases of the Cornea**
 - General terms
 - Corneal ulcer
 - Corneal abrasion
 - Keratitis
 - Corneal edema
 - Corneal opacity
 - Risk factors for corneal diseases
 - Corneal ulcers
 - Bacterial corneal ulcers
 - Viral corneal ulcers
 - Fungal corneal ulcers
 - Xerophthalmia and nutritional corneal ulceration
 - Corneal dystrophies
 - Causes
 - Clinical presentation
 - Corneal oedema
 - Causes
 - Clinical presentation
 - Keratoplasty
 - Definition
 - Common indications
- **Diseases of the Lens**
 - Cataract
 - Other diseases of the lens
 - Subluxation
 - Dislocation
- **Diseases of the Uvea**
 - Uveitis
 - Definition
 - Causes
 - Iridocyclitis
 - Choroiditis
 - Intermediate Uveitis
 - Management of uveitis
 - Congenital abnormalities of uvea
 - Coloboma
 - Aniridia

- Introduction to tumors and degenerative conditions of uvea
- **Diseases of Retina**
 - Symptoms of retinal diseases
 - Types of retinal diseases
 - Vascular retinopathies
 - Diabetic
 - Hypertensive
 - Retinal detachment
 - Degenerative disorders
 - Retinitis pigmentosa
 - ARMD
 - Tumors of the retina
 - Retinoblastoma
- **Introduction to common disorders of the optic nerve**
 - Optic neuritis
 - Optic atrophy
 - Papilledema
- **Glaucoma**
 - Causes, Classification, Treatment & Prevention
- **'The Red Eye'**
 - Differential diagnosis
 - Management
- **Visual pathway**
 - Lesions of visual pathway
- **Pupil**
 - Marcus Gunn pupil
 - Adie's pupil
 - Argyll-Robertson pupil
 - Anisocoria

PHARMACOLOGY II

Course contents:

1. Pharmacology of GIT
2. Drugs affecting endocrine system
3. Pharmacology of CNS
4. Anesthetics and analgesics
5. Chemotherapeutics

Recommended Book:

Pharmacology by Lippincott.

General Pharmacology by Multi authors.

Review of pharmacology by Katzung.

PATHOLOGY -II

Course Contents

1. Respiratory System

- Obstructive lung diseases
- Asthma.
- Chronic Bronchitis.
- Bronchiectasis.
- Emphysema.
- Pneumonia.
- ASRD
- Pleural effusion
- Tumors

2. Cardiovascular System

- a. Ischemic Heart Diseases.
- b. Heart Failure
- c. Hypertensive Heart Disease.
- d. Infective Endocarditis.
- e. Rheumatic Heart Disease.
- f. Atherosclerosis

3. Lesions of thyroid gland

- a. Nodular goiter
- b. Thyroiditis and its types

4. Lesion of GIT

- a. Oral cavity (Apthous ulcers, HSV infection, oral candidiasis, pyogenic granuloma, fibroma, submucosal fibrosis, hemangioma, peripheral giant cell granuloma, mucocele and ranula, leukoplakia, keratosis, squamous cell carcinoma)
- b. Esophagus (esophageal stenosis, diverticulum, achalasia, hiatal hernia, esophageal varices, esophagitis, Barrett esophagus)
- c. Stomach (Gastritis, peptic ulcer disease, gastric carcinoma, adenocarcinoma)
- d. diarrhea, Crohn's diseases, IBD, appendicitis)
- e. Liver, gall bladder and Biliary tract(hepatitis, fatty liver, inherited metabolic diseases , cholyolithiasis, jaundice)

5. Renal system:

- a. Glomerular diseases
- b. Nephrotic /Nephritic syndrome
- c. Tubular diseases
- d. UTI
- e. Renal stones

- f. Tumors of kidney and urinary bladder
- 6. Skin
 - a. Acute chronic inflammatory dermatoses
 - b. Infections of skin
 - c. Tumors of skin,
- 7. Nervous system:
 - a. Meningitis
 - b. Neurodegenerative disorders
 - c. Tumors

Practicals

1. Components and setting of the Compound microscope.
 - a. Focusing of object.
 - b. Use of low and high power objectives of microscope.
 - c. Use of oil immersion lens.
 - d. Care and maintenance of the microscope.
 - e. Different types of microscope.
2. Dark field microscopy
3. Fluorescence microscopy.
4. Electronic Microscope
5. **Slides/Photomicrographs of lesions taught in Theory**

FIFTH SEMESTER

Subjects:

- 1. Clinical Refraction**
- 2. Instrument Optics I**
- 3. Clinical Skills & Ocular Pharmacology I**
- 4. Contact Lens & Dispensing Optics I**
- 5. Basic Orthoptics**

Clinical Refraction

- **Objective Refraction**
 - **Retinoscopy**
- Parts & working principle
- Far point & Near point concept
- Foucault principle
 - Methods & Techniques
 - Beam calibrations
 - Cycloplegics in retinoscopy
 - Selection of technique according to patient's disorder
 - Determination of power and axis
 - Net & gross prescription
 - Sphero-cylindrical combination
 - Role of retinoscope in modern eye clinic
 - B. Autorefraction
 - C. Photorefraction & its role in screening
- **Subjective Refraction**
- **Principles of refraction**
- Following objective retinoscopy
 - Refining techniques for sphere
 - Refining techniques for cylinder
 - Jackson's cross cylinder, Astigmatic fan & Stenopic slit
 - Binocular balancing
- Without objective refraction
- Hand neutralization with trial lenses
- **Special techniques and considerations in Refraction**
 - Transposition – Simple & Toric
 - Cycloplegic Refraction
 - Static and Dynamic Refraction
 - Cutting the cylinder and Spherical equivalent
 - Special considerations for cases with
 - Strabismus
 - Refraction after cataract surgery
 - Aphakic refraction
 - Anisometropia
 - High Hyperopia and Myopia
 - Calculation of final refraction and recording of retinoscopy results
 - **Special consideration in Prescribing spectacles**
- Interpupillary distance
- BVD
- Astigmatic aberrations & pantoscopic tilt
- Advise lens types, filters and coatings to suit individual needs
- How to write prescription cards.

- Patient counselling tips and tricks.
- **Trial case and its accessories**
- **Accommodation and its anomalies**
 - Normal accommodation
 - Variation with age
 - Range and Amplitude of accommodation
 - Measurement of accommodation
 - AC/A Ratio
 - Presbyopia and its correction
- **Options for correcting refractive errors**
 - Spectacles
 - Contact Lenses
 - Refractive Surgery

Instrument Optics I

- **Direct/Indirect Ophthalmoscope**
 - Optical principles
 - Clinical uses and maintenance
 - Advantages/ Disadvantages
- **Retinoscope**
 - Optical principles
 - Clinical uses
- **Slit lamp**
 - Optical principle
 - Clinical uses
- **Tonometer**
 - Optical principle
 - Clinical uses
- **Synoptophore**
 - Working principle
 - Clinical uses
- **Focimeter**
 - Optical principle
 - Clinical uses
- **Keratometer**
 - Optical principle
 - Clinical uses

Clinical Skills & Ocular Pharmacology I

- **Clinical Skills**
- **History Taking**
 - All bio-clinical details of the patient
 - Personal details
 - History of present illness
 - Information regarding general health
 - Drug history
 - Past history
 - Family history
 - Commonly met complaints in clinical practice and their interpretation
- **Clinical Examination of the Eye**
 - Assessment of visual acuity
 - Anterior segment examination
 - Examination of the pupils
 - Fundus examination
 - Extra ocular movements examination
 - Visual field examination
 - Color vision
 - Contrast sensitivity
 - Glare
 - IOP check up
- **Clinical documentation & Record keeping**
 - Importance of clinical documentation
 - Types of clinical documents
 - History sheets
 - Reports
 - Medical certificates
 - Requisition forms
 - Management of hospital data
 - Role of computers in managing data
- **Principles of outpatient care**
 - Patient assessment
 - Assisting in basic or specialized investigations
 - Basic outpatient procedures
 - Health education & promotion activities
 - Outpatient follow up

Ocular Pharmacology

- Main categories of the delivery system of ophthalmic medications, Methods of instillation of ophthalmic medications
- **Diagnostic Ophthalmic Medications:**
- Mydriatics
- Cycloplegics
- Fluorescein/ Indocyanine green
- Topical anesthetics etc.
- **Safety Measures:**
- The technique for accurate instillation of eye drops & ointments
- Importance of expiry date of medication,
- Storage after opening and reuse,
- Shelf life,
- Avoidance of contamination of the containers,
- List of drugs that an ophthalmic technician can safely prescribe.

Contact Lens & Dispensing Optics I

Contact Lens

- **Brief history of development of contact lenses**
- **Materials and manufacturing techniques**
 - Properties of contact lens materials
 - Oxygen permeability and transmissibility
 - Wettability, water absorption
- **Indications, contraindications and selection criteria**
- **Insertion and removal of contact lens**
- **Cornea and contact lens**
 - Corneal shape and uses of Keratometer
 - Corneal physiology and lens wear
 - Uses of stains in contact lens practice
- **Hard contact lenses**
 - Introduction
 - Fitting patterns (apical clearance, apical bearing ,apical alignment)
 - Lens design (BOZR, BOZP, BPZD, TD, CT)
 - **Rule of thumb (BC and Dia calculation)**
 - DK value
 - Wettability
- **Soft contact lenses**
 - Lens design
 - Indications and contraindications
 - Fitting
 - Optimum fitting criteria
 - Fitting characteristics
- **Patient management and aftercare**
 - Contact lens spoliation and preventive measures
 - Contact lens complications
 - Consultations: procedures of preliminary, delivery and aftercare routines
 - CL care systems (multipurpose solution& two step)

- **Contact lens complications**

- **Dispensing Optics**
- **Introduction**
 - Role of dispensing
 - Prescription analysis
 - Pediatric dispensing
 - Skin profile& dispensing for elderly
- **Lenses for Spectacles**
 - Single vision lenses
 - Basic lens materials
 - Lens forms
 - Photochromic lenses
 - Additional benefits for spectacle lenses
 - Hard coating
 - Tint and filters
 - Multi-anti-reflection(MAR) coating

- **Measurements for spectacle fitting**
 - IPD measurement for distance and near
 - BVD measurement
 - Blank size
 - Centration
 - Understanding about manual and auto lens edger
 - Prentice rule (formula)
- **Frames**
 - Frame types
 - Frame fitting
 - Frame parts

Basic Orthoptics

- **Extraocular Muscles**
 - Origin, Course and Insertion
 - Innervations
 - Actions
 - Yoke muscles
- **Ocular Movements**
 - Monocular
 - Binocular
 - Laws applicable to Ocular movements
 - Definition of important terms used
 - Positions of gazes
- **Binocular Single Vision**
 - Definition of BSV
 - Binocular vision and its requirements
 - Physiology of BSV
 - Normal retinal correspondence
 - Grades of Binocular Vision
 - Qualities of Binocular Vision
 - Abnormalities of BSV
- **VA assessment in children**
 - Normal visual development
 - Qualitative visual assessment
 - Quantitative visual assessment
- **Accommodation**
 - Accommodation and the accommodative process
 - Anomalies of accommodation
 - Role of accommodation in Orthoptic practice
- **Convergence**
 - Definition of convergence
 - Types of convergence
 - Assessment of convergence
 - Anomalies of convergence
- **AC/A Ratio**
 - Definition
 - Gradient method of assessment
 - Heterophoric method of assessment
 - Role in strabismus

- **Introduction to Strabismus**
 - Definition.
 - Terminologies used in strabismus
- **Investigations and Assessment of Strabismus**
 - Cover test
 - Alternate cover test
 - Prism cover test
 - Krimsky test
 - Hirschberg test
 - Post operative diplopia test
 - Ocular motility assessment
 - Abnormal head posture
 - Maddox rod
 - Maddox wing
- **Classification of Strabismus**
 - Comitant
 - Incomitant
 - Ateiology
 - Investigation
- **Esotropia**
 - Classification
 - Congenital esotropia
 - Clinical characteristics
 - Investigation
 - Management
- **Accommodative Esotropia**
 - Types
 - Investigations
 - Management
- **Exodeviation**
 - Types
 - Investigations
 - Management
- **The Orthoptic assessment**
 - History
 - Examination
 - Orthoptic Investigation
 - Hess test or chart
- **Inconcomitant Strabismus**

- Causes
- Types
- Clinical features
- Assessment
- Management
- **Binocular Vision**
 - Theories of binocular vision
 - The geometric horopter, horizontal disparity and the longitudinal horopter, diplopia and the Panum's fusional area
 - Stereopsis, depth perception
 - Assessment of fusional vergences
 - The identification of binocular anomalies

SIXTH SEMESTER

Subjects:

- 1. Neuro - Optometry**
- 2. Instrument Optics II**
- 3. Clinical Skills & Ocular Pharmacology II**
- 4. Contact Lens & Dispensing Optics II**
- 5. Clinical Orthoptics**
- 6. Behavioral Sciences**

Neuro-Optometry

- **Introduction**

- Embryology of the eye & the embryological basis of diseases
 - Orbit, ocular adenexa & the eyeball
 - Nerve supply & the blood supply of orbit, the ocular adenexa and the eyeball
- The optic nerve
- The visual pathway
- Neural pathway for the pupillary reflex
- The 3rd, 4th & 6th cranial nerves
- 5th & 7th cranial nerves
- **Neurophysiology of vision**
- The optic nerve
- The visual pathway
- The basics of reflex and reflex arc
- Accommodation and its pathway
- The pupillary reflex and its pathway
- Retinal integration of visual information and the electrophysiology of vision
- Neural organization of the visual system in the brain and its coding
- Psychophysics of measurements in vision
- Spatial temporal vision
- Colorometry, visual perception

Instruments Optics II

- **Corneal topograph**
 - Working principle
 - Clinical uses
- **Autorefractometer**
 - Working principle
 - Clinical uses
- **Phoropter**
 - Working principle
 - Clinical uses
- **Pachymeter**
 - Working principle
 - Clinical uses
- **Cross cylinder**
 - Optical principle
 - Clinical uses
- **Maddox rod**
 - Working principle
 - Clinical uses
- **Maddox wing**
 - Working principle
 - Clinical uses
- **OCT**
 - Working Principle
 - Clinical uses

Clinical Skills & Ocular Pharmacology II

Clinical Skills

- **Introduction to refractive errors**
 - Basic optics of Emmetropia and ametropia
 - Myopia
 - Hypermetropia
 - Astigmatism
 - Presbyopia
 - Management of refractive errors and presbyopia
 - Types and uses of corrective lenses
- **Low vision and visual impairment definition by WHO**
- **Orientation to advance technical skills**
 - Ophthalmic ultrasonography
 - Visual field analyzers
 - Manual
 - Automated
 - Lasers in ophthalmology
 - Ophthalmic angiography

Ocular Pharmacology

- **Therapeutic Ophthalmic Medications:**
 - Antibiotics
 - Antiviral agents
 - Anti-fungal
 - Anti-glaucoma drugs
 - Anti-inflammatory agents
 - Lubricants etc.
 - Use of steroids and their effects
 - Fortified/ high concentration ophthalmic solutions preparation

Contact Lens & Dispensing Optics II

Contact Lens

- **Lens Verification**
 - Measuring BOZR and other radii, diameters, thickness, back vertex power
 - Measuring water content
 - Examining edges and surface
- **Optics and verifications**
 - The tear/cornea lens system
 - Residual astigmatism
 - Magnification and accommodation with contact lenses and their implications
 - Convergence with contact lenses , far and near point
 - Rigid contact lens design
 - Bicurve, tricurve, axial, radial, edge lift, aspheric design
- **Rigid gas permeable contact lens fitting**
 - Rigid gas permeable lenses
 - Fluorescein patterns
 - Aspheric lens fitting
 - Common fitting technique
- **Special purpose contact lenses**
 - Astigmatism and contact lenses
 - Extended wear lenses
- **Evaluation of hard and soft contact lenses**
- **Contact lenses for keratoconus and keratoglobus**
- **Corneal topography/ pachymetry**

Dispensing Optics

- **Common problems with spectacles and their remedies**
 - Things to be remembered before the customer selects the frame
 - Checking the fit and making necessary arrangements
 - Cleaning and after-care advice
- **Spectacles correction for Presbyopia**
 - Assessing the needs of a presbyope
 - Bifocal, trifocals and varifocals

- Instructions to the user
- **Special considerations**
 - High Index Lenses
 - Materials
 - Frame choice
 - Edge thickness comparison
 - Dispensing of high index lenses
 - Aspheric Lenses - Their advantages and dispensing
 - Prisms and their dispensing
 - Base curves and their importance
 - Weight and cost of frame
- **Focimetry and its applications**
 - The focimeter
 - Single vision lenses' focimetry
 - Spheres, cylinders and prisms

Clinical Orthoptics

- **Clinical analysis of binocular status**
 - Vision therapy concepts
 - Vision therapy procedures and instrumentations
- **Neurology of Ocular movements**
 - Smooth pursuit
 - Saccades
 - Vergence
- **Heterophoria**
 - Aetiology and classification
 - Clinical signs and symptoms
 - Compensation and decompensation
 - Investigations
 - Management
 - Effects of refractive correction
 - Visual therapy and prismatic therapy
- **Heterotropia**
 - Aetiology
 - Classification
 - Comitance and incomitance
- **Esodeviations**
 - Types
 - Clinical presentations
 - Investigations
 - Management
- **Exodeviations**
 - Types
 - Clinical presentations
 - Investigation
 - Management

- **Dissociated vertical deviations**
 - Aetiology
 - Characteristics
 - Diagnosis
 - Measurement
 - Management
- **A & V patterns**
 - Aetiology
 - Characteristics
 - Diagnosis
 - Measurement
 - Management
- **Amblyopia**
 - Pathophysiology of Amblyopia
 - Classification and terminology
 - Clinical features
 - Fixation pattern of the amblyopic eye
 - Diagnosis and management
- **Paralytic strabismus**
 - Types
 - Clinical presentation
 - Investigation
 - Management
- **Nystagmus**
 - Nomenclature and type
 - Clinical characteristics of different types
 - Clinical evaluation
 - Treatment options
 - Orthoptic
 - Surgical
- **Special forms of strabismus**

- Duane syndrome
- Mobius syndrome
- Bowman syndrome
- Adherence syndrome
- Strabismus fixus syndrome
- Graves disease and dysthyroid ophthalmopathy
- Congenital fibrosis syndrome
- Internuclear ophthalmoplegia
- Double elevator palsy
- 4th nerve palsy
- 6th nerve palsy
- 3rd nerve palsy
- **Surgical Planning in Strabismus**
 - Understanding about recessions and resections and transposition of EOM

Behavioral Sciences

Course contents:

1) Introduction to Behavioral Sciences and its importance in health.

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

2) Understanding Behavior

3) Sensation and sense organs

- Describe sensation, sense organs/special organs

4) Perception

- Define perception, what factors affecting perception

5) Attention and concentration

- Define attention and concentration. What factors affecting them

6) Memory

- Define memory and describe its stages, types and methods to improving it

7) Thinking

- Define thinking; describe its types and theories □ What is cognition and levels of cognition?
- Discuss problem solving and decision making strategies

8) Communication

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

9) Individual Differences

10) Personality

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

11) Intelligence.

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

12) Emotions

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

13) Motivation

- Define motivation and what are the types of motivation?

14) Learning

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

15) Stress and Stressors

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

16) Life Events

- Concept of life events and their relationship with stress and illness

17) Stress Management

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

18) Interviewing / Psychosocial History Taking

- Define, types of interviews and listening
- Skills of interviewing and listening

19) Allied Health Ethics-Hippocratic oath

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

20) Culture and Allied Health practice

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

21) 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

22) Breaking Bad News

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

23) Pain, Sleep, Consciousness

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

24) 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

SEVENTH SEMESTER

Subjects:

- 1. Community Medicine I**
- 2. Low Vision**
- 3. Investigative Ophthalmology**
- 4. Biostatistics & Research Program I**

Community Medicine I

INTRODUCTION

- History of Community Medicine
- Definition, concept of Health & illness of diseases
- Natural History of diseases, levels & prevention.

Epidemiology

- Epidemiology
- Epidemiological approach
- Basic measurements in epidemiology
- Tools of measurement
- Measurement of mortality, morbidity
- Epidemiological methods
- Epidemic investigation
- Surveillance
- Screening for diseases

ENVIRONMENTAL SANITATION & MEDICAL ENTOMOLOGY

- Environment
- Water
- Air
- Soil
- Noise
- waste disposal
- Environmental problems & pollution.

EPIDEMIOLOGY of communicable diseases

- Respiratory infections
- Vector borne diseases
- Water borne diseases
- Air born diseases
- Contact diseases
- Diseases of major public health and its importance alongwith national health programmes wherever Applicable.
- Hospital acquired infections

Non-communicable diseases

- Diabetes
- Hypertension
- Heart diseases
- Blindness
- Mental health

Low Vision

Epidemiology of low vision

- **Introduction**
 - Definitions
 - Low vision care
 - Low vision services at Primary, Secondary and Tertiary levels
 - The role of optometrist, family and community
 - Psychological implications of Low vision
 - FUNCTIONAL IMPLICATIONS OF LOW VISION
- **Clinical assessment of low vision patient (Children & Adults)**
- **Low vision history form**
- **Magnification**
- Definition
- Types of magnification
- EVP, EVD
- **Low Vision Devices**
- **Near LVds**
- **Distance LVds**
- Non-optical aids
- Optical aids
 - Optical Magnifiers
 - Telescopes
 - Telemicroscopes
- **Color vision**
 - Visual field enhancement
 - Contrast sensitivity
 - Causes of low vision
 - Illumination and glare control in low vision patient
 - Environmental modifications
 - Training for LVd's
 - Aids for peripheral field loss
 - Orientation & Mobility Guidelines
 - Counseling and rehabilitation
 - Multidisciplinary rehabilitation
 - Case studies from low vision manual

Investigative Ophthalmology

- A & B Scan (SRK formula)
- Immersion & contact techniques
- OCT
- Perimetry
- Amsler grid
- Keratometry
- Tachymetry
- Slit Lamp Examination Techniques
- Fundus Photography
- Lasers
- FFA
- ICG
- IOP adjustment with corneal thickness

Biostatistics & Research Program I

- 1) Introduction to biostatistics
- 2) Sampling Techniques
- 3) Management of data
- 4) Measure of location
- 5) Measure of variation
- 6) Probability & distribution
 - Definition of probability
 - Normal distribution
- 7) Measure of relationship
 - Scatter diagram
 - Correlation analysis
 - Measurement of correlation
 - Interpretation of “r”
 - Regression analysis
 - Regression coefficient
 - Fitting of simple linear regression line
 - Properties of regression line
 - Degree of freedom
 - CHI-Square test & types
 - Contingency table

RECOMMENDED BOOK:

- I. Biostatistics for medical students by M. Ibrahim
- II. Walpole; R.E.1982. “Introduction to statistics” 3rd edition, Macmillan, Publishing Co. Inc. New York

EIGHTH SEMESTER

Subjects:

- 1. Community Medicine II**
- 2. First Aid & Ocular Emergencies**
- 3. Pediatric Optometry**
- 4. Biostatistics & Research Program II**

Community Medicine II

HEALTH EDUCATION

- Principles of Health Promotion
- Methods, approaches and media for
- I. E. C (Information, Education & Communication)
- Medical and Health/Information system
- Role of health care providers in health education
- Principles of health education

Reproductive Health ,Family Planning and child health

- Introduction
- Maternal mortality and morbidity
- MCHC Services
- Care(antenatal, intra and post natal care)
- Safe motherhood
- Family planning intro
- Fertility regulation
- Methods of family planning
- Neonatal care
- Child health problems
- National policy for children
- IMNCI

Nutrition And Health

- Nutrition, nutrients
- Balanced diet
- Micro and macro nutrients
- Dangerous foods
- Assessment of nutritional status
- Food related diseases
- Malnutrition
- PEM
- Nutritional anaemia
- Investigation a case of food poisoning

Hospital waste management and radiations

- Types of hospital waste

- Risks from wastes
- Waste management team
- Waste management plan
- Steps in waste management
- Treatment and disposal technologies for health care waste
- Radiation and its hazards

Community Ophthalmology

- Introduction to community ophthalmology
- Trachoma
- Pan ophthalmitis
- Eye care
- Corneal ulcers

RECOMMENDED TEXT BOOKS:

1. Textbooks of Community Medicine, by Prof. H. A. Siddique (2nd Edition).
2. Parks text book of preventive & social medicine –K Park.
3. Excel community medicine by dr M. Neveed Alam

First Aid & Ocular Emergencies

First Aid

- **Definition**
- **Principles**
- **Management**
 - Dressing and Bandages
 - Assisted respiration
 - Shock - Types of Shock, its signs, symptoms and treatment
 - Assessment and resuscitation of newborn
 - CPR
- First aid management of
 - Fractures
 - Burns
 - Wounds
 - Accidents
 - Poisoning
 - Bite stings
 - Choking
- Sports injuries
- Transport of injured persons specially spinal care
- Safety at home

Ocular Emergencies

- Foreign body
- Chemical burn
- Kinds of infections
- Modes of spread of infection
- Ocular and Orbital trauma
 - Causes
 - Management
 - Preventive strategies
 - Complications
- Ocular emergencies and management of 'Red Eye'
 - Patient assessment
 - Management
 - The triage system
 - The emergency room
 - First aid for various common emergencies

Pediatric Optometry

- Introduction
 - Development of eye(embryology)
 - VA measurement in children, VA charts for children
 - Visual function assessment
 - Milestones of visual development
- Refraction in children
- Orthoptics techniques and procedures
 - Assessment of squint
 - Management of Aphakia in children
 - Etiology and management of amblyopia and aphakia
- Low vision in children, low vision aids for children
- Refractive surgery in children
- Pediatric cataract, glaucoma and other ocular congenital diseases
- Worldwide causes of blindness in children
- Screening for pediatric ophthalmological disorders
- Learning Disabilities: Learning disabilities and related vision problems.
- The role of the optometrist in conjunction with parents, teachers and psychologists.

Biostatistics & Research Program II

- 1) Introduction to research
- 2) Validity & reliability
- 3) Review of literature
- 4) Research problem
- 5) Hypothesis
- 6) Research design
- 7) Data collection instruments
- 8) Measurement
- 9) Sensitivity & specificity
- 10) Prevalence & incidence
- 11) Cumulative incidence
- 12) Statistical inferences
- 13) Report writing

Student will prepare a comprehensive report on medical imaging investigation of any human body system

RECOMMENDED BOOKS:

- I. Biostatistics for Medical Students by M. Ibrahim
- II. Wale pole, R.E 1982. "Introduction to Stats" 3rd edition Macmillan, Publishing to Inc. New York.

Research Project

1) Dissertation:

The dissertation requires the generation of new applied knowledge through the comprehensive application of the research process. The thesis option is a better choice for students who desire to gain confidence in their ability to plan, conduct, and write a research work and wish to gain confidence in their ability to critically apply existing knowledge and methods to the solution of a problem.

2) Proposal Format:

Proposal for the Dissertation: The proposal submitted for a dissertation should follow the outline listed below. The outline corresponds to the major chapters expected in a thesis.

Deviations from the content in this outline should be discussed and approved by the supervisor (and committee in advance of submitting the proposal for the defense).

1. Introduction

- Establish importance of topic
- Conceptual model/relationship of independent and dependent variables
- Summary of what is/is not known □ What gap the study is filling
- Statement of research purpose(s)

2. Aims and Objectives/Hypotheses or research questions including operational definitions

3. Material and Methods □ Study design

- Duration of study
- Study population
- Sampling Strategies
- Sample size/power
- Sample recruitment: Inclusion and Exclusion criteria
- Data Collection Procedure: Identify the recruitment of the population to the collection of :
 - Variables
 - Measurements

- Instruments (include copies of relevant instruments (surveys, etc.) as appendices)
 - Standards, if used
 - Reliability
 - Validity
- Data analysis plan (including software to be used and tables if applicable)

4. Rationale of the study

5. Ethical Considerations*

- Informed Consent Procedures
- Confidentiality
- Risks
- Benefits
- Permission to access data (if applicable)

*should also attach an approval by the IRB

6. References listing:

Reference listing is to be done at the end of the proposal. (The references should consist of at least 6 references from not older than last 5 year; preferably from the published articles and only occasionally from the books). Vancouver style is the recommended method of referencing.

7. Timeline: A timeline should be attached as an annexure.

8. Proposed budget: A proposed budget should be given at the end of the proposal.

OUTLINES FOR THE DISSERTATION:

Part I: Consists of:

- Title page with the name of the student and the program they are working under, i.e. name and MPH with year.
- Declaration duly signed by the Advisors/Supervisors
- Acknowledgements
- Table of Contents
- List of Tables/Figures with page numbers
- List of Abbreviations used

All pages are to be given Roman numerals before the summary.

Executive Summary/Abstract

A structured summary should be the first part of the dissertation write up. Introduction, objectives, material and methods: Study design, duration, sample population including sampling techniques, sample size and sample selection and statistical analysis, brief results and conclusions. Key words: 3-5 words best describing the study. **Part II**

1. Introduction

It shall cover:

- Establish importance of topic
- Conceptual model/relationship of independent and dependent variables
- Summary of what is/is not known □ What gap the study is filling
- Statement of research purpose(s)

2. Literature Review It shall cover:

- General overview
- Theoretical models/conceptual frameworks
- Relationships among variables
- Other relevant literature

3. a Aims

4. Objectives (or Research Questions)

5. Material and Methods □ Study design

- Duration of study
- Conceptual models/conceptual frameworks
- Study population
- Sampling techniques
- Sample size/power
- Sample recruitment: Inclusion and Exclusion criteria

6. Data Collection Procedure*

Identify the recruitment of the population to the collection of:

- Variables: how measured
- Measurements: how performed?
- Instruments*: questionnaires etc.

- Reliability
- Validity

*include copies of relevant instruments (surveys, etc) as appendices.

7. Data analysis plan

How was the data analyzed? Procedures for statistical application and statistical software/s used should be outlined in sufficient details

8. Ethical Considerations

Consent form must be attached as an Annexure. Ethical clearance should be attached from the IRB. Informed Consent Procedures: Consent Form.

9. Results

This chapter includes presentation of results as tables, figures etc. based on the statistical applications and not as computer outputs. The results should be described in adequate details indicating the major findings. The results should be in line with the objectives of the study. The results should be on separate pages; one table/figure on one page. Same tables cannot be replicated as figures.

10. Discussion

In this chapter a detailed discussion of the results and comparisons with other study reaching to a conclusion in accordance will be made.

11. Conclusions

The conclusions should be in line with the objectives and the results

12. References

The reference list consists of published articles not older than 5 years unless required for the work. References from books are not the preferred method. The number of references should not be less than 30. Vancouver style is the recommended method of referencing. The pages should be numbered from (Introduction to references) in Arabic numerals.

Defense Process:

The defense begins with administrative/introductory remarks by the Chair who will review the process and procedures for the defense, including any ground rules set forth for the specific defense with the internal and external examiners. The student will then make a prepared 10-15

minute (proposal) or 20-25 minute (dissertation) presentation which summarizes the proposal/dissertation.

The Chair will announce in advance whether questions may be asked during the presentation or held to the end. Normally, clarifying questions will be permitted during the presentation with probing/analytic questions following the presentation.

Following the formal presentation and clarifying questions, questioning/critiquing by the Examiners then begins. For the proposal defense, emphasis is on the suitability of the proposed research/project and the design/methods/analytic plan/approach. For the final defense, emphasis is on the results, lessons learned, and implications.

In both cases, questions related to application of core competencies may be asked, even if they are per or in relation to the proposal/dissertation under review. The session concludes when the examiners have finished questioning or the allotted time has elapsed. Fifteen minutes at the end of the session are reserved for the Examiners' deliberations and finalizing of their results. The student may be excused from the room while the Examiners deliberate. The students will be informed of the formal results after approved by the University, Controller of Examinations.

Presentation Evaluation:

Effective presentation and oral communication skills are core competencies expected of graduates. Consequently, separate from the content assessment of the proposal/dissertation, the examiners will evaluate the student's presentation skills. During the proposal defense, the assessment will be used to advise the student of perceived strengths and weaknesses and recommended actions to ensure a strong presentation during the final defense (diagnostic). For the dissertation defense, the examiners will formally assess the student's presentation/oral communication skills (evaluative). Successful mastery of the communication skills is a requisite for passing the defense.

Outcomes:

There are 3 possible outcomes for a defense (be it proposal, thesis, or project): unconditional pass, and conditional pass, and fail.

- **Pass:** Accepted as such
- **Recommended for Minor Revisions:** Can be submitted after minor changes and approval of supervisor and HoD
- **Recommended for Major Revisions:** Can be submitted after major changes after re-defense. The deficiencies are such that the Examiners wish to see a redefense of the revised

dissertation/proposal. (Students are permitted only one re-defense of the Dissertation). Students work with their supervisor and department to correct any deficiencies in the proposal/manuscript and other areas as needed prior to scheduling a re-defense. The date of re-defense will be notified in one month's time to the student. The revisions will be accepted by the examiners and notified to the University.

- **Fail:** It is associated with poor performance and evidence of gaps in knowledge and critical reasoning skills during the defense. In case of these major technical flaws, student need to repeat the whole process/procedures.

The End

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