

Bachelor of Vocation (Optometry Technology)

B.Voc. (Optometry Tech.) Syllabus

II Semester				
S.No.	Course Code	Subject	Type of Course	Credits
1	BVOPT-201	Ocular Anatomy and physiology	Gen	4
2	BVOPT-202	Physical optics	Skill	4
3	BVOPT-203	Geometrical optics II	Skill	4
4	BVOPT-204	Optometric Optics -I	Skill	2
5	BVOPT-205	Orientation in para clinic science	General	3
6	BVOPT-206	Basics of Health Market & Economy	General	3
	BVOPTP-201	Practical of Course BVOPT-201	Skill	2
	BVOPTP-202	Practical of Course BVOPT202	Skill	2
	BVOPTP-203	Practical of Course BVOPT-203	Skill	2
	BVOPTP-204	Practical of Course BVOPT-204	Skill	2
	BVOPTP-205	Practical of Course BVOPT-205	Skill	2
		Internship in Hospital		

BVOPT 201 Ocular Anatomy and physiology

UNIT-1

Central nervous system A brief Introduction, Spinal cord and brain stem Cerebellum and Cerebrum, Embryology of the Eye, Orbit, adnexa, Eye Ball

UNIT-2

Eye Lid, Conjunctiva, Cornea, Sclera Anterior chamber, Uvea, Crystalline Lens ,Vitreous, Choroid, Retina, Protective mechanisms in the eye: Eye lids and lacrimation, description of the globe, Extrinsic eye muscles, their actions and control of their movements ,Coats of the eye ball ,Cornea , Aqueous humor and vitreous: Intra ocular pressure

UNIT-3

Iris and pupil ,Crystalline lens and accommodation, Mechanism of accommodation – presbyopia ,Retina – structure and functions ,Vision – general aspects of sensation Pigments of the eye and photochemistry, The visual stimulus, refractive errors, Visual acuity, Vernier acuity and principle of measurement ,Visual perception – Binocular vision, stereoscopic vision, optical illusions, Visual pathway, central and cerebral connections, Colour vision and colour defects. Theories and diagnostic tests

UNIT-4

Introduction to electro physiology ,Scotopic and Photopic vision ,Color vision, Color mixing ,Retinal sensitivity and Visibility ,Receptive stimulation and flicker, Ocular, movements and saccades

Visual perception and adaptation, Introduction to visual psychology (Psychophysics)

BVOPT-202 -Physical optics

UNIT 1

Nature of light - light as electromagnetic oscillation –wave equation; ideas of sinusoidal oscillations – simple harmonic oscillation; transverse nature of oscillation; concepts of frequency, wavelength, amplitude and phase. Sources of light; Electromagnetic Spectrum. Polarized light, linearly polarized light; and circularly polarized light

UNIT 2

Intensity of polarized light Malus' Law, polarizers and analyzers; Methods of producing polarized light, Brewster's angle. Birefringence; ordinary and extraordinary rays Relationship between amplitude and intensity

UNIT 3

Coherence- Interference; constructive interference, destructive interference; fringes, fringe width, Double slits, multiple slits, gratings. Diffraction; diffraction by a circular aperture; Airy's disc

UNIT 4

Resolution of an instrument, Telescope, for example), Raleigh's criterion, Scattering; Raleigh's scattering, Tyndall effect, Fluorescence and Phosphorescence Basics of Lasers, Coherence; population inversion; spontaneous emission; Einstein's theory of lasers. Radiometry, solid angle; radiometric units; photopic and scotopic luminous efficiency and efficacy curves; photometric units Inverse square law of photometry; Lambert's law. Other units of light measurement; retinal illumination, Trolands

BVOPT-203-Geometrical optics II

UNIT 1

Vergence and vergence techniques revised, schematic and reduced eyes, visual acuity, Emmetropia and ametropia

UNIT 2

Blur retinal Imaginary, Correction of spherical ametropia, vertex distance and effective power, dioptric power of the spectacle, to calculate the dioptric power, angular magnification of spectacles in aphakic, Thin lens model of the eye –angular magnification –spectacle and relative, spectacle magnification.

UNIT 3

Aperture stops- entrance and exit pupils, Astigmatism. - To calculate the position of the line image in a sphero-cylindrical lens

UNIT 4

Accommodation, Accommodation formulae and calculations, Presbyopia- Spectacle magnification, angular magnification of spectacle lens, near point, calculation of add, depth of field.

Spatial distribution of optical information- modulation transfer functions- Spatial filtering- applications. Visual optics of aphakia and pseudophakia

BVOPT-204-Optometric Optics -I

UNIT -1

Introduction –Light, Mirror, Reflection, Refraction and Absorption Prisms –Definition, properties, Refraction through prisms, Thickness difference, Base-apex notation, uses, nomenclature and units, Sign Conventions, Fresnel’s prisms, rotary prisms

UNIT- 2

Lenses –Definition, units, terminology used to describe, form of lenses Vertex distance and vertex power, Effectivity calculations

UNIT -3

Lens shape, size and types i.e. Spherical, cylindrical and Sphero-cylindrical Transpositions –Simple, Toric and Spherical equivalent

UNIT- 4

Prismatic effect, centration, decentration and Prentice rule, Prismatic effect of Plano-cylinder and Spherocylinder lenses Spherometer & Sag formula, Edge thickness calculations Magnification in high plus lenses, Minification in high minus lenses Tilt induced power in spectacles, Aberration in Ophthalmic Lens

BVOPT-205- ORIENTATION IN PARACLINIC SCIENCE.

UNIT-1

PARASITOLOGY

Entamoeba Histolytica, Leishmania, Material Parasites of man ,Helminthology Taenia Saginata, Taenia Soleum, Echinococcus granulosus, Ascaris Lumbricoides, Ancylostoma duodenale ,Strongylids stercoralis

UNIT-2

MICROBIOLOGY

Morphology & Physiology of Bacteria , Staphylococcus , Streptococcus Mycobacterium tuberculosis ,Spirochetes, Corynebacterium Diphtheria.

UNIT-3

VIRUS 1

General Properties of Virus, Herpes virus ,Poliovirus ,Hepatitis virus ,Oncogenic virus , HIV

UNIT-4

PATHOLOGY Inflammation, Neoplasia ,Osteomyelitis , Fractures , Osteoporosis , Rickets.

BVOPT-206-BASIC OF HEALTH MARKET AND ECONOMY

Unit I

Health Care Market An Introduction : Main Problems in the Market for Health Care, Health Care and Economic Basics, Analyzing Health Care Markets. Demand-Side Considerations: Demand for Health and Health Care, Market for Health Insurance

Unit II

Supply-Side Considerations: Managed Care, Health Care Professionals, Hospital Services, Confounding Factors Public Policy in Medical Care: Policies to Enhance Access, Policies to Contain Costs, Medical Care Systems Worldwide,

UNIT-III

Health Sector in India: An Overview Health Outcomes; Health Systems; Health Financing Evaluation of Health Programs Costing, Cost Effectiveness and Cost-Benefit Analysis; Burden of Diseases ,Role of WHO , Health Care Budget: purpose, types & practices in Indian context.

UNIT-IV

Health Economics: Fundamentals of Economics: Scope & coverage of Health Economics, demand for Health Sciences, Health as an investment, population, Health & Economic Development.

Tools of Economics-Concepts of need, demand, supply & price in Health Services.

Methods & Techniques of Economic Evaluation of Health Programmes, Cost benefit & cost effective methods-output & input analysis. Market, monopoly, perfect & imperfect competition. Health Financing from various sources – Public, Private, TPA.

Economics of Health Programmes for Nutrition, diet & population control, economics of abuse of tobacco & alcohol, environmental influences on health and feeding. Economics of Communicable (STDs & Malaria) & non-communicable (IHD & Cancers) diseases.

PRACTICALS

BVOPTP 201 PRACTICAL Ocular Anatomy and physiology

1. Practical dissection of bull's eye
2. Orbit: Practical demonstration of orbital structure

DEMONSTRATION OF:

- Eye Lid,
- Conjunctiva,
- Cornea,

- Sclera Anterior chamber
- Uvea,
- Crystalline Lens ,
- Vitreous,
- Choroid,
- Retina
- Lid movements
- Tests for lacrimation tests
- Extra ocular movements
- Break up time
- Pupillary reflexes
- Applanation tonometry
- Schiottz tonometry.
- Measurement of accommodation and convergence
- Visual acuity measurement.
- Direct ophthalmoscopy
- Indirect ophthalmoscopy
- Retinoscopy
- Light and dark adaptation.
- Binocular vision(Stereopsis)

BVOPTP-202-PRACTICAL PHYSICAL OPTICS

- Methods of producing polarized
- amplitude and intensity
- Double slits, multiple slits, gratings. Diffraction; diffraction by a circular aperture; Airy's disc
- Telescope, for example
- Fluorescence and Phosphorescence
- Basics of Lasers,
- Radiometry; solid angle; radiometric units; photopic and scotopic luminous efficiency and

BVOPTP-203 -GEOMETRICAL OPTICS II PRACTICAL

1. Construction of a tabletop telescope – all three types of telescopes.
2. Construction of a tabletop microscope
3. Imaging by a cylindrical lens – relationship between cylinder axis and image orientation
4. Imaging by two cylinders in contact – determination of the position of CLC; verification of CLC using a spherical lens with power equal to the spherical equivalent; orientations and position of the line images and their relation to the cylinders' powers and orientations
5. Imaging by a spherocylindrical lens – sphere and cylinder in contact – determination of the position of CLC; verification of CLC using a spherical lens with power equal to the spherical equivalent; orientations and position of the line images and their relation to the cylinder's power and orientation

BVOPTP- 204-PRACTICAL OPTOMETRIC OPTICS-1

1. Measurement of lens power , lens centration using conventional techniques
2. Transposition of various types of lenses
3. Knowledge to identify different forms of lenses
 - a. (equi- convex, planoconvex, periscopic, etc.)
4. Knowledge to select the tool power for grinding process.
5. Measurement of surface powers using lens measure.
6. Method of laying off the lens for glazing process.

BVOPTP-205 Orientation in para clinic science

- Know the diagnostic techniques used in pathology
- Know the various categories of the causes of diseases
- Know the course, outcome, consequences of diseases
- Compound Microscope
- Dark ground Microscopy
- Measurement of Microorganisms
- Hanging drop Preparation
- Isolation of Pure Cultures
- Bacterial Staining
- Simple Staining
- Gram's Staining
- Acid Fast Staining
- Albert's Staining
- Capsule Staining