SGT UNIVERSITY
SHREE GURU GOBIND SINGH TRICENTENARY UNIVERSITY
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Faculty of Allied Health Sciences

Bachelor of Optometry

Syllabus

2017

Prof. M. Ejaz Hussain
Dean, Faculty of Allied Health Sciences
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Bachelor of Optometry

Scheme of Examination

First Semester

	Paper Code	Theory Examination		*Practical Examination*		*Total Marks*	*Credits*
		Univ. Exam.	Internal Assessment	Univ. Exam.	Internal Assessment		
General Anatomy	05250101	60	40	-------	-------	100	4
General Physiology	05250102	60	40	-------	-------	100	4
Ocular Anatomy, Physiology and Biochemistry	05250103	60	40			100	4
Physical and Geometrical Optics	05250104	60	40	60	40	200	4+2
Communication Skills and Personality Development	05250105	60	40			100	2
Total		**300**	**200**	**60**	**40**	**600**	**20**

Second Semester

	Paper Code	Theory Examination		Practical Examination		Total Marks	Credits
		Univ. Exam.	Internal Assessment	Univ. Exam.	Internal Assess Ment		
Ocular Pathology and Microbiology	05250201	60	40	---------	---------	100	4
Ocular Pharmacology	05250202	60	40	------	------	100	4
Clinical Examination of Visual System	05250203	60	40	60	40	200	4+2
Visual optics-1	05250204	60	40	60	40	200	4+2
Fundamentals of Computer Science	05250205	60	40			100	2
Total		**300**	**200**	**120**	**80**	**700**	**22**

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Third Semester

	Paper Code	Theory Examination		Practical Examination		Total Marks	Credits
		Univ. Exam.	Internal Assessment	Univ. Exam.	Internal Assessment		
OcularDiseases-1		60	40	-	-	100	4
Optometric Instruments-1		60	40	60	40	200	4+2
Visual Optics—2		60	40	60	40	200	4+2
Public Health and Community Optometry		60	40	-	-	100	4
Medical Psychology		60	40			100	2
Environmental science		60	40			100	4
Total		**360**	**240**	**120**	**80**	**800**	**26**

Fourth Semester

	Paper Code	Theory Examination		Practical Examination		Total Marks	Credits
		Univ. Exam.	Internal Assessment	Univ. Exam.	Internal Assessment		
Ocular Disease-2		60	40	------	------	100	4
Optometric Instruments -2		60	40	60	40	200	4+2
Binocular Vision and Orthoptics-1		60	40	60	40	200	4+2
Investigations in clinical ophthalmology-1		60	40	60	40	200	4+2
Contact lens-1		60	40	60	40	200	4+2
Total		**300**	**200**	**240**	**160**	**900**	**26**

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Fifth Semester

	Paper Code	Theory Examination		Practical Examination		Total Marks	Credits
		Univ. Exam.	Internal Assessment	Univ. Exam.	Internal Assessment		
Investigations in clinical ophthalmology -2		60	40	60	40	200	4+2
ContactLens-2		60	40	60	40	200	4+2
Dispensing Optics		60	40	60	40	200	4+2
Binocular Vision and Orthoptics-2		60	40	60	40	200	4+2
Research Methodology and Biostatistics		60	40	...		100	4
Total		**300**	**200**	**240**	**160**	**900**	**28**

Sixth Semester

	Paper Code	Theory Examination		Practical Examination		Total Marks	Credits
		Univ. Exam.	Internal Assess-ment	Univ. Exam.	Internal Assess-Ment		
Low Vision Aids		60	40	60	40	200	4+2
Eye Banking		60	40	--	--	100	4
Management of OT		60	40	---	---	100	4
Occupational Optometry		60	40			100	4
Pediatric& Geriatric Optometry		60	40	.....	.....	100	4
Total		**300**	**200**	**60**	**40**	**600**	**22**

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Bachelor of Optometry
First Semester
Paper-1
Paper Code

GENERAL ANATOMY **----40 hours**

1. **Introduction to human body-** Gross anatomy,cell and various types of tissue of the body, Epithelium and glands of body with examples
2. **Embryology and development-**Spermatogenesis, oogenesis, Ovulation, Fertilization, Placenta
3. **Skeletal system of Human body-**Parts of skeletal system, Bone, Cartilage, Joints, Spine, Muscles of the body,
4. **Circulatory System-** Parts of circulatory system, Heart, Pericardium, Main arteries and veins of the body & Lymphatic system
5. **Digestive system**—Parts of gastro intestinal tract- Liver, The Gall bladder, Pancreas & Spleen, Peritoneum.
6. **Respiratory system-**Airway, Lungs, Thoracic cavity, Nose and para-nasal sinuses.
7. **Endocrine Organs of body-**Pituitary, Thyroid, Parathyroid, Pancreas, Adrenal glands
8. **Excretory System-**Kidney, ureter, gall bladder, urethra
9. **Reproductive system-**Male and female reproductive organs, Mammary glands
10. **Central Nervous System-** Brain & Cranial Nerves, Spinal Cord and peripheral nerves, Autonomic nervous system
11. **Sensory organs**—Skin, Ear, Eye, Nose, Tongue

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First Semester
Paper-2
Paper Code

GENERAL PHYSIOLOGY **----40 hours**

1-Introduction to Human Physiology—Physiology of cell organelles, Cell division in brief
2. Skeletal System- Functions of Bones, Cartilages, Muscles, Nerve muscle junction. Transmission of nerve impulse
3. Circulatory System-Cardiac cycle, Heart sounds, Blood pressure, ECG, The Blood-RBC, WBC, Platelets, Plasma, Haemoglobin, Blood groups, Rh system, Blood donation
4. Digestive System- Process of digestion with functions of different digestive organs
5. Respiratory System-- Physiology of respiration, exchange of gases between lungs and blood.
6. Endocrine Organs of Body-- Hormones secreted by different glands of body and their functions
7. Excretory System-- Physiology of urine formation
8. Reproductive System-Physiology of reproduction in brief and lactation
9. Nervous System--Functions of different parts of nervous system, neuron, Synapse, Reflex action, transmission of nerve impulse, EEG, Cerebro-spinal fluid
10. Sensory Organs—Physiology of special sense organs in brief

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First Semester

Paper-3

Paper Code

OCULAR ANATOMY, PHYSIOLOGY and BIOCHEMISTRY --40 hours

1. Embryology of the eye in general
2. Different parts of eyeball and their functions
3. General metabolic processes occurring in different parts of eyeball—Krebs's Cycle, Glycolysis, Sorbitol Pathway. General biochemical tests like Hemoglobin, Glycosylated Hemoglobin, LFT, KFT, Lipid profile, Thyroid function tests, Blood sugar
4. Orbit and its immediate relations, walls of orbit, fissures and foramina, anatomical spaces of orbit
5. Lids--Layers of eyelids, lid glands and their functions, muscles of eyelids
6. Conjunctiva-Parts and glands of conjunctiva
7. Cornea -Transparency of cornea, metabolism of cornea, Layers of cornea and conjunctiva
8. Sclera-Anatomy of sclera
9. Uveal Tract—Gross anatomy of iris, choroid and ciliary body and their functions, Intra-ocular muscles
10. Pupil-Different types of pupillary reflexes and their pathway- Light reflex, near reflex, psycho-sensory reflex
11. Anterior Chamber--Formation and drainage and functions of aqueous humor, Structures of angle of AC
12. Lens and Vitreous—Anatomy, transparency and Metabolism of lens, Anatomy and functions of vitreous
13. Retina and Optic Nerve-Anatomy of retina and visual pathway, Physiology of vision, color vision
14. Ocular Muscles-Extra-Anatomy and Physiology of extra-ocular muscles, Movements of eyeball, concept of BSV
15. Nervous and Vascular supply of eyeball-- Sympathetic and parasympathetic nervous system in relation to eyeball.
16. Lacrimal apparatus, Tear film and pH
17. Visual acuity Principles and visual perception
18. Intra-Ocular pressure
19. Visual field

FirstSemester
Paper-1
Paper Code

PHYSICAL AND GEOMETRICAL OPTICS ---40 hours

1) Elementary basis of light-Basic idea about Refraction, Reflection, Interference, diffraction, polarization, spectrum of light, Law of inverse square
2) Lens Shapes -Convex, Concave, Spherical, Cylindrical &Toric surfaces, Aspheric surfaces, Thin Lens equation, thick lens equation, Front and back vertex power, Determination of focal length &diopteric power of lens
3) Aberrations of lenses and eyeball
4) Prisms -definition, uses, nomenclature, How to detect and measure power of a prism, Compounding and resolving prism powers
5) Strum's Conoid
6) Neutralization of lenses, Combination of lens, Notation of lenses, Image formation by Concave and Convex lenses, How to check power of unknown lens
7) Effectivity of lens, Gauss theorum
8) Focimeter
9) Optical Centre & Axis Marking by focimeter
10) Simple &Toric transposition
11) Prismatic effect &Decentration, Prentice rule

Practicals:

1. Identification of different types of lenses
2. Neutralization of lenses
3. Focimeter
4. How to record vision, use of Pin hole, Slit

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SEMESTER 1
PAPER 5
COMMUNICATION SKILL AND PERSONALITY DEVELOPMENT

Total: 40 hours

Unit I
Listening Comprehension

- Speeches
- Interviews
- audio-video clippings followed by exercises
- Introduction to Communication
- Importance of Communication
- Barriers to Communication and ways to overcome them

Unit II
Conversation Skills

- Greetings and introducing oneself
- Framing questions and answer
- Role play
- Buying: asking details etc
- Word formation strategies
- Vocabulary building: Antonyms, Synonyms, Affixation, Suffixation, One word substitution

Unit III
Reading Comprehension

- Simple narration and Stories
- Simple Passages
- Newspaper and articles clippings
- Note Making
- Paragraph Writing
- Comprehension
- Report Writing: types, characteristics
- Introduction to Letter Writing

Unit IV:
Pronunciation

- Pronunciation

- Syllable and Stress
- Intonation and Modulation

UNIT V

Writing Comprehension

- Letters: types, format, style
- Précis Writing
- Paragraph: Order, Topic sentence, consistency, coherence
- Report and Proposal

Project Writing: Features, Structure

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THEORY SUBJECTS FOR SECOND SEMESTER

Bachelor of Optometry

Second Semester

Paper-1

Paper Code

OCULAR PATHOLOGY and MICROBIOLOGY ---40 hours

1. HAEMATOLOGY

a) Blood Cells and blood collection techniques
b) Haemoglobin estimation
c) Total leucocyte count
d) Differential leucocyte count
e) Erythrocyte sedimentation rate
f) Pheripheral blood film – staining, significance of a peripheral smear
g) Bleeding time, clotting time

2. CLINICAL PATHOLOGY

a) Urine collection methods
b) Physical Examination of Urine
c) Chemical Examination of Urine
d) Microscopic Examination of Urine

3. HISTOPATHOLOGY

a) Grossing of tissue
b) Tissue processing
c) Fixation of tissue
d) Section cutting
e) Staining – Hematoxylin &Cosin and Special Stains

4. Microbiology

1. Introduction to Microbiology & classification.
2. Gram Positive Bacteria
3. Gram Negative Bacteria
4. Fungi -Sephorophytics and pathogenic
5. Virus
6. Aseptic techniques
7. Chlayadia& parasites.

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Bachelor of Optometry
Second Semester
Paper-2
Paper Code

OCULAR PHARMACOLOGY ---40 hours

1) Ocular Pharmacology – An introduction
2) Autonomic nervous system
3) Routes of drug administration
4) Miotics, Mydriatics&Cycloplegics drugs
5) Antibacterial drugs
6) Antifungal drugs
7) Anti-Viral drugs
8) Anti-inflammatory drugs
9) Anti-glaucoma drugs
10) Ophthalmic dyes
11) Local Anaesthetics
12) Ophthalmic preservatives
13) Ocular lubricants
14) Ocular irrigating solutions
15) Ocular antiseptics & disinfectants
16) Visco elastic agents
17) Anti-cataract agents
18) Contact lens solution
19) Chelating agents
20) Immunosuppressive agents
21) Anti-allergic agents

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SecondSemester
Paper-3
Paper Code

Clinical Examination of Visual System —40 hours

Theory:

1. History Taking of ophthalmic patient—Chief complaints, History of present illness, H/o Past illness, Family history, Personal history, Treatment history, Menstrual history with examples and relevance.
2. Visual acuity testing, Vision with and without glasses, for distance and near
3. Examination of muscle balance
4. Examination of Eyelids, conjunctiva, cornea, Iris, Pupil Lens,
5. IOP measurement and Gonioscopy
6. Examination of fundus with Direct, Indirect ophthalmoscope
7. Examination of Lacrimal system, Orbit
8. Macular function tests
9. Visual field charting
10. Neuro-ophthalmological examination

Practical:

OPD and IPD posting of students and training how to take history and examine a patient.
Refraction under supervision

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Second Semester
Paper-4
Paper Code

VISUAL OPTICS-1 ---40 hours

Theory

1. Review of geometrical optics—Light and its properties, Vergence and power, Sign convention, Catoptric imagery, Magnification and field of view of a lens
2. Emmetropia &Ammetropia—Detailed study –[Aetiology, Clinical features, management, complications] of Myopia, Hypermetropia, Astigmatism, Aphakia/Pseudo-phakia, Anisometropia, Anisekonia, Amblyopia
3. Growth of eyeball in relation to refractive errors
4. Retinoscopy -Principle & Method, Objective Refraction, Subjective Refraction, Verification of subjective acceptance –cross cylinder, Duochrome test, Stenopeic slit test, Astigmatic fan test, Pin Hole test, Difficulties faced during retinoscopy and their solution
5. Simple and Toric Transposition

Practicals

1. Practice of Retinoscopy
2. Use of slit to find axis of astigmatism
3. Visual acuity charts
4. Practical models of Emmetropia, Myopia, Hypermetropia, Astigmatism

SEMESTER 2
PAPER 6
FUNDAMENTALS OF COMPUTER SCIENCE

Total: 40 Hours

1. **Introduction**:
   What are computers, Application areas, Characteristics & limitations, Evolution of computers, Classification& generations of computers, Data representation in computer memory (numbering system)

2. **Computers Architecture /Organization:**
   Basicarchitecture, Functional Block diagram, Types of computers on the basis of purpose, Signal and Portability.
3. **Hardware:**
   CPU their generations and performance parameters, Input, output and storage devices.
   Primary (Main) Memories (RAM, ROM, Types of RAM and ROM, Cache Memory, Registers and types of registers, Storage Evaluation Criteria, Memory Capacity),
   Secondary Storage Devices: (Magnetic Disk, Floppy and Hard Disk, USBs, Optical Disks CD-ROMs)

4. **Software:**
   Types: System Software (Machine Level Languages, Operating Systems, Device Specific Drivers), Higher Level Languages, and Applications

5. Languages: Machine Language, Assembly Languages, Programming Languages. Use of Compilers, Assemblers, Linkers, Loaders and interpreters in programming languages
6. Operating System: Booting/Start Up Procedure of machines, Introduction to Operating System, Functions and Classification of Operating Systems, Basic introduction to DOS, UNIX/LINUX OS, Windows
7. HTML, Use of Multimedia, Computer aided teaching and testing
   Application Software MS office (Word, Excel and Powerpoint)

8. **Basic Introduction to Computer Networks:**
   Data Communication, Network devices (Hub, Switches, Modems, and Routers etc), LAN, LAN topologies, WAN, MAN, Internet: Introduction, Basics of E-mail, Web browsers (IE, Google Chrome, and Mozilla Firefox),
9. Structure of Universal Resource Locator, Domains (.com, .in, .country specific, .org and rationale behind them), IP address, Backbone network, Network connecting devices, HTTP, DNS, Network Security and Search Engine.

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ThirdSemester

Paper-1

Paper Code

Ocular Diseases-1 ---40 hours

1) Diseases of conjunctiva-Infective Conjunctivitis, Allergic conjunctivitis, Trachoma, Ophthalmianeonatorum, Pinguecula, Pterygium, Concretions, sub-conjunctival haemorrhage, Xerophthalmia
2) Diseases of Cornea-Corneal ulcers-bacterial, viral and fungal. Herpes zoster ophthalmicus, acanthamoeba keratitis, Arcus senelis, Band shaped keratopathy, Keratoconus, Corneal opacity, Degenerations and dystrophies of cornea
3) Diseases of Sclera-Scleritis, Episcleritis, Staphylomas,
4) Diseases of Uveal Tissue-Iridocyclitis-clinical features and ,management, Abnormalities of iris--Endophthalmitis, Sympathetic ophthalmia,
5) Diseases of Lens-Cataract-its types, causes, work-up of a patient of cataract, indications of surgery, types of surgeries, complications of surgery, different types of IOLs, sub-luxation and dis location of lens

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Third Semester

Paper-2

Paper Code

OPTOMETRIC INSTRUMENTS-1 ---30 hours

Theory:

1) Simple and Compound Microscope
2) Lensometer, Genewa lens measure
3) Trial Frame design
4) Types of retinoscopes
5) Projection Charts
6) Types of Ophthalmoscopes
7) Auto-refractometer
8) Dark adaptometer
9) Indirect Ophthalmoscope, Direct Ophthalmoscope
10) Slit Lamp: Techniques of slit lamp examination, Slit lamp Photography
11) Tonometer-Schioetz and applanation, Non Contact Tonometer
12) , Placido disc, Keterometer

Practicals:

1) Lensometer
2) Retinoscopes
3) Auto refractometer
4) Ophthalmoscopes
5) Tonometers
6) Keratometer

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ThirdSemester

Paper-3

Paper Code

Visual Optics-2 30 Hours

1. Accommodation and Convergence-Far point, Near point, Amplitude, Mechanism and theories of accommodation, Anomalies of accommodation-Paralysis of accommodation, Presbyopia, Spasm of accommodation, Types of convergence, AC/A ratio, Convergence insufficiency
2. Schematic eye, Reduced eye
3. Strum's Conoid
4. Axes and angles of eyeball
5. Ghost Images—Definition, Mechanism of formation and trreatment
6. Keratoconus
7. Post-Op. Refractive errors/ Residual refractive errors
8. Refraction of irregular reflex
9. Effective power of Spectacles-Vertex distance effects, Spectacle magnification and minification and its effect on accommodation and convergence.

Practicals:

5. Measurement of corneal curvature
6. Measurement of corneal thickness
7. Effect of lens and prism in front of eyes
8. Study of Purkinje images

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ThirdSemester
Paper-4
Paper Code

Public Health and Community Optometry ---40 Hours

1) Public Health Optometry-Concepts and implementation, Stages of diseases, Dimensions, determinants and indicators of health.
2) The Epidemiology of Blindness—Defining blindness and visual impairment.
3) Survey Methodology
4) Screening procedures in Ophthalmology -School eye screening programs
5) Primary eye care
6) Organization of Eye camps
7) Health Education, Nutritional blindness in relation to Vitamin A deficiency
8) Rehabilitation of the visually handicapped
9) National program for control of Blindness
10) Vision 2020 : The Right to sight
11) Ethical, legal, social and scientific issues in relation to optometry-Definition and scope of Medical ethics, Code of conduct, malpractice, Negligence, Valid consent, Professional confidentiality, Rights of patients, Professional indemnity insurance

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ThirdSemester

Paper-4

Medical Psychology

Theory: 40 hours

1. Introduction to Psychology
   - A – Definition, History, Branches, Scope and Current Status
   - B – Methods, Concepts of Normality and abnormality
2. Sensation, Attention and Perception
   - Primary senses
   - Types of attention and determinants
   - Principles of perception and determinants
3. A – Intelligence, B - Learning, C - Memory, D - Personality, E – Motivation and F – Body image and personality integration
4. Helper – Helpee relationship and Ophthalmic counseling
   - Characteristics of therapist, Relationship between the therapist and client
   - Counseling patient with partial sight, colour blindness and hereditary vision defects
5. Psychological Reaction
   - A – Illness, loss and Grief
   - B - Adapting changes in Vision (age, diseases, etc.…)
6. Tests for people with disability
   - WAIS – R, WISC –R (for visually handicapped) Blind learning aptitude tests
7. Disability and Rehabilitation

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Semester 3

Paper 6

ENVIRONMENTAL SCIENCE

Theory: 60 Hours

Unit 1:

The Multidisciplinary nature of environmental studies

- Definition, scope and importance.
- Need for public awareness.

Natural Resources

Renewable and non-renewable resources: Natural resources and associated problems.

- Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.
- Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.
- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Unit 2:

Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.

Biodiversity and its conservation

- Hot-spots of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts
- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Unit 3:

Environmental Pollution

Definition, causes, effects and control measures of:-

a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

- Solid waste Management : Causes, effects and control measures of urban and industrial wastes.
- Fireworks, their impacts and hazards
- Pollution case studies.
- Disaster management : floods, earthquake, cyclone and landslides.

Unit 4 :

Social Issues and the Environment

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions.
- Consumerism and waste products.
- Environmental Legislation (Acts and Laws)
- Issues involved in enforcement of environmental legislation

Human Population and the Environment

- Population growth, variation among nations with case studies
- Population explosion – Family Welfare Programmes and Family Planning Programmes
- Human Rights.
- Value Education.
- Women and Child Welfare.

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THEORY SUBJECTS FOR FOURTH SEMESTER

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FourthSemester
Paper-1
Paper Code

Ocular Diseases-2 ---40 hours

1) Glaucoma-Definition, congenital glaucoma, POAG, PNAG-clinical features and management. Anti-glaucoma drugs and types of glaucoma surgeries, secondary glaucomas
2) Diseases of Vitreous, Retina and Optic nerve- Basic idea about Asteroid hyalosis, Synchysisscintillans, Vitreous haemorrhage, retinal detachment, retinopathy of prematurity and optic neuritis, Papilloedema, Optic Atrophy, Endophthalmitis
3) Ocular manifestations of systemic diseases—Diabetes, Hypertension, Xerophthalmia, Tuberculosis
4) Diseases of eyelids-Stye, Chalazion, Ptosis, Entropion, Ectropion
5) Diseases of Lacrimal apparatus-congenital dacryocystitis, Chronic dacryocystitis
6) Diseases of Orbit-orbital cellulitis, proptosis, Pthisis bulbi
7) Ocular injuries-Mechanical, Penetrating, thermal, chemical injuries and their management

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Fourth Semester

Paper-2

Paper Code

OPTOMETRIC INSTRUMENTS-2---30 hours

1) Pupillometer
2) Perimeter – Manual & automated
3) Pachymeters
4) Contrast sensitivity tests
5) Glare acuity tests
6) Colour vision tests
7) OCT, A and B Scan
8) Nerve fiber analyzer
9) Specular Microscopy, Aesthesiometer
10) Fundus Camera
11) Exophthalmometer

Practicals:

1) Specular Microscopy
2) Exophthalmometer
3) Perimeter
4) Fundus Camera
5) Contrast sensitivity tests
6) Glare acuity tests
7) Colour vision tests
8) Dark adaptometer
9) OCT, A and B Scan

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Bachelor of Optometry
FourthSemester
Paper-3
Paper Code

Binocular Vision and Orthoptics -1 --40 hours

Theory

1. Review on Ocular muscles- Types, origin , Action , innervations, Microscopic structure
2. Ocular movement- Duction, versions, Vergence
3. Laws of ocular movement
4. Fick's Law, Position of gaze
5. Yokes muscles, antagonist, synergist, agonist
6. Ocular movement – saccadic ,pursuits, optokinetics
7. Binocular single vision- Grades of BSV, Development of BSV ,advantages of BSV
8. Test for grades of BSV
9. Horopter- Concepts , types , method of measurement
10. Visual space and physical space
11. Visual direction
12. Diplopia/ confusion
13. Retinal correspondence
14. Retinal disparity, pannum's area
15. Suppresion
16. Stereopsis – Binocular and monocular clues
17. Amblyopia –Definition, Concepts, Classification of Amblyopia, Clinical features of amblyopia, Investigation of amblyopia, Amblyopic therapy
18. Nystagmus-Definition, Etiology, Types of nystagmus, Clinical examination of nystagmus, Treatment of nystagmus

Practicals:

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1) Pleoptics
2) Orthoptic Exercises
3) Synptophore
4) Near point of accommodation
5) Near point of convergence
6) Fusion exercise
7) Stereopsis exercise

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Bachelor of Optometry
FourthSemester
Paper-4
Paper Code

INVESTIGATIONS IN CLINICAL OPHTHALMOLOGY-1 —30 hours

1) Lensometry
2) Keratometry
3) Slit Lamp
4) Gonioscopy
5) Pachymetry
6) Perimetry
7) Ultrasono-graphy-A Scan biometry and B Scan
8) Colour Vision Investigations – Ishihara Charts, Lantern test, Negal'sanomaloscope, 100 Hue Color vision test
9) Syringing & Lacrimal function Test
10) Contrast Sensitivity
11) Tonometry-Schiotz, Applanation, NCT

Practicals :

1. Focimeter
2. Keratometry
3. Perimetry
4. Syringing & Lacrimal function Test
5. Slit Lamp
6. Applanation, schiotz tonometry, NCT
7. Contrast Sensitivity

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Bachelor of Optometry
Fourth Semester
Paper-5

Contact lens-1

Theory

1. Review on anatomy and physiology of cornea
2. Corneal physiology and contact lens
3. Slit- lamp technique for contact lens evaluation
4. Keratometry, Placido's disc
5. Topography
6. Uses of specular microscopy in contact lens
7. Uses of pachymetry in contact lens
8. History of contact lens
9. Contact lens materials- classification ,concept , advantages and disadvantages
10. Important of contact lens material properties
11. FDA classification
12. Optics & principle of contact lens
13. Glossary terms: Contact lenses
14. Indications & Contraindications of contact lens
15. Contact lens manufacturing process
16. Identifications of contact lens types
17. Soft and RGP Contact lens Design
18. Contact lens Verification & Modification
19. Preliminary measurement and investigation for Contact lens
20. Insertion and removal of contact lens

Practical

1. Slit –lamp examination
2. Keratometry – BC calculation
3. Preliminary examination of contact lens

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THEORY SUBJECTS FOR FIFTHSEMESTER

Bachelor of Optometry
FifthSemester
Paper-1
Paper Code

INVESTIGATIONS IN CLINICAL OPHTHALMOLOGY-2 —30 hours

1) Specular Microscopy
2) Ocular Photography -anterior segment
3) Fundus Photography
4) Fluorescein Angiography
5) Dark Adaptometry : Adaptation &Adaptometry
6) Laser therapy in optometry
7) Nerve fiber analyzer
8) UBM
9) OCT
10) ERG, EOG, VEP

Practicals :

1. Fluorescein Angiography
2. Specular Microscopy
3. Dark Adaptometry
4. A -Scan Biometry
5. B Scan
6. ERG/EOG/VER
7. OCT

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Bachelor of Optometry
FifthSemester
Paper-2
Paper Code
CONTACT LENS-2 —40 hours

Theory

1. Introduction to Contact lens fitting
2. Fitting of Spherical SCL and effect of parameter changes
3. Fitting of Toric SCL and effect of parameter changes
4. Fitting spherical RGP contact lens. Low OK, high Ok
5. Effect of RGP CL parameter changes on lens fitting
6. Fitting Toric RGP Contact lens in Astigmatism
7. Fitting in keratoconus, Fitting in Aphakia, Fitting in pseudophakia
8. Fitting contact lens in children
9. Lens dispensing and patients education
10. Conducting after care visit
11. Follow-up fitting & Slit-Lamp Examination
12. Bifocal contact lens- Fitting in Bifocal contact lens
13. Continuous wear & extended wear lenses
14. Therapeutic Contact lens
15. Fitting procedure for therapeutic contact lens
16. Bandage contact lens
17. Contact lenses for ocular surgeries
18. Disposable contact lens and Cosmetic contact lens
19. Checking finished lenses parameter
20. Contact lens complication

Practicals:

1. Slit Lamp examination
2. Keratometry
3. Soft Contact Lens fitting
4. RGP lens fitting
5. Counselling of Contact Lens patient

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Bachelor of Optometry
FifthSemester
Paper-3
Paper Code

Dispensing Optics —40 hours

1) Types of ophthalmic lenses--Plastic Lenses, Glass lenses, Polycarbonate lenses -Manufacturing & Characteristic
2) Spectacle Lens Manufacturing -Spherical, Toric, Bifocals, Lenticular
3) Spectacle Frames -History, Nomenclature, Types & parts, sides, joints, frame bridge.
4) Shape of Spectacles-- Frame & Face Measurements
5) Best Form lenses, Pantoscopic tilt, Retroscopic tilt and its consequence, Tilting of lens
6) Lens Designs –Ashperic. Lenticular, Achromatic
7) Progressive addition lenses
8) High Index Lenses,
9) Photochromatic Lenses
10) Tinted Lenses, ARC lenses, Hard coat lenses, U V protective lenses, Balance lens
11) Optical centre of a lens
12) Polaroid Lenses
13) Bifocals/Toric lenses/ Cross compound lenses
14) Measurement for ordering spectacle, IPD, Marking centration.V. D. Calculation.
15) Fitting Bifocals, Multifocals, Prism Lenses
16) Fitting Lenses in Frames
17) Glazing & Edging
18) Final Checking & Adjustments to prescriptions
19) Patient complains and management
20) Repair of spectacles
21) Test chart standards
22) Phoropter
23) Projection Charts
24) Refraction room Standards

Practicals:

1. Workshop
2. Manufacturing Spectacle Lens
3. Manufacturing Bifocal Lenses
4. Measurement for ordering spectacle, IPD, Marking centration,.
5. Fitting Bifocals, Multifocals, Prism Lenses
6. Fitting Lenses in Frames
7. Glazing & Edging
8. Final Checking, Adjustments to prescriptions
9. Patient complains, handling correction.
10. Repair of spectacles
11. Special types of spectacles ptosis, hemianopic glasses

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Bachelor of Optometry
FifthSemester
Paper-4
Paper Code

Binocular Vision and orthoptics-2

Theory

1. Accommodation- Definition& theory of accommodation, Range & Amplitude of accommodation, Insufficiency & paralysis of accommodation, Spasm of accommodation, exercise and vision therapy of accommodation
2. Convergence- Definition, Range and Types, Convergence insufficiency, exercise and vision therapy of convergence
3. Strabismus – Definition, Classification
4. Evaluation of Strabismus- Prism bar cover test(PBCT), Corneal reflex test- Hirschberg & PBRT, Maddox rod Test & Maddox wing test, Diplopia Charting ,WFDT, Bagolini Strighted Glass test, Hess Screen Test
5. Latent Squint- Concepts, classification ,clinical features, evaluation ,exercise ,vision therapy and management options
6. Manifest Squint- Concepts, classification ,clinical features, evaluation ,exercise ,vision therapy and management options
7. Divergent Squint- Concepts, classification ,clinical features, evaluation ,exercise ,vision therapy and management options
8. Convergent Squint- Concepts, classification ,clinical features, evaluation ,exercise ,vision therapy and management options
9. Paralytics Squint- Concepts, classification ,clinical features, evaluation ,exercise ,vision therapy and management options
10. Vertical & restrictive squint- Concepts, classification ,clinical features, evaluation ,exercise ,vision therapy and management options
11. Head posture & its significance
12. Synoptophore

Practical

1. Evaluation of squints
2. Synoptophore
3. Work-up of squints

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Semester V

Paper 5

RESEARCH METHODOLOGY & BIO STATISTICS

Theory: 60 Hours

Introduction

Meaning, definition, characteristics of statistics
Importance of the study of statistics
Branches of statistics
Statistics and health science including nursing
Parameters and estimates
Descriptive and inferential statistics
Variables and their types
Measurement scales

Tabulation of Data

Raw data, the array, frequency distribution
Basic principles of graphical representation
Types of diagrams - histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, Normal probability curve

Measure of Central Tendency

Introduction: Uses, applications and practical approach
Definition and calculation of mean - ungrouped and grouped data
Meaning, interpretation and calculation of median ungrouped and grouped data
Meaning and calculation of mode
Comparison of the mean, and mode
Guidelines for the use of various measures of central tendency

Measure of Variability

Introduction: Uses, applications and practical approach
The range, the average deviation or mean deviation
The variance and standard deviation
Calculation of variance and standard deviation for ungrouped and grouped data
Properties and uses of variance and Standard deviation

Sampling Techniques

Introduction: Uses, applications and practical approach
Criteria for good samples
Application of sampling in Community
Sampling methods, sampling and non-sampling errors
Sampling variation and tests of significance

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Bachelor of Optometry

SixthSemester

Paper-1

Paper Code

Low Vision Aids 40 Hours

1) Identifying thelow vision patient
2) Basic idea about diseases responsible for low vision
3) Optics of low vision aids
4) Refraction, specialcharts,Radicalretinoscopy
5) Evaluatingnear vision:Amsler gridand fielddefects, prismatic scanning
6) Demonstratingaids – Optical-Magnifiers, Telescopes, Field expandersNon-optical,Electronic
7) Guidelinesfor determiningmagnification and selectinglow vision aids for distance, intermediate andnear
8) Childrenwith low vision
9) Rehabilitationof theVisuallyhandicapped

Practicals

1 Refraction in Children
2 Refraction in adults
3 Refraction in patients of low vision
4 Demonstration of different types of low vision aids available in market
5 Work-up of a patient of low vision

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Bachelor of Optometry

SixthSemester

Paper-2

Paper Code

EYE BANKING —40 hours

1) Publicity
2) How to donate your eyes
3) Collection of eyes
4) Preservation of eyes
5) Pre-operative Instructions
6) Post-operative Instructions
7) Latest techniques for preservation of donor Cornea
8) Human organ transplantation act 1994-Breif idea

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Bachelor of Optometry

SixthSemester

Paper-3

Paper Code

MANAGEMENT OF O T --40 hours

1) Introduction to Operation Theater in general-- How to achieve asepsis, scrubbing techniques, theater clothes, handling sterilized articles in OT, OT environment
2) Drugs used in OT in relation to ophthalmology-Mydriatic and miotic agents, Local anesthetic agents [Lignocain, Bupivacain, Proparacain], Viscoelastic agents, Trypan blue dye etc.
3) Sterilization procedures of operation theater and Instruments
4) Maintenance of Instruments and equipments: Ophthalmic Instruments, Orthoptics Instruments, Surgical Instruments, Optometric & Contact Lens Equipment
5) Instruments required for different types of ophthalmic surgeries—Cataract, Glaucoma, Squint, DCR, DCT, Entropion, Probing, Keratoplasty, Ptosis.
6) Biomedical waste management-Generation, Segregation, transportation, disposal of biomedical waste. Regulating authority. Risks involved to public and waste handlers.

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Bachelor of Optometry
SixthSemester
Paper-4
Paper Code

Occupational Optometry 30 Hours

1) Introduction to occupational health, hygiene and safety
2) International bodies like WHO, ILO etc.
3) Electromagnetic radiations and its effects on eye
4) Factory act, ESI act
5) Occupational Hazards and preventive/ protective methods
6) Industrial vision screening
7) Vision Standards Railways, Roadways, Airlines

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Bachelor of Optometry

SixthSemester

Paper-5

Paper Code

Pediatric & Geriatric Optometry —40 hours

PAEDIATRIC OPTOMETRY

1) Geneticfactors - Perinatalfactors- Prenatalfactors - Postnatalfactors responsible for diseases in children
2) Assessmentof visualacuity in children
3) Measurementof refractive status
4) Determining binocular status
5) Management of Myopia, Pseudo myopias Hyperopia Astigmatism, Anisometropia, Amblyopia, strabismus and nystagmus, Vergenceand accommodation

GERIATRIC OPTOMETRY

1) Structural and physiological changes ineye with age
2) Ocular diseases common inold eye, withspecialreference to cataract, glaucoma, macular disorders, vascular diseasesof the eye
3) Specialconsiderations in ophthalmic dispensing tothe elderly
4) How to carryon one's visualtask overcoming theproblems of aging?

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