HIMALAYAN UNIVERSITY, ARUNACHAL PRADESH

DIPLOMA IN PARAMEDICAL

(OPHTHLAMIC TECHNOLOGY)

1st YEAR

1st Semester

S. NO.	SUB. CODE	SUBJECT NAME	MARKS			
			INTERNAL	THEORY	TOTAL	PASS
1	101	General English	30	70	100	40
2	102	Computer Fundamentals	30	70	100	40
3	103	Human Anatomy	30	70	100	40
4	104	Human Physiology	30	70	100	40
5	105	Practical	30	70	100	40

2nd Semester

S. NO.	SUB. CODE	SUBJECT NAME	MARKS			
			INTERNAL	THEORY	TOTAL	PASS
1	201	General Pathology	30	70	100	40
2	202	General Microbiology	30	70	100	40
3	203	General Biochemistry	30	70	100	40
4	204	General Pharmacology	30	70	100	40
5	205	Practical	30	70	100	40

2ndYEAR

3rd Semester

S. NO.	SUB. CODE	SUBJECT NAME	MARKS			
			INTERNAL	THEORY	TOTAL	PASS
1	301	Ocular Anatomy	30	70	100	40
2	302	Ocular Physiology	30	70	100	40
3	303	Ocular Pathology	30	70	100	40
4	304	Ocular Microbiology	30	70	100	40
5	305	Ocular Biochemistry	30	70	100	40
6	306	Practical	30	70	100	40

4th Semester

S. NO.	SUB. CODE	SUBJECT NAME	MARKS			
			INTERNAL	THEORY	TOTAL	PASS
1	401	Physical and Physiological Optics	30	70	100	40
2	402	Orthoptics	30	70	100	40
3	403	Refraction	30	70	100	40
4	404	Ophthalmic Instruments and Appliances				
5	405	Ocular Pharmacy and Pharmacology				
6	406	Practical	30	70	100	40

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DIPLOMA IN PARAMEDICAL

(OPHTHLAMIC TECHNOLOGY)

1st YEAR

1st Semester

General English (101)

1) English, Communication Skill and Public Relations:

2) Writing Skills: Basics of English grammar How to write good and correct English .what is a Sentence? Types of Sentences - simple, compound, complex.

3) Listening Skills: What is listening? Types of Listening Purpose of Listening, Obstacles of listening

4) Reading Skills: Purposes of reading Types of reading - skimming, scanning, extensive reading, intensive reading, Loud and silent reading

5) Rapport Building Interpersonal Response, Traits, Managing Difficult Communication Traits in a hospital, communication in terminal illness

6) Effective Communication - The Ten Commandments The process of communication & different type of communication Communication - Definitions, Meaning, nature of communication, Purpose of communication

7) FORMAL LETTERS: Formal Style of Communication, Formal and Informal Letters, Essentials of a Formal Letter, Mechanics of Writing a Formal Letter, Drafting the Letter, Some Basic Equipment, The Format, Letters of Request, Letters of Complaint, Replying to Letters of Complaint, Letters about Jobs, Applications, Accepting an Offer, Declining an Offer, Letters to Government and Other Organisations, Letters of Complaint, Letters Giving Instructions, Letters of Request,

8) WRITING REPORTS: Different Stages in Writing a Report, Types of Report, Reporting Case History: Informal Reports, Reporting Case History: Formal Reports, Referral Letters, Referral Letters, Reply to Referral Letter

CLINICAL CASE STUDY: Significance of case study method some features, How is clinical case study prepared, Analyzing the case, Documentation and presentation, Conclusions

IMPROVING STUDY SKILLS: How do People Learn, Reading with a Purpose, What are Study Skills, Locating Information, Study Strategies for Better Comprehension: SQ3R, Variations of the SQ3R Approach

WRITING SUMMARIES-I : The technique of summarizing, Let us sum up, Key words

F**ORMAL CONVERSATION:** FACE-TO-FACE: Making Enquiries and Giving Information at Public Offices, Making Enquiries at Hotels and Other Places, Making Enquiries : Taking a Medical History, Giving Advise to Patients. and their Relatives, Arguing with and Persuading People, Describing a Process

INFORMAL CONVERSATIONS: FACE-TO-FACE: Greetings: Enquiries about one's Health, Everyday Situations, Social Life, Other Informal Situations

TELEPHONE CONVERSATIONS: Face-to-Face and Telephone Conversation Compared, Formal Conversation, Emergency Calls, Business Calls, Informal Conversation

INTERVIEWS: Preparation for an Interview, Unfolding the Personality: Specimen Interviews

CASE PRESENTATION: How is a Case Presentation Prepared, Data Collection and Compilation of Material, Audiovisual Aids, Choice and Method of Use, How to Make the Case Presentation, Conclusion.

Computer Fundamentals (102)

Introduction to Computer: Meaning or Definition of Computer**,** Evolution of computer**,** Features of Computer**,** Main Operation of the Computer**,** Main Elements of Computer System**,** Bits, Bytes and Words**,** Device in Computer**,** Various Input & output Device.

Applications of Computer: Advantages and limitations of computers.

Memory: Overview of storage devices. Main memory, storage evaluation criteria, random access memory, read only memory, secondary storage devices.

Generation of Computers and their Classification Generation of Computers**,** Classification of Computers

Operating System Meaning of Operating System**,** Function of Operating System**,** Language Translators

Database Meaning Of Database**,** Data Processing System**,** Function of Data Processing**,** Objectives of Database**,** Type of Database**,** Functions of Database Management System (DBMS)**,**Advantages & Disadvantages of DBMS**,** Various Database Structures or database models

Windows Graphical User Interface**,** Windows**,** Features of Windows**,** Control Button of windows**,** Various Icons on Desktop

Microsoft Word (INTRODUCTION)

Microsoft Excel (INTRODUCTION)

Microsoft PowerPoint (INTRODUCTION)

Internet – Features, Different type of network, Internet,

Patient Management Medical Establishments using Computer**,** One or More Computer**,** Network**,** Software**,** Training**,** Service Operators of System Computerization in Hospitals and Nursing Homes**,** Features of a Hospital Software Packages**,** Password Protection **,**Various Application of Different Medical **,**Software and Support

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Human Anatomy (103)

Introduction, Subdivisions of anatomy, anatomical Nomenculature-in terms of position ,location and fundamental planes

Introduction to bones of human body of:

Bone: definition, composition, functions, classification and features of a long bone.

Cartilage: definition, components and classification.

Joints: definition of joints, classification and function

Upper limb: clavicle, scapula, humerus, radius, ulna, carpus, metacarpus & phalanges,

Lower limb: hipbone, femur, tibia, fibula, tarsus. Metatarsus & phalanges, Skull: name the bone of the skull an sutures between them, Thorax: ribs and their articulation,

Vertebral column: cervical, thoracic, lumbar, sacral and coccygeal

Surface markings of the body: Nine regions of the abdomen, Four quadrants of the hip

Introduction to vital organs:

Respiratory organ Nasopharynx, Oropharynx, Larynx, Trachea, Bronchi, Lungs (and their lobular segments), Thoracic, Pleura and pleural cavity

Circulatory organ Anatomical position of the heart, Pericardium of the heart, Chambers of the heart, Great vessels of the heart, Valves of the heart

Digestive organs Tongue, Teeth, Oral cavity, Pharynx, Esophagus, stomach

Reproductive organs Male and female gonads: testes, epididymis, ovary, fallopian tube, uterus, vagina, Introduction to male genital organs, Introduction to female genital organs

Liver and spleen Introduction, Anatomical position, Gall bladder

Excretory organs Cortex and medulla of kidney, Ureter, Urinary bladder, Urethra (male and female)**,** nephrons.

Nervous System : Basic anatomy of nervous system, Central nervous system, Peripheral nervous system, Autonomic nervous system.

Muscles Introduction, origin and insertion, function.

Human Physiology (104)

Cell : Definition ,Structure and functions the cytoplasmic organelles , Reproduction: meiosis, mitosis

The important Physio - Chemical Laws Applied to physiology Diffusion **,** Osmosis**,** Bonding, Filtration**,** Dialysis**,** Surface tension**,** Adsorption**,** Colloid

Fundamentals of different organ system:

Cardiovascular System: Systole, Diastole, Blood circulation, Conduction system of Heart ,ECG. Cardiac Output, Cardiac Stroke.

Respiratory System: Functions of Respiratory Tract, Mechanism of Breathing and Respiration, Muscles of Respiration. Common Respiratory Disorders.

Digestive System: Digestion of food in mouth, stomach & small intestines. Absorption of food, function of liver.

Excretory System: Structure & function of kidney and urinary bladder. Mechanism of urine formation. disorders of kidney.

Reproduction system: Male and Female Reproductive organs. Mensuration cycle.

Endocrine system: Functions of various endocrine glands and hormones secreted by them

Lymphatic system: Lymph vessels, lymph nodes and lymphoid organs, their structure & functions.

Blood Definition, Composition, Function

Formation of different types of blood cells Erythrocytes, Leucocytes, Thrombocytes

Mechanism of Blood clotting

Cerebrospinal fluid Formation, Composition, Function

Special senses Hearing, Taste, Smell, Touch, Sight

Practical (105)

1. Study and care of Microscope.

2. Collection of blood samples.

3. Separation of plasma from blood.

4. Demonstration of Vacutainers and its use.

5. Preparation and Examination of blood smear.

6. Histology of Skeletal Muscle.

7. Histology of smooth muscle.

8. Histology of bone.

9. Histology of hyaline cartilage

10. Histology of elastic cartilage

11. Histology of Epithelial tissues: Columnar Epithelium, Squamous Epithelium, Cuboidal Epithelium.

12. Study of Lab Equpiments.

13. Study of lab specimens

English: Job application, Resume writing .Interviews, Group discussions, Essay writing, Formal and informal communication.

Computers: Presentations, using excel sheet, Identification of computer devices,

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2nd Semester

General Pathology (201)

Introduction, Cell Injury ,Cell Death and Cellular Adaptation, Inflammation and types of Inflammation, Infections and types of Infections, Wound Healing and Neoplasia**.**

Pathology of Human Body

Introduction, Atherosclerosis and Other Vascular Diseases.

Morphological Responses of the Cardiovascular System and Ischemic Heart Diseases.

Pathology of Bacterial Pneumonia and Abscess, Tuberculosis.

Kidney and Urinary Tract Diseases.

Chronic Obstructive Pulmonary Diseases,

Pathology of the Esophagus and Stomach,

Pathology of the Small and Large Intestines

General Microbiology (202)

CLASSIFICATION OF MICROORGANISMS.

BACTERIOLOGY Introduction, Structure, Classification & Metabolism of Bacteria **.**Bacterial growth curve, Basis of Antimicrobial Action- .Antibiotics.

Infections by staphylococcus and streptococcus, Infections by Mycobacterium. Tuberculosis, Infections by E.Coli, Infections by Salmonella. typhi**.**

VIROLOGY Introduction, Structure, Classification and multiplication of viruses, Viral genetics and pathogenesis of Virus, HIV virus, Hepatitis virus, Influenza virus, Herpes Virus .Antiviral drugs

MYCOLOGY General concepts of mycology, Classification of Fungus, Structure of Fungi and disease mechanisms, Diagnosis of Fungal Infections, Treatment of Fungal Infection.

STERILIZATION AND DISINFECTION.STAINING TECHNIQUES.

General Biochemistry (203)

Chemical Bonding Valency, Electrovalent Bonding (Ionic Bonding), Covalent Bonding **Molecular Weight of Compounds**

Solutions Definition and Importance of Solutions**,** Types of Solutions**,** Diffusion, Osmosis and Dialysis

Electrolytes Acids, Bases and Salts**,** Ionization**,** Physiological Importance of Electrolytes**,**

Cell: Eukaryotic Cell, its Structure and function, cell organelles structure and functions. Biological membrane and transport .Passive and Active Transport.

Carbohydrates: classification, glycolysis and its energetic, TCA cycle and its energetics, fate of pyruvate, Regulation of blood glucose by Insulin and Glucagon. Normal Blood Glucose levels.

Lipids: Classification and importance of lipids, Types of Fatty acids, Triacylglycerols ,importance of TAG ,Phospholipids classification and function, prostaglandins and steroids. Digestion and Transportation of Lipids.

Amino acids, Proteins and Enzymes: Classification of amino acids, Importance of amino acids, Classification of Proteins, structure and functions of proteins .Classification of enzymes, Properties of Enzyme, Factors affecting Enzyme action ,Diagnostic Significance of Enzymes.

General Pharmacology (204)

Introduction, Basic concepts of drugs, Factors affecting drug response. Routes of administration of drugs, Effects of Drugs on the body, Prevention of adverse effects to drugs .Drugs and laws, Paramedics Responsibility in Drug Administration, Terminology, drug store, Ethical and Legal Aspects. Antibiotics, Antifungals, Antivirals, Time of Administration, Abbrievations and Symbols used. Antiseptics and Disinfectants,

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Practical (205)

1. Blood collection.
2. TLC
3. DLC
4. Microscopic Urine analysis.
5. Microscopic Stool Examination.
6. Staining techniques: Grams staining, Acid Fast Staining, Negative Staining, Simple Staining.
7. Laboratory instruments: Principle and working of Centrifuge, Incubator, colorimeter.
8. Blood grouping.
9. Type of Stains and their Action: Acidic Stains and Basic Stains.
10. Types of media for Bacterial Culture: Nutrient Agar , Nutrient Broth, Macconkey Agar Bleeding Time and Clotting Time.

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3rd Semester

Ocular Anatomy (301)

1. Embryology of the eye in general

2. Orbit and its immediate relations

3. Lids and eye lid glands

4. Conjunctiva,Cornea and Sclera

5. Iris and Ciliary body

6. Lens and Vitreous

7. Retina & Choroid

8. Ocular Muscles

9. Visual pathways

10. Sympathetics and parasympathetic system

11. Vascular supply of eye

12. Lacrimal apparatus

13. Higher visual centers

Ocular Physiology (302)

1. General physiology of the eye - An introduction

2. Maintenance of Transparency of the Cornea

3. Maintenance of Transparency of the Lens

4. Visual acuity and form sense

5. Pupillary reflexes

6. Accommodation

7. Convergence

8. Intra Ocular Pressure

9. Night Vision

10. Colour Vision

11. Visual Fields

12. Extrinsic Muscles, Actions and Ocular Movements

13. Higher Visual Centers and righting reflexes

14. Electrophysiological Aspects

15. Conjugate and Disguate -Movements of the eye

Ocular Pathology (303)

1. DISEASES OF CONJUNCTIVA: Conjunctivities and its types, Trachoma, Pinguecula, Concretions, Chemosis and Xerosis of conjunctiva.

2. DISEASES OF CORNEA: Cngenital anomalies, ulcerative and non ulcerative keratitis ,corneal degenerations, corneal dystrophies, abnormalities of corneal Transparency.

3. DISEASES OF THE SCLERA: Episcleritis, Scleritis, Blue Sclera Staphylomas.

4. DISEASES OF THE UVEAL TRACT: Congenital Anomalies,Uveitis,Degenerative conditions of iris and choroid, tumours of Choroid, Ciliray body and Iris

5. DISEASES OF THE LENS: Cataract, Congenital Anomalies of the Lens.

6. DISEASES OF THE RETINA: Retinitis ,Periphelebitis retinae.

7. GLAUCOMA: Congenital, Open Angle Glaucoma and Closed Angle Glaucoma.

8. DISEASES OF THE LIDS: Congenital Anomalies, Inflammatory Disorders-Blepharitis, Chalazion. Blepharospasm, Ptosis, Entropion, Ectropion, Trichiasis, Tumours and Injuries.

9. DISEASES OF THE ORBIT: proptosis, Classification & Causes and Investigations, Orbital Inflammations,Orbital Tumours.

10. DISEASES OF THE LACRIMAL APPARATUS.:Dry Eye-Sjogren's Syndrome, The Watering Eye, Dacrocystitis, Swelling of the Lacrimal Gland.

Ocular Microbiology (304)

1) Introduction to Bacteria, Virus and Eukaryotic Organisms causing Ocular Infections.
2) Bacterial infections: Septicaemia, Meningococcal infections ,Typhoid fever, T.B,
3) Fungal infections :systemic fungal infections. colonization of contact lens by fungi,
4) Viral infectons: Measles, Mumps, Rubella, whooping cough, AIDS

5) Parasitic Infections: Toxoplasmosis, Taenia Echinococcus.
6) Immunology: Infectivity and pathogenesis, Innate immune response, Adaptive immune response, Antimicrobial agents.

Ocular Biochemistry (305)

1. Vitamins & Minerals
2. Tears film and pH
3. General Introduction to metabolic processes affecting the eye
4. Rhodopsin cycle
5. Aqueous and Vitreous humors
6. Metabolism of lens and cornea.

Practical (306)

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4th Semester

Physical and Physiological Optics (401)

1. Elementary basis of light- Interference, diffraction, polarization spectrum, surface tension, viscosity
2. Principles of Refraction.
3. Physical Optics -1, Lens Shapes -Convex, Concave
4. Physical Optics -2, Thin Lens equation, thick lens equation
5. Physical Optics -3, Front and back vertex power
6. Physical Optics -4. Aberrations
7. Physical Optics -5. Spherical, Cylindrical & Toric surfaces, Aspheric surfaces
8. Prisms -definition, uses, nomenclature, apex
9. Determination of focal length & diopteric power of lens
10. Strum's Conoid
11. Neutralization of lenses
12. Focimeter
13. Centre & Axis Marking by foci meter

14. Simple & Toric transposition
15. Prismatic effect & Decentration
16. Aberrations & Tints in spectacle Lenses
17. Spectacle Lens Manufacturing -Spherical, Toric, Bifocals, Lenticular & Lab Visit
18. Spectacle Frames -History, Nomenclature, Types & parts, sides, joints, frame bridge.
19. Shape of Spectacle Frame -Measurements & Making, Frame & Face Measurements
20. Schematic eye
21. Emmetropia & Ammetropia -Etiology, Population, Distribution, Growth of eye,
22. Myopia
23. Hypermetropia
24. Astigmatism
25. Aphakia/Pseudo-phakia
26. Presbyopia
27. Keratoconus
28. Post-Op. Refractive errors
29. Refraction of irregular reflex
30. Accommodation & Convergence -1, Far point, near point, range, amplitude of accommodation
31. Accommodation & Convergence -2. Methods of measurements, NPA. AC/A ratio.
32. Retinoscopy - Principle & Methods
33. Objective Refraction
34. Subjective Refraction
35. Cross Cylinder
36. Workshop
37. Manufacturing Spectacle Lens
38. Plastic Lenses -Manufacturing & Characteristic
39. Lens Designs -Aspheric
40. High Index Lenses,
41. Photocromatic Lenses
42. Tinted Lenses
43. Polaroid Lenses

44. Bifocals
45. Measurement for ordering spectacle, IPD, Marking centration.V. D. Calculation.
46. Fitting Bifocals, Multifocal, Prism Lenses
47. Fitting Lenses in Frames
48. Glazing & Edging
49. Final Checking & Adjustments to prescriptions
50. Patient complains, handling correction.
51. Repair of spectacles
52. Special types of spectacles monocles'/ptosis hemianopic glasses
53. Test chart standards
54. Phoropter
55. Objective Optometer
56. Projection Charts
57. Refraction room Standards

Orthoptics (402)

1. Orthoptics-General Concept
2. Ocular muscles and movements
3. AC/ A ratio
4. Measurements of angle of squint
5. Latent squint
6. Maddox rod
7. Maddox wing
8. Synoptophore
9. Manifest concomitant
10. Squint concomitant
11. Paralytic Squint

12. Head posture and its significance

13. Hess Screening and its Interpretations

14. Pleoptics

15. Occlusion -types and uses

16. Nystagmus

17. A. V. Syndromes

18. Testing of ARC

19. Amblyopia

20. Disorders of accommodation

21. Paediatric visual acuity assessment

22. Paediatric Refraction

23. Neural aspects of binocular vision

Refraction (403)

1. Emmetropia & Ammetropia -Etiology, Population, Distribution, Growth of eye.
2. Myopia
3. Hypermetropia
4. Astigmatism
5. Aphakia/Pseudo-phakia
6. Presbiopia
7. Keratoconus
8. Post-Op. Refractive errors
9. Refraction of irregular reflex
10. Accommodation & Convergence –1. Far point, near point, ranges. Amplitude of accommodation
11. Accommodation & Convergence – 2. Methods of measurements, NPA. AC/A ratio.

12. Retinoscopy - Principle & Method
13. Objective Refraction
14. Subjective Refraction
15. Cross Cylinder

Ophthalmic Instruments and Appliances (404)

1. Lensometer, Lens gauge
2. Tonometer
3. Placido disc
4. Keterometer
5. VKG
6. Specular Microscopy
7. Exophthalmometer
8. Perimeter
9. Non Contact Tonometer
10. Slit Lamp: Haag-Streit.
11. Photo-slit lamp
12. Fundus Camera
13. Contrast sensitivity tests
14. Glare acuity tests
15. Colour vision tests
16. Dark adaptometer

Ocular Pharmacy and Pharmacology (405)

1. Ocular Pharmacology – An introduction
2. Autonomic nervous system
3. Routes of drug administration
4. Miotics, Mydriatics & Cycloplegics drugs
5. Antibacterial drugs & therapy

6. Antifungal drugs & therapy
7. Anti-Viral drugs & therapy
8. Antibacterial drugs & therapy
9. Anti-inflammatory drugs & therapy
10. Anti-glaucoma drugs & therapy
11. Ophthalmic dyes
12. Local Anesthetics
13. Ophthalmic preservatives
14. Ocular lubricants
15. Ocular irrigating solutions
16. Ocular antiseptics & disinfectants
17. Anti-cataract agents
18. Contact lens solution
19. Chelating agents
20. Immunosuppressive agents

Practical (406)

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