

Bachelor of Optometry

Syllabus - First Semester

PHYSICAL OPTICS

Course Code: OPT2104

Credit Units: 03

Course Objectives: The objective of this course is to equip the students with a thorough knowledge of properties of light. At the end of this course, students will be able to predict the distribution of light under various conditions.

Course Contents:

Module-I: Nature of light

Light as electromagnetic oscillation – wave equation, Sources of light; Electromagnetic Spectrum, Polarized light; Intensity of polarized light; Malus' Law; polarizers and analyzers.

Module-II: Birefringence; ordinary and extraordinary rays.

Relationship between amplitude and intensity, Coherence; interference; constructive interference, destructive interference; fringes; fringe width, Double slits, multiple slits, gratings, Diffraction; diffraction by a circular aperture;

Module-III: Resolution of an instrument

Raleigh's criterion, Scattering; Raleigh's scattering; Tyndall effect, Fluorescence and Phosphorescence

Module-IV: Basics of Lasers

Coherence; population inversion; spontaneous emission; Einstein's theory of lasers.

Module-V: Radiometry

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

Practicals:

Determination of wavelengths of light from Mercury vapour lamp, Measurement of the resolving power of telescopes;; Demonstration of fluorescence and phosphorescence using crystals and paints.

Examination Scheme:

Components	CT	HA	P	A	EE
Weightage (%)	10	5	10	5	70

(CT-Class Test; HA - Home Assignment-,P-Practical; A- Attendance; EE-End Semester Examination)

Text & References:

- Text Book:Subrahmanyam N, Brij Lal, A text book of Optics, S. Chand Co Ltd, New Delhi, India, 2003.

Reference Books:

- Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.
- Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA, 2002.

GEOMETRICAL OPTICS-I

Course Code: OPT2105

Credit Units: 03

Course Objectives: The objective of this course is to equip the students with a thorough knowledge of mirrors and lenses. At the end of this course, students will be able to predict the basic properties of the images formed on the retina by the optics of the eye.

Course Contents:**Module-I: Nature of light**

Light as electromagnetic oscillation; ideas of sinusoidal oscillations; amplitude and phase; speed of light in vacuum and other media; refractive index; Wavefronts – spherical, elliptical and plane; Curvature and vergence; rays; convergence and divergence in terms of rays and vergence; vergence at a distance; Refractive index; its dependence on wavelength

Module-II: Mirrors

Fermat's and Huygen's Principle – Derivation of laws of reflection and refraction (Snell's law) from these principles; Plane mirrors – height of the mirror; rotation of the mirror; Reflection by a spherical

mirror – paraxial approximation; sign convention; derivation of vergence equation; Imaging by concave mirror & convex mirror; Reflectivity; transmittivity; Snell’s Law; refraction at a plane surface; Glass slab; displacement without deviation; displacement without dispersion.

Module-III: Refraction

Thick prisms; angle of prism; deviation produced by a prism; refractive index of the prism; angular dispersion; dispersive power; Abbe’s number, definition of crown and flint glasses; materials of high refractive index; Thin prism – definition; definition of Prism diopter; deviation produced by a thin prism; it dependence on refractive index; Refraction by a spherical surface; sign convention; introduction to spherical aberration using image formed by a spherical surface of a distance object; sag formula; Paraxial approximation; derivation of vergence equation; Imaging by a positive powered surface; Imaging by a negative powered surface.

Module-IV: Effectivity

Vergence at a distance formula; effectivity of a refracting surface; Definition of a lens as a combination of two surfaces; different types of lens shapes; Image formation by a lens by application of vergence at a distance formula; definitions of front and back vertex powers; equivalent power; first and second principal planes/points; primary and secondary focal planes/points; primary and secondary focal lengths; Newton’s formula; linear magnification; angular magnification; Nodal Planes.

Module-V: Lenses

Thin lens as a special case of thick lens; review of sign convention; Imaging by a thin convex lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions; Imaging by a thin concave lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions; Prentice’s Rule; System of two thin lenses; review of front and back vertex powers and equivalent power, review of six cardinal points; System of more than two thin lenses; calculation of equivalent power using magnification formula

Practical:

Thick Prism – determination of prism angle and dispersive power; calculation of the refractive index; Thin Prism – measurement of deviation; calculation of the prism diopter; Image formation by spherical mirrors; Convex lens - power determination using lens gauge, power determination using distant object method; power determination using the vergence formula; Concave lens – in combination with a convex lens – power determination; Construction of a tabletop telescope – all three types of telescopes; Construction of a tabletop microscope.

Examination Scheme:

Components	CT	HA	P	A	EE
Weightage (%)	10	5	10	5	70

(CT-Class Test ; HA - Home Assignment-,P-Practical; A- Attendance; EE-End Semester Examination)
Text & References:

Text book:

- Milton Katz, Introduction to Geometrical Optics : World Scientific Publishing Co. Pre. Ltd.
- Subrahmanyam, Brijlal and Avadhanulu ,A Textbook of Optics Pub: S. Chand
- Tunnacliffe A. H, Hirst J. G, Optics, The association of British Dispensing Opticians, London, U.K., 1990.
- Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.

Reference Books:

- Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA, 1991.
- Schwartz S. H. Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, New York, USA, 2002.

OPTOMETRIC PROCEDURES-I

Course Code: OPT2106

Credit Units: 01

Course Objectives: At the end of the course the students will be equipped with the introduction to certain concepts that would lay the foundation of the program

Course Content:

Module-I: Introduction to Optometry

Introduction to structure of eye.

Torch examination

Module-II: Scope of optometry

History of Optometry

Visit to Hospital / clinics

Introduction to various eye examination procedures

Module-III:

Visual Acuity

Refractive errors

Spectacle lenses and types

Module-IV:

History Taking;

Basic Eye Examination

Examination Scheme:

Components	A	P	HA	V	EE
Weightage (%)	5	20	25	20	30

(CT-Class Test ; V-Viva; P-Practical; A- Attendance; EE-End Semester Examination, HA= assignments)

Reference Book:

- Primary Care Optometry: Theodore Grosvenor, Theodore P. Grosvenor; Elsevier Health Sciences
- BHVI: Module I.
- Teachers reference notes

BASICS IN COMPUTER & PC PACKAGE

Course Code: OPT2107

Credit Units: 02

Course objective: This course aims at preparing the students to handle personal computers, Learn Basics of the current hardware and software being used .the student should be able to complete his optometry and other professional assignment like project work ,thesis presentation etc. he should be well versed in using e-mail, and internet .

Course Contents:

Module-I: Computer Basics

History of computers, Definition of computers, Input Devices, storage devices, types of memory, and units of measurement, range of computers, generations of computers. Characteristics of computers.

Module-II: System

Hardware, Software,, system definition, fundamentals of networking, internet, performing searches and working with search engines ,types of software and its applications

Module-III: Office Application Suite

Word Processor, spread sheet, presentations, other utility tools Fundamentals of Linux /windows operating system, functions, interfaces, basic commands.

Module-IV: Special Applications

Use of database software for clinic records

Use of specialised software for optometric use

Practical:

Various browsers, Search engines, E-mail

Text document with multiple formatting option using specific office package

Spread sheet using a specified office package

Presentation on a specified topic using a specified office package

Examination Scheme:

Components	A	HA	(CT)	VIVA	PRACTICAL
Weightage (%)	20	20	20	20	20

(CT-Class Test; V-Viva; HA - Home Assignment; P-Practical; A- Attendance; EE-End Semester Examination)

Syllabus - Second Semester

OCULAR ANATOMY

Course Code: OPT2202

Credit Units: 03

Course Objectives:

At the end of the course, the student should be able to:

- Comprehend the normal disposition, inter-relationships, gross, functional and applied anatomy of various structures in the eye and adnexa.
- Identify the microscopic structures of various tissues in the eye and correlate the structure with the functions.
- Comprehend the basic structure and connections between the various parts of the central nervous system and the eye so as to understand the neural connections and distribution.
- To understand the basic principles of ocular embryology.

Course Contents:

Module-I:

Ocular Embryology

Orbit

Orbital Blood supply

Ocular Adnexa and Lacrimal system

Eye Lids

Extraocular Muscles

Module-II:

Conjunctiva

Cornea

Aqueous, anterior chamber, Angle structures

Uvea – Iris, ciliary body & Choroid

Crystalline lens

Module-III:

Vitreous

Retina

Sclera (episclera & sclera)

Optic Nerve

Visual Pathway

Module-IV

Detailed anatomy, cellular structure, vasculature, nerve supply for all the above coats, pupils, nerve supply for Pupillary actions, Pupillary pathway.

Cranial Nerves : Detailed study of each of the following nerves in terms of their nuclei, course, relationship within brain, effects of compression etc at different regions

Optic nerve

Oculomotor nerve

Trochlear nerve
Trigeminal nerve
Abducent nerve
Facial nerve

Practical: Eye dissection of bull's eye

Demonstration / identification of various ocular structures

Practical file of various ocular structures to be prepared by student

Examination Scheme:

Components	A	HA	CT	R	EE
Weightage	5	5	10	10	70

(CT-Class Test; HA - Home Assignment; R- Record File; A- Attendance; EE-End Semester Examination)

Text & References:

Text Book:

- AK Khurana, InduKhurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006
- As recommended by faculty

Reference Books:

- Wolff's Anatomy of the Eye & Orbit: Anthony J. Bron, Ramesh C. Tripathi, Brenda J. Tripathi
- L A Remington: Clinical Anatomy of the Visual System, Second edition, Elsevier Butterworth Heinemann, Missouri, USA, 2005.

OCULAR PHYSIOLOGY

Course Code: OPT2203

Credit Units: 04

Course Objectives: At the end of the course the student will be able to:

- Explain the normal functioning of all the structures of the eye and their interactions.
- Elucidate the physiological aspects of normal growth and development of the eye.
- Understand the phenomenon of vision.
- List the physiological principles underlying pathogenesis and treatment of disease of the eye.

Course Contents:

Module-I:

Protective mechanisms in the eye
Precorneal tear film, eyelids and lacrimation

Module-II:

Extrinsic Ocular muscles, their actions and control of their movements
Saccadic, smooth pursuit and Nystagmic eye movements

Module-III:

Corneal Physiology
Physiology of Aqueous humor and vitreous: Intra ocular pressure
Physiology of Iris and pupil
Physiology of Crystalline lens and accommodation – presbyopia

Module-IV:

Retina – structure and functions, dark and Light Adaptations, Visual cycle
Visual pathway, central and cerebral connections, lesions of pathway and effects

Module-V:

Pigments of the eye and photochemistry, electrophysiology
The visual stimulus, refractive errors
Visual acuity, vernier acuity and principle of measurement
Visual perception – Binocular vision, stereoscopic vision, optical illusions
Contrast visual acuity
Colour vision and colour defects. Theories and diagnostic tests

Module-VI

Eye movements
Tests for lachrymal secretion (Schirmer's)
Pupillary reflexes
Schiotz tonometry
Measurement of accommodation
Visual acuity measurement
Ophthalmoscopy and retinoscopy- Procedure demo
Light and dark adaptation
Binocular vision Grades assessment
Colour vision assessment
Contrast visual acuity
Electrophysiology

Examination Scheme:

Components	A	HA	CT	P+R	EE
Weightage	5	5	10	10	70

(CT-Class Test; HA - Home Assignment; P+R-Practical & Record File; A- Attendance; EE-End Semester Examination)

Text & References:**Text book:**

- AK Khurana, InduKhurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006
- Recommendation As per faculty

Reference Book:

- RD Ravindran: Physiology of the eye, Arvind eye hospitals, Pondicherry, 2001
- PL Kaufman, A Alm: Adler's Physiology of the eye clinical application, 10th edition, Mosby, 2002
- RD Ravindran: Physiology of the eye, Arvind eye hospitals, Pondicherry, 2001
- PL Kaufman, A Alm: Adler's Physiology of the eye clinical application, 11th edition, Mosby, 2002

GEOMETRICAL OPTICS-II

Course Code: OPT2204

Credit Units: 04

Course Objectives: The objective of this course is to equip the students with a thorough knowledge of mirrors and lenses used in spectacle lenses. At the end of this course, students will be able to predict the basic properties of the images formed on the retina by the optics of the eye.

Course Contents:

Module-I: Cylindrical Lenses

Image formation; relation between cylinder axis and line image orientation; Imaging due to two cylinders in contact with axes parallel; Two cylinders in contact with axes perpendicular; line images and their orientations to the cylinders' powers; interval of Sturm; circle of least confusion (CLC); spherical equivalent; position of CLC; Spherical lens and a cylindrical lens in contact; spherical equivalent; interval of Sturm and CLC; Spherocylindrical lens notations – plus/minus cylinder form, cross cylinder/meridian form; transformations between them; depth of focus; depth of field;

Module-II: Aberrations

Chromatic Aberrations; methods of removing chromatic aberrations; Abbe number; Monochromatic Aberrations – deviation from paraxial approximation; difference between ray aberrations and wavefront aberrations; Third order aberrations – spherical aberrations; coma; astigmatism; distortion and curvature of fields; Ways of minimizing spherical aberrations – pupil size, bending of lens, shape factor; Lens tilt – astigmatism; Higher order aberrations; introduction to Zernike Polynomials

Module-III: Telescopes & Microscopes

Telescopes – Keplerian, Galilean and Newtonian; position of cardinal points, entrance and exit pupils; magnifications; advantages and disadvantages; Microscopes – magnification; tube length.

Module-IV: Gullstrand's Schematic Eye (GSE)

Calculation of the power of the cornea, the lens and the eye; axial length; calculation of the position of the cardinal points; magnification; Purkinje images and their reflectances; Entrance and exit pupils for a 3mm pupil; ocular aberrations – spherical aberrations and coma; chromatic aberrations; Introduction to refractive errors - myopia and hyperopia; corneal curvature; axial length; far point; blur size calculations; corrections; astigmatism; blur size; circle of least confusion; correction; Object closer than at infinity; introduction to accommodation; far point; near point; presbyopia; spectacle and contact Lens corrections - comparison of magnification.

Practical- Demonstration:

Imaging by a cylindrical lens – relationship between cylinder axis and image orientation; 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; 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

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

(CT-Class Test; HA - Home Assignment; P-Practical; A- Attendance; EE-End Semester Examination)

Text & References:**Text book:**

- Tunnacliffe A. H, Hirst J. G, Optics, The association of British Dispensing Opticians, London, U.K., 1990.
- Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.
- Recommendation as per faculty

Reference Books:

- Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA, 1991.
- Schwartz S. H. Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, New York, USA, 2002.

OPTOMETRIC PROCEDURES-II

Course Code: OPT2205

Credit Units: 02

Course Objectives: At the end of the course the students will be equipped with the basics knowledge about certain concepts, which would lay the foundation for their courses in the next semester

Course Content:

Module-I: Objective refraction

Principles of Retinoscopy, instrumentation brief and purpose; Retinoscopy demonstration and practical on model eyes.

Module-II: Examination of the anterior segment

Pupillary reflex test; Anterior segment examination with torch light – Slit lamp examination – demo, Tonometry.

Module-III: Examination of the posterior segment

Fundus demonstration by ophthalmoscopy, direct & indirect

Module-IV: Adjunct tests

Near point of convergence; cover test; Motilities; Visual field testing; Colour vision; IPD; Stereopsis; Contrast visual acuity

Examination Scheme:

Components	A	CT	PL	V	P	EE
Weightage	5	15	20	20	10	30

(CT-Class Test; A- Attendance; PL- Practical Lab Record; V- Viva; P- Performance; EE-End Semester Examination)

Text & References:

Text book:

- Grosvenor, Primary Care Optometry , Butterworth-Heinemann,

Reference Books:

- Benjamin Borish ,Clinical Refraction ,Butterworth Heinemann

CLINICS-I

Course Code: OPT2206

Credit Units: 01

Course Objective: This course aims to give student the basic knowledge of the theory and practical behind the basic clinical procedures. After completion, of course the student should have standard eye examination. Learn to write formal records and understand the preliminary eye testing

Course Content:

The practical will involve rotation in campus clinics, observation in eye hospitals and screening camps.

Unit of Competency:

Methods of ocular Examination-I

The ability to communicate effectively with a diverse group of patients with arrange of optometric conditions and needs.

The ability to use techniques in ocular examination and to understand the implication of findings in terms of subsequent examination techniques

History taking of an Ophthalmic care

Visual acuity testing – Distance, Near

Basic of eye examination

History Taking

Visual Acuity Estimation

Torch light Examination

Pupil Examination

Near point of accommodation

Near point of convergence

Extra ocular Motility and cover/ uncover test

Tear function test

Slit lamp examination – Demo

Retinoscopy procedure on model eyes

IPD

90 % attendance is compulsory in clinics .In case of any miss out the student will have to complete the clinical hours to be allowed for the end term exam

Examination Scheme:

Components	Attd.	Record File	Multiple Choice Questions/ Quiz	Viva	Practical	Total
Weightage	5	15	15	15	50	100

Text & References

Reference book:

- Grosvenor, Primary Care Optometry , Butterworth-Heinemann,
- A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007
- D B. Elliott :Clinical Procedures in Primary Eye Care,3rd edition, Butterworth-Heinemann, 2007

PROJECT

Course code: OPT2232

Credit Units: 03

Course Objectives:

The aim of the project is to provide the students with an opportunity to further their intellectual and personal development in the chosen field by undertaking a significant practical unit of activity.

The basics of Research methodology need to be understood

The project can be defined as a scholarly inquiry into a problem or issues, involving a systematic approach to gathering and analysis of information / data, leading to production of a structured report.

Course Contents:

Module-I:

Introduction to research methods, Variables in research, Reliability and validity in research, Conducting a literature review, Formulation of research problems and writing research questions, Hypothesis, Null and Research Hypothesis, Type I and Type II errors in hypothesis testing

Module-II:

Experimental and non experimental research designs, Sampling methods, Data collection methods- Observation method, Interview method, Questionnaires and schedules Construction

Module-III

Ethical Issues in Research, Principles and Concepts in research ethics – confidentiality and privacy, informed consent

Module-IV:

Writing Research proposals, Development of conceptual framework in research

Module-V:

Basics of statistics in Research

Standard deviation, variance, T test, Regression, correlation

Examination Scheme:

Components	CP	V	A	ME	CT
Weightage	5	10	5	30	50

(CP – Class Performance; V-Viva; A- Attendance; ME- Mid-Term Exam, CT-Class Test)

Text & References:

Text books:

- Research Methodology: A Step By Step Guide For Beginners : Ranjit Kumar
- Research Methodology: Methods and Techniques : By C. R. Kothari

Syllabus - Third Semester

APPLIED OPTICS-I (Optometric Optics)

Course Code: OPT2302

Credit Units: 03

Course Objectives: Skills/knowledge to be acquired at the end of this course:

Measurement of lens power, lens centration using conventional techniques

Transposition of various types of lenses

Knowledge to identify different forms of lenses (equi-convex, planoconvex, periscopic, etc.)

Knowledge to select the tool power for grinding process.

Measurement of surface powers using lens measure.

Method of laying off the lens for glazing process.

Ophthalmic prism knowledge – effects, units, base-apex notation, compounding and resolving prisms.

Knowledge of prism and decentration in ophthalmic lenses

Knowledge of different types of materials used to make lenses and its characteristics

Knowledge lens designs – single vision, bifocals, progressive lens

Knowledge on tinted and protective lenses

Knowledge on special lenses like isekonic, spectacle magnifiers.

Knowledge on spectacle frames – manufacture, materials

Course Contents:

Module-I: Revision of Basics

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

Module-II:

Lenses – Definition, units, terminology used to describe, form of lenses; Vertex distance and vertex power, Effectivity calculations; Lens shape, size and types i.e. spherical, cylindrical and Sphero-cylindrical; Transpositions – Simple, Toric and Spherical equivalent; Prismatic effect, centration, decentration and Prentice rule, Prismatic effect of Plano-cylinder and Sphero-cylinder lenses

Module-III:

Spherometer & Sag formula, Edge thickness calculations; Magnification in high plus lenses, Minification in high minus lenses; Tilt induced power in spectacles; Aberration in Ophthalmic Lenses

Module-IV:

The characteristics of Ophthalmic lens material properties (Refractive index, Specific gravity, UV Cutoff, Impact resistance-Drop ball test, Abbe value, Center thickness) :Power Specification (Measurement of Lens power) including Lensometry:Types of Ophthalmic Lenses

Module-V:

Spectacle Frame Nomenclature, Lens surfacing: Identification of Optical center of the given Lens: Marking Datum line for spherical and cylindrical lenses: Glazing of spectacle lenses (Fitting)

Practicals: Based on theory lectures

Unit of competency: Lens Identification and Centration.

The ability to interpret different types of lenses, Facial and frame measurements.

The ability to measure the lens power by different methods

Elements of competence:

- A) Lens Identification: Biconvex, biconcave, Meniscus, Plano Convex and plano concave.
- B) Geneva lens measure for surface power calculation
- C) Lensometry and Hand neutralization
- D) Identification of optical centre and datum line marks for spherical lens
- E) Prism Power measurement with Lensometer
- F) Lens Material Identification
- G) Identification of different types of bifocal
- H) IPD measurement (Monocular and binocular)

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

CT-Class Test; HA-Home Assignment; P-Practical; A- Attendance; EE-End Semester Examination)

Text & References:

- Text Books: Jalie M: The principles of Ophthalmic Lenses, The Association of Dispensing Opticians, London, 1972

Reference Books:

- David Wilson: Practical Optical Dispensing, OTEN- DE, NSW TAFE Commission, 1999
- C V Brooks, IM Borish: System for Ophthalmic Dispensing, Second edition, Butterworth-Heinemann, USA, 1996

VISUAL OPTICS-I

Course Code: OPT2303

Credit Units: 04

Course Objectives:

To understand the fundamentals of optical components of the eye

Upon completion of the course, the student should be able:

1. To understand the fundamentals of optical components of the eye
2. To gain theoretical knowledge and practical skill on visual acuity measurement, colour vision and history taking

Course Contents:

Module-I: Review of Geometric Optics

Vergence and power, Object space and image space, Sign convention, Cardinal points, Magnification, Aberrations

Module-II: Optics of Ocular Structures

Cornea and aqueous, crystalline lens, Vitreous, Schematic and Reduced Eye

Module-III: Measurement of the optical constants of the eye

Curvature of cornea, Curvature of the lens, Measurement of Axial length, Axes of the eye

Module-IV: Basic Optometric Procedures

History taking in various cases, Visual Acuity, Color Vision, Maddox rod, filters,

Module-V: Refractive anomalies and their causes

Etiology of refractive anomalies, populating distributions of anomalies, Optical component measurements, Growth of the eye in relation to refractive errors

Practicals:

History taking

Visual acuity measurement

Measurement of corneal curvature

Study of Purkinje Images

Effects of lenses

Colour Vision Measurement,

Pinhole

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

CT-Class Test; HA - Home Assignment; A- Attendance; P-Practicals, EE-End Semester Examination

Text & References:

Text Books:

- A H Tunnacliffe: Visual optics, The Association of British Optician, 1987
- AG Bennett & RB Rabbets: Clinical Visual optics, 3rd edition, Butterworth Heinemann, 1998

Reference Books:

- WJ Benjamin: Borish's clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA, 2006
- Primary Care Optometry- Theodore Grosvenor, 4th edition, Butterworth

OCULAR DISEASES-I

Course Code: OPT2305

Credit Units: 04

Course Objective: At the end of the course the students will be knowledgeable in the following aspects of ocular diseases: knowledge on the etiology, epidemiology, symptoms, signs, course sequelae of ocular disease, diagnostic approach, and Management of the ocular diseases.

Course Contents:

Module-I: Orbit

Applied Anatomy; Proptosis (Classification, Causes, Investigations); Enophthalmos; Developmental Anomalies; (craniosynostosis, Craniofacial Dysostosis, Hypertelorism, Median facial cleft syndrome); Orbital Inflammations (Preseptal cellulites, Orbital cellulitis Orbital Periostitis, cavernous sinus Thrombosis); Grave's Ophthalmopathy; Orbital tumors(Dermoids, capillary haemangioma, Optic nerve glioma); Orbital blowout fractures; Orbital surgery (Orbitotomy); Orbital tumors; Orbital trauma; Approach to a patient with proptosis

Module-II: Lids

Applied Anatomy; Congenital anomalies (Ptosis, Coloboma, Epicanthus, Distichiasis, Cryptophthalmos); Oedema of the eyelid (Inflammatory, Solid, Passive edema); Inflammatory disorders (Blepharitis, External Hordeolum, Chalazion,; Internal hordeolum, MolluscumContagiosum); Anomalies in the position of the lashes and Lid Margin (Trichiasis, Ectropion, Entropion, Symblepharon, Blepharophimosis, Lagophthalmos, Blepharospasm, Ptosis); Tumors (Papillomas, Xanthelasma, Haemangioma, Basal carcinoma, Squamous cell carcinoma, sebaceous gland melanoma); Exophthalmometry

Module-III: Conjunctiva & Lacrimal System

Applied Anatomy; Inflammations of conjunctiva (Infective conjunctivitis – bacterial, Chlamydial, viral , Allergic conjunctivitis, Granulomatous conjunctivitis; Degenerative conditions; Pinguecula, Pterygium, Concretions; Symptomatic conditions; Hyperaemia, Chemosis, Ecchymosis, Xerosis, Discoloration; Cysts and Tumors. Applied anatomy & physiology of lacrimal system; Evaluation of the watering eye, causes of watering; Obstruction of Lacrimal drainage; Infection of Lacrimal Passages.

Module-IV: Cornea

Applied Anatomy and Physiology; Congenital Anomalies; (Megalocornea, Microcornea, Cornea plana, Congenital cloudy cornea); Inflammations of the cornea (Topographical classifications: Ulcerative keratitis and Non ulcerative; Etiological classifications: Infective, Allergic, Trophic, Traumatic, Idiopathic); Degenerations (classifications, Arcus senilis, Vogt's white limbal girdle, Hassal-henle bodies, Lipoid Keratopathy, Band shaped keratopathy, Salzmann's nodular degeneration, Droplet keratopathy, Pellucid Marginal degeneration); Dystrophies (Reis Buckler dystrophy, Recurrent corneal erosion syndrome, Granular dystrophy, Lattice dystrophy, cornea guttata, Fuch's epithelial endothelial dystrophy, Congenital hereditary endothelial dystrophy); Keratoconus, Keratoglobus; Corneal oedema, Corneal opacity, Corneal vascularisation
Refractive procedures; Penetrating Keratoplasty; Corneal investigations; keratometry; Aberrometry; Pachymetry; Topography; Aesthesiometer; Tearscope; Specular microscope

Module-V: Lens

Applied Anatomy and Physiology ; Clinical examination; Classification of cataract; Congenital and Developmental cataract; Acquired (Senile, Traumatic, Complicated, Metabolic, Electric, Radiational, Toxic); Morphological: Capsular, Subcapsular, Cortical, Supranuclear, Nuclear, Polar; Management of cataract; Complications of cataract surgery; Displacement of lens: Subluxation, Displacement; Lens coloboma, Lenticonus, Microspherophakia.

Practicals:

Students will visit OPD clinic and record pathologies seen during the posting [under supervision of faculty]; Record file of ocular pathologies to be prepared [Faculty to decide]; At Least two Case presentation of pathologies seen during clinical posting; Assist ophthalmic surgeon while surgical procedures

Examination Scheme:

Components	A	HA	CT	R	EE
Weightage	5	5	10	10	70

CT-Class Test; HA - Home Assignment, R-Case records; A- Attendance; EE-End Semester Examination)

Text & References:**Text books:**

- A K Khurana: Comprehensive Ophthalmology, 4th edition, new age international (p) Ltd. Publishers, New Delhi, 2007

Reference Books:

- Stephen J. Miller : Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990
- Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth - Heinemann, 2007

CLINICAL OPTOMETRIC PROCEDURES

Course Code: OPT2306

Credit Units: 03

Course Objectives: At the end of the course the students will be skilled in knowing the purpose, set-up and devices required for the test, indications and contraindications of the test, step-by-step procedures, documentation of the findings, and interpretation of the findings of the various clinical optometry procedures.

Course Contents: Revision of skills and enhanced knowledge on skills as discussed in previous courses OP 1 and OP 2

Module-I: Case History

Case History Script

Module-II: Entrance Tests

Visual acuity and its estimation

Colour vision

cover test, Extraocular motility

Hirschberg test,

Near point of accommodation, Near point of convergence

Stereopsis

WFDT

Pupils Examination

Visual field test-Confrontation, Amsler' grid

IPD

Module-III: Ocular Health Assessment

External examination of the eye, Lid Eversion

Tear function test-Schirmer's, TBUT, tear meniscus level, NITBUT (keratometer),

Anterior segment examination with torch light – Slit lamp examination – demo

Photostress test

Corneal Sensitivity

Module-IV: Functional Test

Contrast acuity

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

CT-Class Test; HA - Home Assignment, P-Practical; A- Attendance; EE-End Semester Examination)

Text & References:

Text books:

- T Grosvenor: Primary Care Optometry, 5th edition, Butterworth – Heineman, USA, 2007.

Reference Books:

- A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007
- D B. Elliott :Clinical Procedures in Primary Eye Care,3rd edition, Butterworth-Heinemann, 2007

- Jack J. Kanski Clinical Ophthalmology: A Systematic Approach,6th edition, Butterworth-Heinemann, 2007
- J.B Eskridge, J F. Amos, J D. Bartlett: Clinical Procedures in Optometry, Lippincott Williams and Wilkins,1991
- N B. Carlson , DI Kurtz: Clinical Procedures for Ocular Examination,3rd edition, McGraw-Hill Medical, 2003

CLINICS-II

Course Code: OPT2307

Credit Units: 01

Course Objective: This course aims to give student the basic knowledge of the theory and practical behind the basic clinical procedures. After completion, of course the student should have standard eye examination. Learn to write formal records and understand the preliminary eye testing

Unit of Competency:

Methods of ocular Examination Part 2

The ability to communicate effectively with a diverse group of patients with arrange of optometric conditions and needs.

The ability to use techniques in ocular examination and to understand the implication of findings in terms of subsequent examination techniques

Elements of competence:

Module-I: Basic Eye examination and finding the refractive error.

History taking,

Visual acuity estimation

Retinoscopy on model eye.

Retinoscopy on human eye and neutralization.

Module-II: Anterior segment examination

External examination of the eye, Lid Eversion

Schirmer's, TBUT, tear meniscus level, NITBUT (keratometer)

Pupillary reflex test

Slit lamp techniques.

Anterior segment examination with torch light

Slit lamp examination on live eye – demo

Corneal Sensitivity, HVID, Keratometry

Module-III: Visual field examination.

Visual field testing

Confrontation test, Amsler' grid

Module-IV: Miscellaneous test

Photostress test,

Colour vision

Direct Ophthalmoscopy

Examination Scheme:

Components	Attd.	Record File	Written Test	Viva	Practical	Total
Weightage	5	15	30	30	20	100

MEDICAL LAWS AND ETHICS

Course Code: OPT2310

Credit Units: 02

Course Objective: The course not only aims at training students to gain knowledge in the fields related to Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.

Medical ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice". Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum.

Course Contents:

Few of the important and relevant topics that need to focus on are as follows:

1. Medical ethics - Definition - Goal - Scope b
2. Introduction to Code of conduct
3. Basic principles of medical ethics –Confidentiality
4. Malpractice and negligence - Rational and irrational drug therapy
5. Autonomy and informed consent - Right of patients
6. Care of the terminally ill- Euthanasia
7. Organ transplantation
8. Medico legal aspects of medical records –Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.
9. Professional Indemnity insurance policy
10. Development of standardized protocol to avoid near miss or sentinel events
11. Obtaining an informed consent.

Examination Scheme:

Components	A	ASG	CT1	CT2	EE
Weightage	5	15	15	15	50

(CT-Class Test; ASG-Assignment; A- Attendance; EE-End Semester Examination)

Text book/ Reference Book

As recommended by the faculty

TERM PAPER

Course Code: OPT2331

Credit Units: 02

Course Objective:

The objective of this course is to judge the understanding as well as application of the knowledge gained by the students. The aim of the term paper is to provide the students with an opportunity to further enhance their knowledge in a sector of their choice by undertaking a significant practical unit of examining and analyzing various aspects of Clinical Optometry at a level commensurate with the learning outcomes of the various courses taken up them in the ongoing semester.

A term paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. At least one middle level or senior level person of a company from the chosen sector may be interviewed face to face.

Guidelines:

1. The term paper will be related to the contemporary Optometry topic and it will be given by the department.
2. The presentation of the term paper is scheduled to be held before the commencement of Semester examinations.
3. The paper will carry 100 marks that will be marked on the basis of understanding and organization of content based on the literature review. The Bibliography shall form an important part of the paper.

Examination Scheme:

Components	Organization & relevance of content	Literature Review	Bibliography	Total
Weightage	40	40	20	100

PROJECT

Course Code: OPT2332

Credit Units: 02

Course Objectives:

The objective of this module is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings.

Course Contents:

Module-I and II: Research Methodology

1. Introduction to research methods
2. Identifying research problem
3. Ethical issues in research
4. Research design
5. Types of Data
6. Research tools and Data collection methods
7. Sampling methods
8. Developing a research proposal

Module-III and IV: Biostatistics

1. Basics of Biostatistics
 - 1.1 Introduction of Biostatistics
 - 1.2 Measures of Morality
 - 1.3 Sampling
 - 1.4 Statistical significance
 - 1.5 Correlation
 - 1.6 Sample size determination.
 - 1.7 Statistics –Collection of Data - presentation including classification and diagrammatic representation –frequency distribution. Measures of central tendency; measures of dispersion.
 - 1.8 Theoretical distributions.
 - 1.8.1 Binomial
 - 1.8.2 Normal
 - 1.8.3 Sampling –necessity of methods and techniques.
 - 1.8.4 Chi. Square test (2 x 2)
2. Hospital Statistics
3. Use of computerized software for statistics

Examination Scheme:

Components	A	ASG	CT1	CT2	EE
Weightage	5	15	15	15	50

(CT-Class Test; ASG-Assignment; A- Attendance; EE-End Semester Examination)

Text book/ Reference Book

- Mausner & Bahn: Epidemiology-An Introductory text, 2nd Ed., W. B. Saunders Co.
- Richard F. Morton & J. Richard Hebd: A study guide to Epidemiology and Biostatistics, 2nd Ed., University Park Press, Baltimore.
- Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs, 2015

WORKSHOP

Course Code: OPT2333

Credit Units: 01

Course Objective:

A workshop is primarily an activity based academic event that is organized to provide the students a one to one and hands on experience on any aspect of their learning. The communication in a workshop has to be necessarily two ways. The trainer has to make sure that the aspects covered are practically practiced by the participants. The student will choose the option of workshop from amongst their concentration electives. The evaluation will be done by Board of examiners comprising of the faculties.

Major Themes for Workshop:

The workshop may be conducted on any of the major themes
The department may choose any recent and relevant topic of study.

Guidelines for Workshop:

The procedure for earning credits from workshop consists of the following steps:
Relevant study material and references will be provided by the department in advance.
The participants are expected to explore the topic in advance and take active part in the discussions held
Attending and Participating in all activities of the workshop
Group Activities have to be undertaken by students as guided by the department.
Evaluation of workshop activities would be done through test and quiz at the end of the workshop.
Submitting a write up of atleast 500 words about the learning outcome from the workshop.

Methodology:

The methodology followed at the workshop could be based on any one or more of the following methods:
Case Study
Hands on training
Simulation
Group Activity
Role Play
Quiz

Evaluation Scheme:

Attendance	Active Participation	Multiple Choice Questions/ Quiz	Solving the case/ Assignment/ Write up	Total
10	30	30	30	100

Syllabus - Fourth Semester

APPLIED OPTICS-II (Dispensing optics)

Course Code: OPT2401

Credit Units: 04

Course Objectives: Skills/knowledge to be acquired at the end of this course:

Measurement of lens power, lens centration using conventional techniques

Ophthalmic prism knowledge – effects, units, base-apex notation, compounding and resolving prisms.

Method of laying off the lens for glazing process.

Knowledge of prism and decentration in ophthalmic lenses

Knowledge of different types of materials used to make lenses and its characteristics

Knowledge lens designs – Bifocals and Progressive lens

Knowledge on tinted and protective lenses

Knowledge on special lenses like isekonic, spectacle magnifiers.

Knowledge on spectacle frames – manufacture, materials

Course Contents:

Module-I

The characteristics of lens material properties (Refractive index, specific gravity, UV cut off, impact resistance – include drop ball test, abbe value, Center thickness); Measurement of lens power; Quality control. Lens enhancements (Scratch resistant coatings – spin/dip, Anti-reflection coating, UV coating, Hydrophobic coating, anti-static coating)

Module-II

Lens types single vision; Lens types bifocal / multifocal; Lens notation; Lens power and thick lenses; Effectivity and high power lenses; Aberrations and lens design; Lens thickness.

Module-III

Ophthalmic prism; Absorptive lenses and lens coatings; Frames types and materials; Frame standard alignment and repairs done; Prescribing ophthalmic lenses; Facial Measurements; Frame Adjustment; Spectacle Delivery - on eye verification

Module-IV

Progressive lenses history and development; Prescribing PALs; Customized PAL designs; Dispensing PALs; Delivery of PALs; Troubleshooting PALs

Module-V

Pediatric Dispensing; Low Vision Aids; Lens enhancements (Scratch resistant coatings – spin/dip, Anti-reflection coating, UV coating, Hydrophobic coating, anti-static coating)

Practical to be conducted along with theory lectures

Lab visit will be undertaken to demonstrate different lab procedures.

Glazing and edging Hands on; A collection of different lens types and frames types should be done by students; Lens verification; Project report : lens and spectacle frames available in Indian market

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

(CT-Class Test; HA - Home Assignment; P-Practical; A- Attendance; EE-End Semester Examination)

Text & References:**Text Books:**

- Jalie M: The principles of Ophthalmic Lenses, The Association of Dispensing Opticians, London, 1972

Reference Books:

- David Wilson: Practical Optical Dispensing, OTEN- DE, NSW TAFE Commission, 1999
- C V Brooks, IM Borish: System for Ophthalmic Dispensing, Second edition, Butterworth-Heinemann, USA, 1996

VISUAL OPTICS-II

Course Code: OPT2402

Credit Units: 03

Course Objectives: To acquire a comprehensive theoretical understanding to the Optometric diagnostic procedures and the refractive conditions of the eye.

Course Outcome: Upon completion of the course, the student should be able:

1. To understand the fundamentals of optical components of the eye
2. To gain theoretical knowledge and practical skill on visual acuity measurement, objective and subjective clinical refraction

Course Contents:

Module-I: Refractive conditions

Myopia
Hyperopia
Astigmatism
Anisometropia and Anisekonion
Presbyopia
Aphakia and Pseudophakia
Correction and Management of Amblyopia

Module-II: Accommodation

Far and near point of accommodation
Range and amplitude of accommodation,
Anomalies of accommodation
Relationship between accommodation and convergence; A/c ratio

Module-III: Objective Refraction

Retinoscopy – principles and methods
Retinoscopy – speed of reflex and optimum condition
Retinoscopy – dynamic/static
Review of objective refractive methods

Module-IV: Subjective Refraction

Subjective refractive methods
Cross cylinder method for astigmatism, Astigmatic Fan test
Duochrome, Transposition of lenses
Spherical equivalent
Prescribing prisms
Binocular balancing & refraction

Module-V: Effective power of spectacles; vertex distance effects

Ocular refraction versus spectacle refraction
Ocular accommodation versus spectacle accommodation
Spectacle magnification and relative spectacle magnification
Retinal image blur; depth of focus and depth of field

Tutorials: Case discussion on difficult situations on Retinoscopy

Practicals

I - History taking

II - Visual acuity measurement

III - Objective Refraction

Students are to neutralize 10cases (2 low myope, 2 low hyperope, 2 high myope, 2 Aphake, 2 astigmats with or without spherical errors). An initial practice session would be given and the students are to exhibit their competency in neutralizing to the nearest power. In case of gross errors the lab would be repeated. The students are to submit the report of their cases duly signed by their supervisor

IV - Subjective refraction

Students should perform fogging technique, Duochrome, cyclodamia, JCC, Binocular balancing and binocular refraction to determine the end point of refraction.

V - Measurement of accommodation

Students need to measure the far point, near point, range and amplitude of accommodation using various methods for 10 cases. Also needs to measure the negative and positive relative accommodation compare the values between the normals.

VI - Measurement of convergence

Students need to measure the near point of convergence, AC/A ratio for 10 patients

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

(CT-Class Test; HA - Home Assignment; A- Attendance; P-Practicals, EE-End Semester Examination)

Text & References:

Text Books:

- Abrams D: Duke elders Practice of Refraction, Edition 9, 1998
- Primary Care Optometry- Theodore Grosvenor,4th edition, Butterworth

Reference Books:

- WJ Benjamin: Borish’s clinical refraction,2nd edition, Butterworth Heinemann, Missouri, USA,2006

OCULAR DISEASES-II

Course Code: OPT2403

Credit Units: 04

Course Objective: At the end of the course the students will be knowledgeable in the following aspects of ocular diseases: knowledge on the etiology, epidemiology, symptoms, signs, course sequelae of ocular disease, diagnostic approach, and Management of the ocular diseases.

Course Contents:

Module-I: Retina and Vitreous:

Applied Anatomy; Congenital and Developmental Disorders (Optic Disc: Coloboma, Drusen, Hypoplasia, Medullated nerve fibers; Persistent Hyaloid Artery) ; Inflammatory disorders (Retinitis: Acute purulent , Bacterial, Virus, mycotic); Retinal Vasculitis (Eales's); Retinal Artery Occlusion (Central retinal Artery occlusion); Retinal Vein occlusion (Ischaemic, Non Ischaemic , Branch retinal vein occlusion); Retinal degenerations : Retinitis Pigmentosa, Lattice degenerations; Macular disorders: Solar retinopathy, central serous retinopathy, cystoid macular oedema, Age related macular degeneration; Retinal Detachment: Rhegmatogenous, Tractional, Exudative); Retinoblastoma; LASERS in Ophthalmology; Fluorescein angiography; OCT

Module-II: Ocular Injuries:

Terminology: Closed globe injury (contusion, lamellar laceration) Open globe injury (rupture, laceration, penetrating injury, perforating injury); Mechanical injuries (Extraocular foreign body, blunt trauma, perforating injury, sympathetic ophthalmitis); Non Mechanical Injuries (Chemical injuries, Thermal, Electrical, Radiational); Clinical approach towards ocular injury patients

Module-III: Uveal Tract & Sclera

Applied Anatomy; Classification of uveitis; Etiology; Pathology ; Anterior Uveitis; Posterior Uveitis; Purulent Uveitis; Endophthalmitis; Panophthalmitis; Pars Planitis; Tumors of uveal tract(Melanoma); Episcleritis and scleritis; Clinical examination of Uveitis and Scleritis

Module-IV: Clinical Neuro-ophthalmology

Anatomy of visual pathway; Lesions of the visual pathway; Pupillary reflexes and abnormalities; Amaurotic light reflex, Efferent pathway defect, Wernicke's hemianopic pupil, Marcus gunn pupil. Argyll Robertson pupil, Adie's tonic pupil); Optic neuritis, Anterior Ischemic optic neuropathy, Pappilloedema, optic atrophy; Cortical blindness; Malingering; Nystagmus; Clinical examination

Module-V: Glaucoma

Applied anatomy and physiology of anterior segment; Clinical Examination; Definitions and classification of glaucoma; Pathogenesis of glaucomatous ocular damage; Congenital glaucomas; Primary open angle glaucoma; Ocular hypertension; Normal Tension Glaucoma; Primary angle closure glaucoma (Primary angle closure suspect, Intermittent glaucoma, acute congestive, chronic angle closure); Secondary Glaucomas; Management : common medications, laser intervention and surgical techniques; Glaucoma investigations and procedures; Confrontation Amsler grid; Tonometry-Appplanation Schiotz; Visual fields-; GTX,HRT; Provocative test; OCT

Practicals:

Students will visit OPD clinic and record pathologies seen during the posting [under supervision of faculty]; Record file of ocular pathologies to be prepared [Faculty to decide]; Atleast two Case presentations of pathologies seen during clinical posting

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

CT-Class Test; HA- Home Assignment; P-Practical; A- Attendance; EE-End Semester Examination)

Text & References:**Text books:**

- A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007

Reference Books:

- Stephen J. Miller : Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990
- Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth-Heinemann, 2007

OPTOMETRIC INSTRUMENTS

Course Code: OPT2405

Credit Units: 02

Course Objectives: Upon completion of the course, the student should be able to gain theoretical knowledge and practical skill in handling the ophthalmic instruments.

Course Contents:

Module-I

Refractive instruments; Test charts standards; Choice of test charts; Phoropter

Module-II

Pachymeter, specular microscope, OCT, FFA; Pupilometer; Ophthalmoscopes and related devices; Design of ophthalmoscopes – Direct and Indirect ophthalmoscope; Lensometer, Lens gauges or clock

Module-III

Slit Lamp; Tonometers; Keratometer and corneal topography, Aberrometry

Module-IV

Orthoptic Instruments (Synaptophore); Ultrasonography (A-Scan , B-Scan)

Practical: Demonstration of the instruments parts and procedure

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

(CT-Class Test; HA- Home Assignment; P-Practical; A- Attendance; EE-End Semester Examination)

Text & References:

Text books:

- David Henson: Optometric Instrumentations, Butterworth- Heinemann, UK, 1991

Reference books:

- P R Yoder: Mounting Optics in Optical Instruments, SPIE Society of Photo-Optical Instrumentation, 2002
- G Smith, D A. Atchison: The Eye and Visual Optical Instruments, Cambridge University Press, 1997

CLINICS-III

Course Code: OPT2406

Credit Units: 03

Course Contents:

Module-I:

Unit of competency: Refraction

An understanding of methods of assessing vision, Refraction in all Patients

The ability to relate facial anatomy to the fitting of optical appliances.

Elements of competence:

1. Recording VA
2. Practice of Streak Retinoscopy and dynamic retinoscopy.
3. Subjective refraction –
4. Initial sphere check.: fogging
5. Cylinder axis and power refinement: clockdial, fan, JCC,
6. Second sphere check , Duochrome or bichrome test,
7. Binocular balance :prism balance, TIB,
8. cyclodeimia,
9. Slit refraction.
10. Presbyopic add determination
11. Writing prescription
12. Overview of the use of cycloplegic drugs.

Module-II

Unit of competency: Applied Optics:

The ability to dispensing appropriate appliances

The ability to interpret and dispense a prescription using appropriate lenses and facial frame measurements.

Elements of competence:

1. Frame types and nomenclature of frames. Know about special frame features and handling the frames.
2. Relationship between frame ,lenses and face
3. IPD measurement (with Scale and IPD ruler , Pupilometer)
4. Recommends and dispenses special optical appliances where appropriate(e.g. VDU users, Sports, safety, pediatric frames, recumbent, reversible, flips, trigeminal spectacles etc.)
5. Identification of tints & Coating on lens surface and its application ,associated advantage and disadvantages.
6. Taking and recording children's facial and frame measurement
7. Awareness of the dermatological effects of the materials to be able to advise patient accordingly.
8. Identifies possible errors in prescription and follows the appropriate course of action.
9. Identification of incomplete, inaccurate and ambiguous prescription.
10. when to modify and when to refer a new prescription

Module-III

Unit of competency: Progressive addition lens

Brief overview of PAL'S and clinical decision making.

An understanding of refractive prescribing and management decisions

Elements of competence:

1. Know Basic construction of progressive addition lens.
2. Frame selection for Progressive

3. Familiarity of different types of progressive lens design and clinical relevance .advantages and disadvantages of different types of lens.
4. Choosing the right type of progressive lens
5. Progressive lens fitting measurement
6. Progressive lens verification.
7. Progressive dispensing
8. Trouble shooting of progressive.
- 9.Familiarity of different brands of PAL's.

Module-IV:

Unit of competency: Comprehensive eye care:

The ability to identify and manage ocular abnormalities

The ability to identify sight threatening eye diseases

Recognizes common ocular abnormalities referred when appropriate

Recognizes adverse ocular reactions to medication

Assess symptoms and signs of neurological significance

Elements of competences:

- 1.Understands the risk factors for developing common ocular conditions including: Glaucoma, cataract, diabetic retinopathy and ARMD .
2. Recognizes, using appropriate technique/s, all of the following: Cataract, Glaucoma or glaucoma suspects ,Anterior eye disorders e.g. blepharitis, dry eye, meibomian gland dysfunction, lid lesions AMD and macular abnormalities and Manages appropriately.
3. Manages patients presenting with cataract.
4. Evaluates glaucoma risk factors, to detect glaucoma and refer accordingly.
5. Recognize the patients presenting with macular degeneration .
6. Recognizes, evaluates and manages diabetic eye disease and refers accordingly.
- 7.Evaluates and manages patients presenting with symptoms of retinal detachment.
8. Recognizes ocular manifestations of systemic disease
9. Assesses symptoms and signs of neurological significance
10. Recognizes adverse ocular reactions to medication.

Module-V

Unit of competency: Ocular diseases 1.

The ability to identify and manage ocular abnormalities

The ability to identify sight threatening eye diseases

Recognizes common ocular abnormalities referred when appropriate

Recognizes adverse ocular reactions to medication

Elements of competences:

1. Interprets and investigates the presenting symptoms and sign of the patient.
2. Identifies external pathology and offers appropriate advice to patients not requiring referral.
 - External eye and ocular surfaces : Lids, lashes, lumps/bumps and red eye
 - Gives the correct advice /treatment and review period
 - Aware of pharmaceutical agents available (legal status, indications, contraindications and side effects and uses appropriate sources of medicines information)
 - Explains clearly to the patient and checks their understanding
3. Recognizes common ocular abnormalities
4. Understanding of symptoms associated with internal eye disease.
5. Manage patient presenting with Red eyes.

Examination Scheme:

Components	Attd.	Record File	Multiple Choice Questions/ Quiz	Viva	Practical	Total
Weightage	5	15	15	15	50	100

Text book/ Reference Book

- Grosvenor, Primary Care Optometry, Butterworth-Heinemann,
- A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007
- D B. Elliott :Clinical Procedures in Primary Eye Care,3rd edition, Butterworth-Heinemann, 2007
- BHVI modules

OPHTHALMIC IMAGING

Course Code: OPT2407

Credit Units: 03

Course Objectives:

Identify corneal interface disease with imaging technology

Examine diagnostic capabilities of imaging for glaucoma

Analyze imaging data for change to determine when to escalate treatment for glaucoma in response to progression by imaging

Examine current imaging printouts to see how they can help diagnose retinal diseases at an earlier stage

Analyze the different OCT imaging platforms based upon their differences in hardware and software design for optimal ophthalmic care

Course Contents:

Module-I: Anterior segment imaging:

Orbscan: Basic science and clinical application.

Anterior Segment OCT: Principle and Interpretation.

Corneal Topography

Ophthalmic Photography: External eye photography, Slit lamp photography,

Module-II: Glaucoma Imaging:

Imaging of the optic nerve head: Basic science behind optic nerve head damage. Principle & role of different imaging system behind optic nerve head evaluation. (GDx, HRT)

Module-III: Retinal Imaging:

B- Scan

Fundus photography,

Basic science and role of OCT (Stratus and Spectral domain OCT) in retinal diagnosis.

Auto fluorescence and fundus fluorescence Angiogram: Optical Principle and basic science, Procedure, Role of angiogram in retinal diagnosis and clinical decision making..

Practical:

Demonstration , Observation and hands on of all the clinical ophthalmic imaging system

Evaluation Scheme:

Attendance	Record file	Multiple Choice Questions/ Quiz	Viva	Practical skills /performance	Total
5	15	15	15	50	100

Text & Reference

Text book:

- HV Nema,NitinNema, Diagnostic procedure in Ophthalmology, Jaypee, second edition 2009.
- David B. Henson, Optometric Instrumentation, Butterworths

Reference Books:

- Roger Steinert and David Huang, Anterior Segment Optical Coherence Tomography,Slack Incorporated.2008
- Carmen A puliafito, Michael R. hee Optical Coherence Tomography of Ocular disease,
- David B. Henson, Optometric Instrumentation, Butterworths.
- Bruce Muchnic, Clinical Medicine in Optometric practice, Mosby Elsevier 2008.
- MAcRae.S, Krueger,R.,Applegate,R.A.(2004) Wavefront Customized Visual Correction-the quest for super vision-II. London: Slack Inc.
- As per faculty recommendation

OPHTHALMIC ELECTRODIAGNOSTIC PROCEDURES

Course Code: OPT2408

Credit Units: 03

Course Objective: The objective of the course is to familiarize the student with the Electrophysiology Laboratory which performs several clinical tests, including the electroretinogram (ERG), electro-oculogram (EOG), visual evoked response (VER), color vision testing (CVT) and dark adaptometry (DA)

Course Contents:

Module-I: Electrophysiological investigations

Electro-oculogram (EOG) Measurement of retinal function with standardised eye movements.

Electroretinogram (ERG)

Macular or Focal Electroretinogram

Pattern Electroretinogram (PERG)

Flash Visually Evoked Cortical Potential (Flash VEP)

Pattern Appearance Visually Evoked Cortical Potential

Other non-standard procedures for recording VEP and ERG e. g., measurement of interocular beat frequencies, flicker and sweep VEPs, multi-focal ERG, fast oscillation.

Electromyogram (EMG)

Electro-nystagmography. For measurement of nystagmus and eye movements.

Module-II: Indications for Patient Referral

Tests Available

Patterns of Referral

Indications for Specific Tests

Standardised Electroretinogram, Electro-Oculogram and Visually, Evoked Potential

Evaluation Scheme:

Attendance	Record file	Multiple Choice Questions/ Quiz	Viva	Practical skills /performance	Total
5	15	15	15	50	100

Textbook:

- Ophthalmic Electrodiagnosis (Major Problems in Ophthalmology) N.R. Galloway

PERIMETRY

Course Code: OPT2409

Credit Units: 03

Course Objective: The aim of this course is to acquire skills in the visual field examination of the eye. This course deals almost exclusively with manual and automated perimetry. Emphasis is on technical aspects of administering the automated test with skill; as well as on skillful interpretation of the result based on an understanding of the text.

Course Contents:

Module-I:

The field of vision
Normal field of vision
Retinal nerve fiber paths and the field of vision
Characteristics of visual field loss in glaucoma

Module-II:

Perimetric Parameters
Manual vs. Automated Perimetry
Advantages of Automated Perimetry
Static vs. Dynamic Perimetry
Target size and luminance
Testing Algorithms

Module-III:

Monitoring Fixation
Monocular vs. Binocular testing
Alternative perimetric targets
Interpretation of SAP
Patient and Test details
Displays of sensitivities across the visual field

Module-IV:

Summary measures of visual field performance
Establishing reliability of results
Identifying Glaucomatous VF Loss on SAP
Common perimetric errors

Evaluation Scheme:

Attendance	Record file	Multiple Choice Questions/ Quiz	Viva	Practical skills /performance	Total
5	15	15	15	50	100

Reference Book

- Automated static perimetry : Douglas R. Anderson

TERM PAPER

Course Code: OPT2431

Credit Units: 02

Course Objective:

The objective of this course is to judge the understanding as well as application of the knowledge gained by the students. The aim of the term paper is to provide the students with an opportunity to further enhance their knowledge in a sector of their choice by undertaking a significant practical unit of examining and analyzing various aspects of Clinical Optometry at a level commensurate with the learning outcomes of the various courses taken up them in the ongoing semester.

A term paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. At least one middle level or senior level person of a company from the chosen sector may be interviewed face to face.

Guidelines:

1. The term paper will be related to the contemporary Optometry topic and it will be given by the department.
2. The presentation of the term paper is scheduled to be held before the commencement of Semester examinations.
3. The paper will carry 100 marks that will be marked on the basis of understanding and organization of content based on the literature review. The Bibliography shall form an important part of the paper.

Evaluation Scheme:

Organisation and relevance of content	Literature Review	Bibliography	Total
40	40	20	100

PROJECT

Course code: OPT2432

Credit Units: 03

Course Objectives:

The objective of this module is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings.

Course Contents:

Module-I and II: Research Methodology

1. Introduction to research methods
2. Identifying research problem
3. Ethical issues in research
4. Research design
5. Types of Data
6. Research tools and Data collection methods
7. Sampling methods
8. Developing a research proposal

Module-III and IV: Biostatistics

1. Basics of Biostatistics
 - 1.1 Introduction of Biostatistics
 - 1.2 Measures of Morality
 - 1.3 Sampling
 - 1.4 Statistical significance
 - 1.5 Correlation
 - 1.6 Sample size determination.
 - 1.7 Statistics –Collection of Data - presentation including classification and diagrammatic representation –frequency distribution. Measures of central tendency; measures of dispersion.
 - 1.8 Theoretical distributions.
 - 1.8.1 Binomial
 - 1.8.2 Normal
 - 1.8.3 Sampling –necessity of methods and techniques.
 - 1.8.4 Chi. Square test (2 x 2)
2. Hospital Statistics
3. Use of computerized software for statistics

Evaluation Scheme:

Attendance	Assignment	CT1	CT 2	End-Term Evaluation	Total
5	15	15	15	50	100

Text book/ Reference Book

- Mausner & Bahn: Epidemiology-An Introductory text, 2nd Ed., W. B. Saunders Co.
- Richard F. Morton & J. Richard Hebd: A study guide to Epidemiology and Biostatistics, 2nd Ed., University Park Press, Baltimore.
- Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs, 2015

WORKSHOP

Course Code: OPT2433

Credit Units: 01

Course Objective:

A workshop is primarily an activity based academic event that is organized to provide the students a one to one and hands on experience on any aspect of their learning. The communication in a workshop has to be necessarily two ways. The department has to make sure that the aspects covered are practically practiced by the participants. The student will choose the option of workshop from amongst their concentration electives. The evaluation will be done by Board of examiners comprising of the faculties.

Major Themes for Workshop:

The workshop may be conducted on any of the various major themes: These themes are merely indicative and the department may choose any recent and relevant topic of study.

Guidelines for Workshop:

The procedure for earning credits from workshop consists of the following steps:

Relevant study material and references will be provided by the department in advance.

The participants are expected to explore the topic in advance and take active part in the discussions held

Attending and Participating in all activities of the workshop

Group Activities have to be undertaken by students as guided by the department .

Evaluation of workshop activities would be done through test and quiz at the end of the workshop.

Submitting a write up of atleast 500 words about the learning outcome from the workshop.

Methodology:

The methodology followed at the workshop could be based on any one or more of the following methods:

Case Study

Hands on training

Simulation

Group Activity

Role Play

Quiz

Evaluation Scheme:

Attendance	Active Participation	Multiple Choice Questions/ Quiz	Solving the case/ Assignment/ Write up	Total
10	30	30	30	100

Syllabus - Fifth Semester

CONTACT LENS-I

Course Code: OPT2501

Credit Units -03

Course Objectives: Upon completion of the course, the student should be able to:

- Understand the basics of contact lenses
- List the important properties of contact lenses
- Finalise the CL design for various kinds patients
- Recognize various types of fitting
- Explain all the procedures to patient
- Identify and manage the adverse effects of contact lens

Course Contents:

Module-I

Anatomy and physiology of anterior segment, History of contact lenses, Optics of contact lenses, comparison spectacles, Contact lens designs, Corneal oxygenation in contact lens wear

Module-II

Contact lens fabrication, Manufacturing of Rigid and soft Contact Lenses –Various methods
Pre fitting examination-steps, significance, recording of results, Instruments used for examination, Special investigation in pre-fitting examinations., Keratometry and corneal topography, Slit lamp examination, Discussion with patient, choice of lens type

Module-III

Examining the Prospective Contact Lens Patient, Selecting Lens Type, Wear Mode and Replacement Rate, Fitting Spherical GP Contact Lenses, Fitting Spherical Soft Contact Lenses, Correcting Astigmatism with Contact Lenses

Module-IV

Calculation and finalizing of contact lens parameters, Ordering contact lenses – writing a prescription to the laboratory, Checking and verifying contact lenses from laboratory, Modifications possible with rigid lenses

Practical:

History Taking role plays, Pre fitting evaluation, RGP CL insertion & Removal, Fitting assessment
Over refraction, Follow up examination, Patient instructions, Contact Lenses Do's and don'ts, Instructions for care and maintenance

Practical:

History Taking role plays; Pre fitting evaluation; RGP CL insertion & Removal; Fitting assessment; Over refraction; Follow up examination; Patient instructions; Contact Lenses Do's and don'ts ; Instructions for care and maintenance.

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

(CT-Class Test; HA- Home Assignment; P-Practical; A- Attendance; EE-End Semester Examination)

Text & Reference:**Text books:**

- IACLE modules A1 - 6,B2-9,C 1-4
- CLAO Volumes 1, 2, 3
- Text book of Contact Lenses 5th edition by Sinha Rajesh ,jaypee publication 2017
- Contact lens Primer :Jaypee Bros : Monica Chaudhry
- Anthony J. Phillips : Contact Lenses, 5th edition, Butterworth-Heinemann, 2006
- Elisabeth A. W. Millis: Medical Contact Lens Practice, Butterworth-Heinemann, 2004
- E S. Bennett ,V A Henry :Clinical manual of Contact Lenses, 3rd edition, Lippincott Williams and Wilkins, 2008

LOW VISION CARE

Course Code: OPT2502

Credit Units: 03

Course Objectives: At the end of the course, the student will be knowledgeable in the following:

- Definition and epidemiology of Low Vision
- Clinical examination of Low vision subjects
- Optical, Non-Optical, Electronic, and Assistive devices.
- Training for Low Vision subjects with Low vision devices
- Referrals and follow-up

Course Contents:

Module-I

Definitions & classification of Low vision; Epidemiology of low vision [magnitude]

Module-II

Pre-clinical evaluation of low vision patients, functional needs assessment; Types of low vision aids – optical aids, non-optical aids & electronic devices, Assistive technologies devices; Optics of low vision aids

Module-III

Clinical evaluation – assessment of visual acuity, visual field, selection of low vision aids, instruction & training; Paediatric Low Vision care

Module-IV

Low vision aids – dispensing & prescribing aspects; Visual rehabilitation & counselling prognostic & psychological factors; psycho-social impact of low vision; Legal aspects of Low vision in India; Eye Disorders & Low vision; Case Analysis

Practical:

Attending in low vision care clinic and history taking; Determining the type of telescope and its magnification (Direct comparison method & calculated method); Determining the change in field of view with different magnification and different eye to lens distances with telescopes and magnifiers; Inducing visual impairment and prescribing magnification; Determining reading speed with different types of low vision aids with same magnification; Evaluation of low vision patient; Prescribing optical devices [How to use]; Prescribing of non-optical devices [how to use them]; Visit to blind school and rehabilitation centers; Establishing a low vision in clinic; Report on disability networks in India; Visit to clinics and prepare report on low vision patients

VISUAL REHABILITATION:

Module-I: Rehabilitation

History of Rehabilitation Optometry; Definition and Principles of Rehabilitation; Psychology in Optometric Rehabilitation; Pain and Suffering; Adaptation and Compensatory Adjustment; Human Motivation; Psychological Disturbance and Psychotherapy; Symptomatology of Visual Disorders

Module-II: Introduction to Optometry rehabilitation Practice

A Basis for Practice; Roles in Daily Life and Professional Practice

Module-III: Clinical Presentation and Case

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

(CT-Class Test; HA- Home Assignment; P-Practical; A- Attendance; EE-End Semester Examination)

Text & References:**Text books:**

- Christine Dickinson: Low Vision: Principles and Practice Low vision care, 4th edition, Butterworth-Heinemann, 1998
- Low vision : jaypee Bros : Monica Chaudhry
- E Vaithilingam: practice of Low vision – A guide book, Medical Research Foundation, 2000

Reference Books:

- Richard L. Brilliant: Essentials of Low Vision Practice, Butterworth-Heinemann, 1999
- Helen Farral: optometric Management of Visual Handicap, Blackwell Scientific publications, 1991
- A J Jackson, J S Wolffsohn: Low Vision Manual, Butterworth Heinnemann, 2007

BINOCULAR VISION-I

Course Code: OPT2504

Credit Units: 03

Course Objectives: On successful completion of this module, a student will be expected to be able to:-

- Demonstrate an in-depth knowledge of the gross anatomy and physiology relating to the extraocular muscles.
- Provide a detailed explanation of, and differentiate between the aetiology, investigation and management of binocular vision anomalies.
- Adapt skills and interpret clinical results following investigation of binocular vision anomalies appropriately and safely.

Course Contents:

Module-I

Binocular Vision and Space perception; Relative subjective visual direction; Retino motor value; Grades of BSV; SMP and Cyclopean Eye; correspondence, Fusion, Diplopia, Retinal rivalry; Horopter; Physiological Diplopia and Suppression; Stereopsis, Panum's area, BSV

Module-II

Revision: Anatomy of Extra Ocular Muscles; Physiology of Ocular movements; Center of rotation, Axes of Fick; Action of individual muscles

Module-III

Laws of ocular motility; Donders' and Listing's law; Sherrington's law; Hering's law; Uniocular & Binocular movements - fixation, saccadic & pursuits; Version & Vergence; Fixation & field of fixation

Module-IV

Near Vision Complex; Accommodation: Definition and mechanism (process), Methods of measurement, Stimulus and innervation, Types of accommodation, Anomalies of accommodation – aetiology and management; Convergence: Definition and mechanism, Methods of measurement, Types and components of convergence - Tonic, accommodative, fusional, proximal, Anomalies of Convergence – aetiology and management.

Module-V

Sensory adaptations: Confusion, Suppression, Investigations, Management, Blind spot syndrome; Abnormal Retinal Correspondence, Investigation and management; Eccentric Fixation, Investigation and management; Amblyopia: Classification and management

Practicals:

Binocular vision assessment, Stereopsis evaluation, Measurement of NPC and NPA, Measurement of AC/A Ratio, Measurement of convergence, Convergence insufficiency and management of cases, ARC-case discussion, Eccentric fixation –Diagnosis and discussion, Amblyopia management –case presentation

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

(CT-Class Test; HA- Home Assignment; P-Practical; A- Attendance; EE-End Semester Examination)

Texts & References:**Text Books:**

- Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers.
- Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincot Williams & Wilkins publishers

References:

- Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd
- Gunter K. Von Noorden: BURIAN- VON NOORDEN'S Binocular vision and ocular motility theory and management of strabismus, Missouri, Second edition, 1980, C. V. Mosby Company
- Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincot Williams & Wilkins publishers

DISEASE OF EYE AND CLINICAL MEDICINE

Course Code: OPT2505

Credit Units: 02

Course Objectives: At the end of the course, students should get acquainted with the following:

Common Systemic conditions: Definition, diagnostic approach, complications and management options

Ocular findings of the systemic conditions

First Aid knowledge

Course Contents:

Module-I

Hypertension – Definition, classification, Epidemiology, clinical examination, complications, and management. Hypertensive retinopathy; Diabetes Mellitus – Classification, pathophysiology, clinical presentations, diagnosis, and management, Complications, Diabetic Retinopathy; Thyroid Disease Physiology, testing for thyroid disease, Hyperthyroidism, Hypothyroidism, Thyroiditis, Thyroid tumors, Grave's Ophthalmopathy; Acquired Heart Disease : Ischemic Heart Disease, Congestive heart failure, Disorders of cardiac rhythm, Ophthalmic considerations

Module-II

Cancer; Connective Tissue Disease; Rheumatic arthritis; Systemic lupus erythematosus; Sjogren syndrome Behcet's syndrome; Tuberculosis – Aetiology, pathology, clinical features, pulmonary tuberculosis, diagnosis, complications, treatment tuberculosis and the eye.

Module-III

Herpes virus (HERPES AND EYE); Hepatitis (Hepatitis A, B, C); Acquired Immunodeficiency Syndrome

Module-IV

Anaemia (Diagnosis, clinical evaluation, consequences, Sickle cell disease, treatment, Ophthalmologic considerations); Common Tropical Medical Ailments; Nutritional and Metabolic disorders: Myasthenia Gravis, Marfan's Syndrome

Practical: Visit to Hospital Medicine O.P.D / Ward, Neurology

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

(CT-Class Test; HA- Home Assignment; P-Practical; A- Attendance; EE-End Semester Examination)

Text & References:

- C Haslett, E R Chilvers, N A boon, N R Coledge, J A A Hunter: Davidson's Principles and Practice of Medicine, Ed. John Macleod, 19th Ed., ELBS/Churchill Livingstone. (PPM), 2002
- Basic and clinical Science course: Update on General Medicine, American Academy of Ophthalmology, Section 1, 1999
- As recommended by Faculty

OCCUPATIONAL OPTOMETRY

Course Code: OPT2506

Credit Units: 02

Course Objectives: At the end of the course the students will be knowledgeable in the following aspects:

- in visual requirements of jobs;
- in effects of physical, chemical and other hazards on eye and vision;
- to identify occupational causes of visual and eye problems;
- to be able to prescribe suitable corrective lenses and eye protective wear and
- to set visual requirements, standards for different jobs.

Course Contents:

Module-I

Introduction to Occupational health, hygiene and safety, international bodies like ILO, WHO, National bodies etc; Acts and Rules - Factories Act, WCA, ESI Act.

Module-II

Electromagnetic Radiation and its effects on Eye; Light – Definitions and units, Sources, advantages and disadvantages, standards; Color – Definition, Color theory, Color coding, Color defects, Color Vision tests

Module-III

Occupational hazards and preventive/protective methods; Task Analysis

Module-IV

Industrial Vision Screening – Modified clinical method and Industrial Vision test; Vision Standards – Railways, Roadways, Airlines

Module-V

Visual Display Units; Contact lens and work

Practical: Students will visit to hospital for various departments and their functioning; visit to sports stadium to know and counsel athletes for their vision requirements and help them in getting their best performance; Visit to different industries and study the vision requirements of different professionals; To prepare project report for vision requirement in different professions/departments; Case discussions on computer vision syndrome

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

(CT-Class Test; HA- Home Assignment; P-Practical; A- Attendance; EE-End Semester Examination)

Text & References:**Text Books:**

- R V North: Work and the eye, Second edition, Butterworth Heinemann, 2001
- BHVI student notes

Reference Books:

- G W Good: Occupational Vision Manual available in the following website: www.aoa.org
- N.A. Smith: Lighting for Occupational Optometry, HHSC Handbook Series, Safchem Services, 1999
- G Carson, S Doshi, W Harvey: Eye Essentials: Environmental & Occupational Optometry, Butterworth-Heinemann, 2008
- The Eye and Sports Medicine Manual/International Academy of Sports Vision
- International Academy of Sports Vision-Sports Vision Manual

CLINICS-IV

Course Code: OPT2507

Credit Units: 03

Module-I

Unit Of competency: Contact lens -1.

The ability to select and fit the most appropriate lens for the planned use

The ability to Identify and manage after care

Elements of competence:

1. Recognize Contact lens types and material.
2. Pre fitting evaluation
3. Demonstrates an understanding of the range of rigid lens material and designs available
4. Appropriate choice of rigid lens parameter.
5. Fitting philosophies of rigid lens and fitting assessment.
6. Demonstrates an understanding of the type of astigmatism which require correction.
7. RGP lens adaptation
8. RGP lens wear and care including use of RGP lens care product.
9. Demonstrates an understanding of the range of soft lens materials and design available.
10. appropriate choices of soft lens , Fitting philosophies and fitting assessment.
11. Write appropriate order form for RGP and soft lenses
12. Instruct patient the technique of RGP, soft lens insertion, removal and other relevant handling instructions.

Module-II

Unit Of competency: Assessment of Binocular vision

The ability to assess the patient with anomalies of binocular vision

The ability to asses binocular status using objective and subjective means

Elements of competence:

1. Understand the different objective test available to asses deviation. E.g. cover & motility test
2. Different subjective test available to assess subjective deviation. E.g. fixation disparity
3. Identification of phoria and tropia
4. Measurement of fusional vergence range dist and near
5. Measureent of accommodative facility
6. Measurement of stereopsis
7. AC/A ratio (heterophoria and gradient method)
8. Synoptophore:
Measurement of SMP, FUSION And stereopsis
Angle of anomaly
ARC

Module-III:

Unit of competency: Low vision and rehabilitation:

The ability to assess a patient with low vision

The ability to advice, refer and provide after care to low vision patients

The ability to refer low vision Patients to other agencies where appropriate

Elements of competence:

1. Distance and near vision chart used for low vision
2. Assessment of visual function, including the use of Log MAR and other specialist charts, effects of illumination, contrast and glare.
3. Assessment of visual field of patient with reduced vision.

4. VA criteria for visual impairment, Low vision and visually handicap
5. Indication of binocular low vision aids
6. Knowledge of Optical and non optical devices
7. Identification of patients visual needs
8. Sign and symptoms of ocular and systemic pathologies.
9. Assessment of magnification for distance and near vision
10. Selection of Optical aids for distance and near.
11. Advises on the use of, and dispenses simple low vision aids :
Identifies which patients would benefit from low vision aids and advice ,
Understands the principles of magnification,
Field of view and working distance in relation to different aids Provides advice on the advantages and disadvantages of different types of simple low vision aids ,
Understands the mechanisms of prescribing magnification including acuity reserve ,
Gives correct instruction to a patient in the use of various aids, to include: Which specs to use with aid,
Lighting required, Appropriate working distance
12. Training in use of aids
13. Low vision rehabilitation

Module-IV:

Unit of competency: Community Visit.

The ability to screen refractive error and knowledge of eye health disordered in community

The ability to impart information in a manner which is appropriate to the recipients.

Elements of competence:

1. School screening
2. Industrial Eye screening
3. Community eye services.

Evaluation Scheme:

Attendance	Record file	Written test	Viva	Practical	Total
5	15	30	30	20	100

Text book/ Reference Book

- Grosvenor, Primary Care Optometry , Butterworth-Heinemann,
- A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007
- D B. Elliott :Clinical Procedures in Primary Eye Care,3rd edition, Butterworth-Heinemann, 2007
- BHVI modules

SUMMER INTERSHIP EVALUATION-I

Course Code: OPT2535

Credit Units: 02

Objective:

The basic objective of a Summer Internship is to refine the practical exposure. This summer training will provide an opportunity to the students to apply their theoretical understanding while working on the concerned project in the hospital / corporates. Thus this summer internship programme is an attempt to bridge the gap between theory and practice. This will also enhance the students' intellectual ability and attributes related to data handling, decision making, report writing, oral presentation and imbibing an interdisciplinary approach.

General Guidelines:

Every student of Boptom shall be required to undergo a practical training in a organization approved by the Institute for minimum of four weeks, normally in the Summer Vacation, after the end of the fourth semester examinations. The candidates shall be required to undergo training in the various areas of the organization concerned. The organization may assign a specific tasks to the candidate, which will be completed by him/her during the period of training. The work done by the candidate during the training period shall be submitted in form of a training report.

The last date for the receipt of training report AND CASE SHEETS in the department shall be one month after the date of completion of training, i.e. at the beginning of the fifth semester.

Evaluation Scheme:

Attendance	Overall Performance: grading by centre	Viva	Attendance	LOG book Report	Total
5	30	30	10	30	100

OCULAR PROSTHESIS

Course Code: OPT2508

Credit Units: 03

Course Objective:

This course aims at making the students equipped with the basics of Prosthesis and the various conditions where they are applied.

Course Contents:

- Basics on Prosthesis,
- Types of Prosthesis
- Indications,
- Techniques employed,
- Complications,
- Advancements and Results

Evaluation Scheme:

Attendance	Record file	Multiple Choice Questions/ Quiz	Viva	Practical skills /performance	Total
5	15	15	15	50	100

Reference Book

- J.H. Prince, Ocular Prosthesis, Livingstone, 1946

REFRACTIVE SURGERY

Course Code: OPT2509

Credit Units: 03

Course Objectives:

- Provide patients with unbiased, up-to-date advice concerning refractive surgery techniques
- Recognise the most appropriate tests for investigating suitable candidates pre-operatively and assessing visual performance post-operatively
- Recognise post-operative complications
- Appreciate the most appropriate management strategy for a given refractive surgery patient, communicating effectively with the patient and their surgeon
- Interpret and critically review research pertaining to refractive surgery.

Course Contents:

Module-I: Background – History of Refractive Surgery, Radial Keratotomy, Excimer Laser Photorefractive Keratectomy, Automated Lamellar Keratoplasty, Laser In Situ Keratoplasty , newer advances

Module-II: Refractive surgery Measurement – Peripheral Keratometry, Photokeratoscopy, Videokeratoscopy, Evaluation of Videokeratoscopy, Applications of Videokeratoscopy, Corneal topography reports, Corneal tomography reports.

Module-III: Principles of Microkeratomers- Types of Microkeratomers, Achieving the Optimal Flap, Risks & Complications, Flap Creation Using Femtosecond Laser, Advantages & Disadvantages of Femtosecond Laser Customized Ablation Procedures - Why Use Customized Ablation?, Technology Used for Customised Ablation, Customized Ablation Methods, Guidelines

Module-IV: Complications of Refractive Procedures- Microkeratome related complication, Laser Ablation related complications, Postoperative Complications, Management.

Module-V: Introduction to Phakic IOLs-and Types of Corneal Rings- Preoperative Evaluation & Inclusion Criteria, Surgical Procedures, Overview of Refractive Lens Exchange (RLE), Deciding to perform RLE, Retinal Risks of RLE, Avoiding Retinal Detachment, Informing Patient of Risks, Postoperative Issues, Problems of Phakic IOLs

Evaluation Scheme:

Attendance	Record file	Multiple Choice Questions/ Quiz	Viva	Practical skills /performance	Total
5	15	15	15	50	100

Text & References:

Text books:

- Ioannis G. Pallikaris and Dimitrios S. Siganos (1998), LASIK, SLACK incorporated, NJ
- T Grosvenor: Primary Care Optometry, 4th edition, Butterworth – heinneman, USA, 2002
- Agarwal: Dr. Agarwal's Step by Step Lasik Surgery; Jaypee Brothers, medical Publishers, India (2005)
- Reference Books:
- Hanratty, M. (2005) Lasik: a handbook for optometrists. Oxford: Butterworth-Heinemann

- MacRae, S., Krueger, R., Applegate, R.A. (2004) Wavefront Customized Visual Correction - the quest for super vision-II. London: Slack Inc.
- Naroo, S.(2003) Refractive Surgery: Clinical Decision making in ophthalmic practice. Oxford: Butterworth Heinemann.
- Probst, L.E. (2001) LASIK - a color atlas and surgical synopsis. London: Slack inc.
- Sullivan, L.(2007) Step by step LASIK surgery (2nd Edition). London: Taylor and Francis

TERM PAPER

Course Code: OPT2531

Credit Units: 02

Course Objective:

The objective of this course is to judge the understanding as well as application of the knowledge gained by the students. The aim of the term paper is to provide the students with an opportunity to further enhance their knowledge in a sector of their choice by undertaking a significant practical unit of examining and analyzing various aspects of Clinical Optometry at a level commensurate with the learning outcomes of the various courses taken up them in the ongoing semester.

A term paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. At least one middle level or senior level person of a company from the chosen sector may be interviewed face to face.

Guidelines:

1. The term paper will be related to the contemporary Optometry topic and it will be given by the department.
2. The presentation of the term paper is scheduled to be held before the commencement of Semester examinations.
3. The paper will carry 100 marks that will be marked on the basis of understanding and organization of content based on the literature review. The Bibliography shall form an important part of the paper.

Evaluation Scheme:

Organisation and relevance of content	Literature Review	Bibliography	Total
40	40	20	100

PROJECT

Course code: OPT2532

Credit Units: 03

Objectives:

The aim of the project is to provide the students with an opportunity to further their intellectual and personal development in the chosen field by undertaking a significant practical unit of activity. The project can be defined as a scholarly inquiry into a problem or issues, involving a systematic approach to gathering and analysis of information / data, leading to production of a structured report.

Chapter Scheme and distribution of marks:

Chapter 1: Introduction – 10 marks

Chapter 2: Conceptual Framework/ National/International Scenario – 25 marks

Chapter 3: Presentation, Analysis & Findings -- 25 marks

Chapter 4: Conclusion & Recommendations -- 10 marks

Chapter 5: Bibliography -- 05 marks

Project Report	Power Point Presentation & Viva
75 marks	25 marks

Components of a Project Report

The outcome of Project Work is the Project Report. A project report should have the following components:

- 1) Cover Page: This should contain the title of the project proposal, to whom it is submitted, for which degree, the name of the author, name of the supervisor, year of submission of the project work, name of the University.
- 2) Acknowledgement: Various organizations and individuals who might have provided assistance /co-operation during the process of carrying out the study.
- 3) Table of Content: Page-wise listing of the main contents in the report, i.e., different Chapters and its main Sections along with their page numbers.
- 4) Abstract: The body of the report should have summary of the project.
 - a) Introduction: This will cover the background, rationale/ need / justification, brief review of literature, objectives, methodology (the area of the study, sample, type of study, tools for data collection, inclusion & exclusion criteria and method of analysis), Limitations of the Study, and Planning.
 - b) Conceptual Framework / National and International Scenario: (relating to the topic of the Project).
 - c) Presentation of Data, Analysis and Findings
 - d) Conclusion and Recommendations: In this section, the concluding observations based on the main findings and suggestions are to be provided.
- 5) Bibliography or References: This section will include the list of books and articles which have been used in the project work, and in writing a project report.
- 6) Annexure: Questionnaires (if any), relevant reports, etc.
(The main text of the Project should normally be in the range of 5000 words. However, there may be annexure in addition to the main text)

The Steps of a Project Report

Step I: Selection of the topic for the project by taking following points into consideration:

Suitability of the topic.

Relevance of the topic

Time available at the disposal.

Feasibility of data collection within the given time limit.

Challenges involved in the data collection (time & cost involved in the data collection, possibility of getting responses, etc.)

Step II: Finalisation of the Topic and preparation of Project Proposal in consultation with the Supervisor.

Step III: Collection of information and data relating to the topic and analysis of the same.

Step IV: Writing the report dividing it into suitable chapters, viz.,

Chapter 1: Introduction,

Chapter 2: Methodology,

Chapter 3: Analysis & Findings

Chapter 4: Conclusion and Recommendations.

Step V: The following documents are to be attached with the Final Project Report.

1) Approval letter from the supervisor

2) Student's declaration

3) Certificate from the Competent Authority of the Organisation / Institution, if the student undertakes the Project Work in any Organisation / Institution.

Guidelines for Evaluation:

Each of the students has to undertake a Project individually under the supervision of a teacher and to submit the same following the guidelines stated below.

Language of Project Report and Viva-Voce Examination may be English. The Project Report must be typed and hard bound.

Failure to submit the Project Report or failure to appear at the Viva-voce Examination will be treated as "Absent" in the Examination. He /she has to submit the Project Report and appear at the Viva-Voce Examination in the subsequent years (within the time period as per University Rules).

No marks will be allotted on the Project Report unless a candidate appears at the Viva-Voce Examination. Similarly, no marks will be allotted on Viva-Voce Examination unless a candidate submits his/her Project Report.

Evaluation of the Project Work to be done jointly by one internal expert and one external expert with equal weightage, i.e., average marks of the internal and external experts will be allotted to the candidate.

WORKSHOP

Course Code: OPT2533

Credit Units: 01

Course Objective:

A workshop is primarily an activity based academic event that is organized to provide the students a one to one and hands on experience on any aspect of their learning. The communication in a workshop has to be necessarily two ways. The department has to make sure that the aspects covered are practically practiced by the participants. The student will choose the option of workshop from amongst their concentration electives. The evaluation will be done by Board of examiners comprising of the faculties.

Major Themes for Workshop:

The workshop may be conducted on any of the major themes: These themes are merely indicative and the department may choose any recent and relevant topic of study.

Guidelines for Workshop:

The procedure for earning credits from workshop consists of the following steps:

Relevant study material and references will be provided by the department in advance.

The participants are expected to explore the topic in advance and take active part in the discussions held

Attending and Participating in all activities of the workshop

Group Activities have to be undertaken by students as guided by the department .

Evaluation of workshop activities would be done through test and quiz at the end of the workshop.

Submitting a write up of atleast 500 words about the learning outcome from the workshop.

Methodology:

The methodology followed at the workshop could be based on any one or more of the following methods:

Case Presentation

Hands on training

Simulation

Group Activity

Role Play

Quiz

Evaluation Scheme:

Attendance	Active Participation	Multiple Choice Questions/ Quiz	Solving the case/ Assignment/ Write up	Total
10	30	30	30	100

Syllabus - Sixth Semester

CONTACT LENS-II

Course Code: OPT2601

Credit Units: 04

Course Objectives: Upon completion of the course, the student should be able to:

- Review the basics of contact lenses
- List the important properties of contact lenses
- Finalise the CL design for various kinds patients
- Recognize various types of fitting
- Explain all the procedures to patient
- Identify and manage the adverse effects of contact lens

Course Contents:

Module-I: Prefitting examination

Review of Basics; Patient Selection; Pre screening for contact lens wear; Slit Lamp examination; Assessment of Cornea; Assessment of Tear film

Module-II: Contact lens fitting

Soft contact lens fitting; Soft Toric Contact Lens fitting; Rigid Contact lens fitting; Managing the Presbyope

Module-III: Extended wear contact lens

Cornea and Oxygen; Extended Wear and Silicone Hydrogel Lenses

Module-IV: Contact lens care

Contact lens After Care; Contact lens Care System

Module-V: Speciality contact lens

Therapeutic and Prosthetic contact lenses; Overview of Special considerations for fitting contact lenses; Business Aspects of Contact lens practice; Setting up a Contact lens clinics

Assignment: The student should consult all the manufacturers of RGP lenses and soft lenses and list down various products (Lenses, care products and accessories) available with them. Detailed parameters along with manufacturer recommendation should be noted. Also students will be encouraged to read books and journals and submit a report to the faculty. The topics of the same can be decided by the faculty.

Practical

Pre fitting evaluation; SCL insertion & Removal; Fitting assessment; Over refraction; Follow-up Examination; Toric contact lens fitting and assessment; Cosmetic contact lens fitting and assessment; Do's and don'ts for contact lenses; Care and maintenance; Special instructions for silicone hydrogels; Demonstration for bifocal ,multifocal lenses, scleral lenses, Orthokeratology; Patient communication workshop / role plays; Visit to contact lens manufacturing unit, Case Presentations (components of Practical exam); Video preparations (components of Practical exam)

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

(CT-Class Test; HA- Home Assignment; P-Practical; A- Attendance; EE-End Semester Examination)

Text & References:

- IACLE modules 1 – 10
- Essential Contact Lens practice : Jane Veys, John Meyler , Ian Davies
- CLAO Volumes 1, 2, 3
- Anthony J. Phillips : Contact Lenses, 5th edition, Butterworth-Heinemann, 2006
- Elisabeth A. W. Millis: Medical Contact Lens Practice, Butterworth-Heinemann, 2004
- E S. Bennett ,V A Henry :Clinical manual of Contact Lenses, 3rd edition, Lippincott Williams and Wilkins, 2008
- Contact lens Primer : Monica Chaudhry : Jaypee Brothers

BINOCULAR VISION-II

Course Code: OPT2602

Credit Units: 04

Course Objective: The objective of this course is to inculcate the student with the knowledge of different types of strabismus its etiology signs and symptoms, necessary investigations and also management. The student on completion of the course should be able to independently investigate and diagnose case of strabismus with comments in respect to retinal correspondence and binocular single vision. The student should be able to perform all the investigations to check retinal correspondence, state of Binocular Single Vision, angle of deviation and special investigations for paralytic strabismus.

Course Contents:

Module-I:

Strabismus - Definition, Classification and etiology; Development of squint or ocular deviation; Adaptation to development of ocular deviation; Orthoptic instruments and their uses; Methods of examination

Module-II:

Anomalous Retinal Correspondence (ARC); Suppression; Amblyopia and eccentric fixation; Definition & Classification; Investigations; Management

Module-III:

Latent Strabismus (Heterophoria); Esotropia; Accommodative esotropia; Partially accommodative esotropia; Non accommodative esotropia; Microtropia; Recurrent esotropia; Secondary esotropia; Management of esotropia; esotropia associated with vertical deviation; Exotropia; Classification and etiology; Primary exodeviation; Dissociated exodeviation; Secondary exodeviation; Cyclo - Vertical Deviation; Comitant hyper deviation; Dissociated vertical deviation; Dissociated horizontal deviation; Elevation in adduction; Depression in adduction; Cyclodeviation

Module-IV:

A and V pattern; Paralytic Strabismus; Genetics and occurrence of squint and binocular vision problems; Special Forms of Strabismus; Retraction syndrome (Duane syndrome); Brown syndrome; Adherence syndrome; Strabismus fixus; Strabismus in high myopes; Fibrosis of extra ocular muscles; Graves' Endocrine ophthalmopathy; Acute orbital myositis; Cyclic heterotropia; Acquired motor fusion deficiency; Fracture of orbital floor; Fracture of medial orbital floor; Ocular Myasthenia gravis; Chronic progressive external ophthalmoplegia (Ocular myopathy of Von Graefe)

Module-V:

Nystagmus; Principle of non surgical treatment; Optical treatment; Pharmacological treatment; Orthoptics; Chemodervation of extra ocular muscles – Botulinum Toxin; Principle of surgical treatment; Vision Training Programme (VTP)

Practicals:

History taking –Role play; Cover test; ocular motility demonstration and hands on various orthoptic instruments and procedures; Case discussion different types of strabismus; Visit to clinic and record cases

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

(CT-Class Test; HA- Home Assignment; P-Practical; A- Attendance; EE-End Semester Examination)

Text & References:

- Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers.
- Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd
- Gunter K. Von Noorden: BURIAN- VON NOORDEN'S Binocular vision and ocular motility theory and management of strabismus, Missouri, Second edition, 1980, C. V. Mosby Company
- Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincot Williams & Wilkins publishers

GERIATRIC OPTOMETRY

Course Code: OPT2603

Credit Units: 03

Course Objectives:

- The student on taking this course should
- Be able to identify, investigate the age related changes in the eyes.
- Be able to counsel the elderly
- Be able to dispense spectacles with proper instructions.
- Have adequately gained knowledge on common ocular diseases.

Course Contents:

Module-I

Structural, and morphological changes of eye in elderly; Physiological changes in eye in the course of aging.

Module-II

Introduction to geriatric medicine – epidemiology , need for optometry care, systemic diseases (Hypertension, Atherosclerosis, coronary heart disease, congestive Heart failure, Cerebrovascular disease, Diabetes, COPD)

Module-III

Optometric Examination of the Older Adult; Ocular diseases common in old eye, with special reference to cataract, glaucoma, macular disorders, vascular diseases of the eye

Module-IV

Contact lenses in elderly; Pharmacological aspects of aging; Low vision causes, management and rehabilitation in geriatrics; Spectacle dispensing in elderly – Considerations of spectacle lenses and frames

Practical: Students will observe and record Geriatric cases actual clinical practice will be done during internship.

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

(CT-Class Test; HA- Home Assignment; P-Practical; A- Attendance; EE-End Semester Examination)

Text & References:

Text Books:

- A.J. ROSSENBLUM Jr & M.W.MORGAN: Vision and Aging, Butterworth-Heinemann, Missouri, 2007.

Reference Books:

- OP Sharma: Geriatric Care – A textbook of geriatrics and Gerontology, viva books, New Delhi, 2005
- VS Natarajan: An update on Geriatrics, Sakthi Pathipagam, Chennai, 1998
- DE Rosenblatt, VS Natarajan: Primer on geriatric Care A clinical approach to the older patient, Printers Castle, Cochin, 2002

PEDIATRIC OPTOMETRY

Course Code: OPT2604

Credit Units: 03

Course Objectives: At the end of the course the student is expected to:

- have a knowledge of the principal theories of childhood development, and visual development
- have the ability to take a thorough paediatric history which encompasses the relevant developmental, visual, medical and educational issues
- be familiar with the accommodative-vergence system, the genesis of ametropia, the disorders of refraction, accommodation and vergence, and the assessment and management of these disorders
- be familiar with the aetiology, clinical presentation and treatment of amblyopia, comitant strabismus and commonly presenting incomitant strabismus
- have a knowledge of the epidemiology of eye disease in children, the assessment techniques available for examining visual function of children of all ages and an understanding varied management concepts of paediatric vision disorders
- Have knowledge of the art of dispensing contact lens, low vision aids and referral to the surgeon or other specialists at the appropriate timing.
- have a capacity for highly evolved communication and co-management with other professionals involved in pediatric assessment and care

Course Contents:

Module-I:

The Development of Eye and Vision; History taking Paediatric subjects; Assessment of visual acuity; Normal appearance, pathology and structural anomalies of Orbit, Eye lids, Lacrimal system, Conjunctiva, Cornea, Sclera, Anterior chamber, Uveal tract, Pupil, Lens, vitreous and Fundus

Module-II

Oculomotor system, Refractive Examination; Determining binocular status; Determining sensory motor adaptability

Module-III

Compensatory treatment and remedial therapy for : Myopia, Pseudomyopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia; Remedial and Compensatory treatment of Strabismus and Nystagmus

Module-IV

Paediatric eye disorders: Cataract, Retinopathy of Prematurity, Retinoblastoma, Neuromuscular; conditions (myotonic dystrophy, mitochondrial cytopathy), and Genetics; Anterior segment dysgenesis, Aniridia, Microphthalmos, Coloboma, Albinism

Module-V

Spectacle dispensing for children; Paediatric contact lenses

Practicals: Students will observe and record paediatric cases .clinical practice will be done during internship.

Examination Scheme:

Components	A	HA	CT	P	EE
Weightage	5	5	10	10	70

(CT-Class Test; HA- Home Assignment; P-Practical; A- Attendance; EE-End Semester Examination)

Text books :

- Paediatric Optometry - JEROME ROSNER, Butterworth, London 1982
- Paediatric Optometry – William Harvey/ Bernard Gilmartin, Butterworth –Heinemann, 2004

References:

- Binocular Vision and Ocular Motility - VON NOORDEN G K Burian Von Noorden's, 2nd Ed., C. V Mosby Co. St. Louis, 1980.
- Assessing Children's Vision. By Susan J Leat, Rosalyn H Shute, Carol A Westall.45 Oxford: Butterworth-Heinemann, 1999.
- Clinical pediatric optometry.L J Press, B D Moore, Butterworth- Heinemann, 1993

CLINIC-V

Course Code: OPT2605

Credit Units: 03

Course Contents:

Module-I

Unit of competency: Contact lens II

The ability to select and fit the most appropriate lens for the planned use

The ability to Identify and manage after care

The ability to understand the techniques used in fitting complex contact lenses and advises patients requiring complex visual corrections.

Module-II

Unit of competency: Pediatric and geriatric optometry:

Pediatric:

Assess ocular health and systemic health conditions.

Identify risk factor of systemic diseases based on ocular findings.

Assess VA, ocular motility, pupil, Objective and subjective refraction.

Pediatric prescribing decision and their purpose. E.g. early onset myopia

investigation and management of children presenting with anomalies of binocular vision.

Geriatric:

Evaluate the functional status of the eye, vision system and account special demands and needs.

Assess ocular health and systemic health conditions.

Detect and diagnose ocular abnormalities and disease

Counsel and educate the patients regarding their visual, ocular and related systemic health care status including recommendations for treatment, management and future care.

Module-III:

Unit of competency: Squint Evaluation:

The ability to assess binocular status using objective and subjective tests

The ability to investigate and manage a patient presenting with heterophoria or heterotropia.

The ability to manage a patient presenting with an incomitant deviations

Demonstration of following Orthoptic instruments/methods and their uses –

Orthoptic Investigative & Therapeutic Procedure.

Cover and uncover test: Differentiate from phoria and tropia.

Measurement of angle of deviation: Subjectively (Synoptophore) and objectively (PBCT/ Modified Krimsky)

Module-IV: Vision Therapy:

The ability to understand different eye exercise procedure

Restoration of vision and maintain ocular alignments by means of different eye exercise

Module-V: Comprehensive eye examination

Evaluation Scheme:

Attendance	Record file	Written test	Viva	Practical	Total
5	15	30	30	20	100

Text book/ Reference Book

- Grosvenor, Primary Care Optometry , Butterworth-Heinemann,
- A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007
- D B. Elliott :Clinical Procedures in Primary Eye Care,3rd edition, Butterworth-Heinemann, 2007
- BHVI modules

VISUAL REHABILITATION

Course Code: OPT2606

Credit Units: 03

Course Objective:

Its aim is develop skills for those who want to work in a professional setting assisting adult populations who are blind/visually impaired and integrate compensatory skills and assistive technology that will enable them to live safe, productive, and independent lives.

Competencies acquired

Specific areas of instruction learned by Vision Rehabilitation Therapists will include:

Communication Systems (Braille, handwriting, recording skills, use of electronic reading systems, use of assistive technology and computer access technology, etc.).

Personal Management (grooming, hygiene, clothing organization, medical measurement, socialization skills, etc.)

Home Management (organization and labeling, repair and home maintenance, budgeting and record keeping, etc.)

Activities of Daily Living (cooking, cleaning, shopping, safety, money organization and management, etc.)

Leisure and Recreation (hobbies, woodworking, crafts, sports, etc.)

Psychosocial Aspects of Blindness and Vision Loss

Medical Management (assessment and instruction and training of adaptive medical equipment)

Basic Orientation and Mobility Skills (sighted guide, safety techniques, etc.)

Evaluation Scheme:

Attendance	Record file	Multiple Choice Questions/ Quiz	Viva	Practical skills /performance	Total
5	15	25	15	40	100

Text & References:

As per the clinical supervisor

VISION THERAPY AND LEARNING DISABILITIES

Course Code: OPT2607

Credit Units: 03

Course Objective: Its aim is develop skills for those who want to work as a professional Vision therapist --The course on learning disabilities, vision therapy is specifically directed toward resolving visual problems which interfere with reading, learning and educational instruction.

Competencies acquired

Overview of Normal Child Development
The Relationship between Vision and Learning General Issues
Visual Efficiency Problems
Management of Visual Information Processing Problems
Vision Therapy Procedures for Developmental Visual Information Processing Problems
Interdisciplinary Management of Learning Problems Case Studies
The Role of the Optometrist in the Management of Learning Related Vision Problems
Optometric Assessment Case History
Optometric Assessment Visual Efficiency Problems
Optometric Assessment Visual Information Processing Problems
Various techniques used in management of anomalies

Evaluation Scheme:

Attendance	Record file	Multiple Choice Questions/ Quiz	Viva	Practical skills /performance	Total
5	15	25	15	40	100

Text & References:

- Optometric Management of Learning-related Vision Problems: Mitchell Scheiman, Michael W. Rouse
- Understanding and Managing Vision Deficits: A Guide for Occupational Therapists Mitchell Scheiman

PROJECT

Course code: OPT2632

Credit Units: 03

Objectives:

The aim of the project is to provide the students with an opportunity to further their intellectual and personal development in the chosen field by undertaking a significant practical unit of activity. The project can be defined as a scholarly inquiry into a problem or issues, involving a systematic approach to gathering and analysis of information / data, leading to production of a structured report.

Chapter Scheme and distribution of marks:

Chapter 1: Introduction – 10 marks

Chapter 2: Conceptual Framework/ National/International Scenario – 25 marks

Chapter 3: Presentation, Analysis & Findings -- 25 marks

Chapter 4: Conclusion & Recommendations -- 10 marks

Chapter 5: Bibliography -- 05 marks

Project Report	Power Point Presentation & Viva
75 marks	25 marks

Components of a Project Report

The outcome of Project Work is the Project Report. A project report should have the following components:

- 1) Cover Page: This should contain the title of the project proposal, to whom it is submitted, for which degree, the name of the author, name of the supervisor, year of submission of the project work, name of the University.
- 2) Acknowledgement: Various organizations and individuals who might have provided assistance /co-operation during the process of carrying out the study.
- 3) Table of Content: Page-wise listing of the main contents in the report, i.e., different Chapters and its main Sections along with their page numbers.
- 4) Abstract: The body of the report should have summary of the project.
 - a) Introduction: This will cover the background, rationale/ need / justification, brief review of literature, objectives, methodology (the area of the study, sample, type of study, tools for data collection, inclusion & exclusion criteria and method of analysis), Limitations of the Study, and Planning.
 - b) Conceptual Framework / National and International Scenario: (relating to the topic of the Project).
 - c) Presentation of Data, Analysis and Findings
 - d) Conclusion and Recommendations: In this section, the concluding observations based on the main findings and suggestions are to be provided.
- 5) Bibliography or References: This section will include the list of books and articles which have been used in the project work, and in writing a project report.
- 6) Annexure: Questionnaires (if any), relevant reports, etc.
(The main text of the Project should normally be in the range of 5000 words. However, there may be annexure in addition to the main text)

The Steps of a Project Report

Step I: Selection of the topic for the project by taking following points into consideration:

Suitability of the topic.

Relevance of the topic

Time available at the disposal.

Feasibility of data collection within the given time limit.

Challenges involved in the data collection (time & cost involved in the data collection, possibility of getting responses, etc.)

Step II: Finalisation of the Topic and preparation of Project Proposal in consultation with the Supervisor.

Step III: Collection of information and data relating to the topic and analysis of the same.

Step IV: Writing the report dividing it into suitable chapters, viz.,

Chapter 1: Introduction,

Chapter 2: Methodology,

Chapter 3: Analysis & Findings

Chapter 4: Conclusion and Recommendations.

Step V: The following documents are to be attached with the Final Project Report.

1) Approval letter from the supervisor (Annexure-IA)

2) Student's declaration (Annexure-IB)

3) Certificate from the Competent Authority of the Organisation / Institution, if the student undertakes the Project Work in any Organisation / Institution.

Guidelines for Evaluation:

Each of the students has to undertake a Project individually under the supervision of a teacher and to submit the same following the guidelines stated below.

Language of Project Report and Viva-Voce Examination may be English. The Project Report must be typed and hard bound.

Failure to submit the Project Report or failure to appear at the Viva-voce Examination will be treated as "Absent" in the Examination. He /she has to submit the Project Report and appear at the Viva-Voce Examination in the subsequent years (within the time period as per University Rules).

No marks will be allotted on the Project Report unless a candidate appears at the Viva-Voce Examination. Similarly, no marks will be allotted on Viva-Voce Examination unless a candidate submits his/her Project Report.

Evaluation of the Project Work to be done jointly by one internal expert and one external expert with equal weightage, i.e., average marks of the internal and external experts will be allotted to the candidate.

Syllabus - Seventh Semester

(CLINIC-VI A – INTERNSHIP) RETINA, GLAUCOMA, LOW VISION

Course Code: OPT2701

Credit Units: 03

Course Objectives:

At the end of the course, the student will be knowledgeable in the following:

- Examination diagnose and manage various conditions of retina
- Examine, Diagnose and manage various conditions of glaucoma
- Examine manage patients with low vision
- Prescribe and train patient for use of low vision devices

Course Contents:

Module-I: Retina and Vitreous: student should be learning following

- Assess pupil reactions
- Interpret and investigate the presenting symptoms of the patient.
- Examine fundus using direct and indirect techniques
- Identify external pathology and offer appropriate advice to patients not needing referral,
- Understand of risk factors for common ocular conditions.
- Recognise common ocular abnormalities and to refer when appropriate.
- Develop a management plan for the investigation of the patient
- Manage a patient presenting with reduced vision.
- Manage a patient presenting with macular degeneration
- Recognize, evaluate and manage diabetic eye disease and refer accordingly.
- Evaluate and manage a patient presenting with symptoms suggestive of retinal detachment.
- An understanding of the treatment of a range of common retinal diseases.
- Recognise ocular manifestations of systemic disease.
- Assess symptoms and signs of neurological significance.
- Manage patients presenting with sight- threatening eye disease.
- Recognise adverse ocular reactions to medication.
- Help ophthalmologist in performing Retinal LASERS
- Perform and analyse Fluorescein angiography
- Perform and interpret test results of OCT

Module-II: Glaucoma

- The ability to perform an examination of the eye and related structures use instruments in ocular examination and to understand the implications of the findings in terms of subsequent examination techniques. Use a contact tonometer to measure intraocular pressure and analyse and interpret the results of Tonometry- Applanation Schiottz
- Amsler grid
- Assess visual fields of patients with reduced visual acuity.
- Interpret and investigate the presenting symptoms of the patient.
- Understanding of risk factors for Glaucoma
- Investigate visual fields and to analyse and interpret the results.
- Visual fields- confrontations, automated, tangent screen, bernels perimeter
- Manage a patient presenting with a red eye.

Manage a patient presenting with reduced vision.
 Evaluate glaucoma risk factors, to detect glaucoma and refer accordingly.
 Understanding of the role of optometrists in shared care
 Recognise adverse ocular reactions to medication.
 Management : common medications, laser intervention and surgical techniques
 Glaucoma investigations and procedures
 GTX,HRT,
 Provocative test
 OCT

Module-III: Low Vision

Clinical examination of Low vision subjects
 Optical, Non-Optical, Electronic, and Assistive devices.
 Training for Low Vision subjects with Low vision devices
 Deciding management plan for Referrals and follow-up
 Visual rehabilitation

Examination Scheme

Component	Attendance	Performance	Log book	Practical skills	Viva	Total
Max marks	05	25	20	30	20	100

Text books:

- A K Khurana: Comprehensive Ophthalmology, 4th edition, new age international (p) Ltd. Publishers, New Delhi, 2007
- Christine Dickinson: Low Vision: Principles and Practice Low vision care, 4th edition, Butterworth-Heinemann, 1998

Reference Books:

- Stephen J. Miller : Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990
- Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth - Heinemann, 2007
- Richard L. Brilliant: Essentials of Low Vision Practice, Butterworth-Heinemann, 1999

(CLINIC-VI B) PEDIATRIC & BINOCULAR VISION

Course Code: OPT2702

Credit Units: 03

Course Objective:

To inculcate in a student the

- Ability to take an appropriate binocular vision history
- Ability to assess eye alignment and eye movements.
- Ability to assess sensory fusion and stereopsis.
- Ability to assess oculomotor function.
- Ability to assess accommodation.

Also to make the student able

- To develop an appropriate timetable for eye and vision examinations for pediatric patients
- To select appropriate examination procedures for all pediatric patients
- To examine the eye health and visual status of pediatric patients effectively
- To minimize or avoid the adverse effects of eye and vision problems in children through early identification, education, treatment, and prevention
- To inform and educate patients, parents/caregivers, and other health care providers about the importance and frequency of pediatric eye and vision examinations

Evaluation:

Evaluation will be based on the following competencies:

- Assesses binocular status using objective and subjective means.
- Understands the management of patients with an anomaly of binocular vision.
- Investigates and manages adult patients presenting with heterophoria
- Manages adult patients with heterotropia.
- Manages children at risk of developing an anomaly of binocular vision.
- Manages children presenting with an anomaly of binocular vision.
- Manages patients presenting with an in committant deviation.

Examination Scheme:

Component	Attendance	Performance	Log book	Practical skills	Viva	Total
Max marks	05	25	20	30	20	100

(CLINIC-VI C) CORNEA & CONTACT LENS

Course Code: OPT2703

Credit Units: 03

Course Objectives: At the end of the course the student will be able to:

- Examine the anterior segment of the eye with the help of advanced diagnostic instrument.
- Access the ocular health and clinical decision making of types of contact lens is appropriate
- Instruct a patient in the techniques of soft & RGP lens insertion, removal and other relevant handling instructions and Instruct a patient on the principles of lens wear and care including lens care products.

Course Contents:

Module-I: Examination of anterior segment:

Anatomy & physiology of the anterior segment
Corneal topography: Measurement and significance
Keratometry: interpretation of keratometry result.
Slit lamp bio microscopy procedure
Tear function test
Corneal staining
Corneal sensation test
Specular microscopy: interpretation of test result

Module-II: RGP lens

Pre-fitting evaluation
Nomenclature and lens design
RGP contact lens fitting
Correction of astigmatism with rigid lens
Market availability of different types of RGP contact lens and lens material

Module-III: Soft contact lens

Nomenclature, design, Material properties and manufacturing techniques.
Soft contact lens fitting
Disposable, extended wear and frequent replacement soft contact lens
Correction of astigmatism with soft contact lens
Silicon hydrogel lens
Market availability of different types of soft CL and

Module-IV: Speciality contact lens

Presbyopic lenses
Rose k Lenses
Scleral lenses
Lenses for irregular cornea
Orthokeratology
Myopia control lenses .
Contact lens fitting in high myopia and hyperopia.

Module-V: Care & Maintenance

Preservation and disinfection
Contact lens cleaning and disinfection

Post fitting care of RGP and soft lenses
Write appropriate order form for RGP and soft lenses
CL practice management

Examination Scheme:

Components	Attd.	Case Presentation	Log book	Viva /CT	EE Practical
Weightage (%)	5	10	15	30	40

Text book:

- IACLE modules
- Essential Contact Lens practice : Jane Veys, John Meyler , Ian Davies
- Contact lens Primer : Monica Chaudhry : Jaypee Brothers
- CLAO Volumes 1, 2, 3
- Anthony J. Phillips : Contact Lenses, 5th edition, Butterworth-Heinemann, 2006
- Elisabeth A. W. Millis: Medical Contact Lens Practice, Butterworth-Heinemann, 2004
- E S. Bennett ,V A Henry :Clinical manual of Contact Lenses, 3rd edition, Lippincott Williams and Wilkins, 2008

(CLINIC-VI D) PRIMARY EYE CARE

Course Code: OPT2704

Credit Units: 03

Objectives:

- It is expected that upon completion the student will be able to carry out the standard clinical procedures safely and efficient
- Upon completion of the course the student must be able to achieve these skills

Module-I: Take down a comprehensive history –

Must be able to take a structured, accurate history of symptoms from patients with a range of ophthalmic problems and needs

Must be able to produce comprehensive, legible and organized record keeping

Module-II: Do a complete and proper refraction

Visual acuity estimation

Must be able to measure and assess visual function of patients of any age with appropriate tests and techniques like

Lensometry

Retinoscopy

Refraction procedures

Must be able to use subjective and objective techniques to identify and quantify ametropia

Module-III: Do a torch light examination.

Hirschberg test

Module-IV: Do a binocular vision assessment

Ocular motility, cover test

Must be able to assess eye alignment and eye movements

Near point of accommodation, Near point of convergence

Do a detailed binocular vision assessment if required in particular cases

Module-V: Use a slit lamp to do a complete anterior segment examination and posterior segment as required

Must be able to examine for abnormalities in eye and adnexa especially eyelid, conjunctiva, cornea, anterior chamber, lens and fundus using appropriate instruments and techniques

Must be able to interpret signs and symptoms of ocular abnormality

Must be able to perform applanation tonometry and non contact tonometry

Must be able to take the decision to dilate the eye as per need

Must be able take the decision to use appropriate ocular drugs diagnostically and to aid refraction and fundus examination in consultation with the ophthalmologist.

Module-VI: Must be able to give a preliminary diagnosis

During management the student must be able to advice on the most suitable form of optical correction

Examination Scheme:

Components	A	Case Discussion	Log book	Viva /CT	EE Practical
Weightage (%)	5	10	10	25	50

SUMMER INTERNSHIP EVALUATION-II

Course Code: OPT2735

Credit Units: 06

Course Objectives:

The basic objective of a Summer Internship is to refine the practical exposure. This summer training will provide an opportunity to the students to apply their theoretical understanding while working on the concerned project in the hospital / corporate. Thus this summer internship programme is an attempt to bridge the gap between theory and practice. This will also enhance the students' intellectual ability and attributes related to data handling, decision making, report writing, oral presentation and imbibing an interdisciplinary approach.

General Guidelines:

Every student of Boptom shall be required to undergo a practical training in a organization approved by the Institute for minimum of four weeks, normally in the Summer Vacation, after the end of the fourth semester examinations. The candidates shall be required to undergo training in the various areas of the organization concerned. The organization may assign a specific tasks to the candidate, which will be completed by him/her during the period of training. The work done by the candidate during the training period shall be submitted in form of a training report.

The last date for the receipt of training report AND CASE SHEETS in the department shall be one month after the date of completion of training, i.e. at the beginning of the next semester.

Evaluation Scheme:

Attendance	Overall Performance: grading by centre	Viva	Attendance	LOG book Report	Total
5	30	30	10	30	100

RESEARCH PROJECT (MID TERM EVALUATION)

Objectives: Midterm review of the final year project will be done this semester. The student is required to submit the following during this semester end

Chapter Scheme and distribution of marks:

Chapter 1: Introduction

Chapter 2: Literature review

Chapter 3 : methodology

Chapter 4 : data and its analysis

Pre conclusion and results

Project Report	Viva
75 marks	25 marks

Components of a Project Report

The outcome of Project Work is the Project Report. A project report should have the following components:

- 1) Cover Page: This should contain the title of the project proposal, to whom it is submitted, for which degree, the name of the author, name of the supervisor, year of submission of the project work, name of the University.
- 2) Acknowledgement: Various organizations and individuals who might have provided assistance /co-operation during the process of carrying out the study.
- 3) Table of Content: Page-wise listing of the main contents in the report, i.e., different Chapters and its main Sections along with their page numbers.
- 4) Abstract: The body of the report should have summary of the project.
 - a) Introduction: This will cover the background, rationale/ need / justification, brief review of literature, objectives, methodology (the area of the study, sample, type of study, tools for data collection, inclusion & exclusion criteria and method of analysis), Limitations of the Study, and Planning.
 - b) Conceptual Framework / National and International Scenario: (relating to the topic of the Project).
 - c) Presentation of Data, Analysis and Findings
 - d) Conclusion and Recommendations: In this section, the concluding observations based on the main findings and suggestions are to be provided.
- 5) Bibliography or References: This section will include the list of books and articles which have been used in the project work, and in writing a project report.
- 6) Annexure: Questionnaires (if any), relevant reports, etc.
(The main text of the Project should normally be in the range of 5000 words. However, there may be annexure in addition to the main text)

The Steps of a Project Report

Step I: Selection of the topic for the project by taking following points into consideration:

Suitability of the topic.

Relevance of the topic

Time available at the disposal.

Feasibility of data collection within the given time limit.

Challenges involved in the data collection (time & cost involved in the data collection, possibility of getting responses, etc.)

Step II: Finalisation of the Topic and preparation of Project Proposal in consultation with the Supervisor.

Step III: Collection of information and data relating to the topic and analysis of the same.

Step IV: Writing the report dividing it into suitable chapters, viz.,

Chapter 1: Introduction,

Chapter 2: Methodology,

Chapter 3: Analysis & Findings

Chapter 4: Conclusion and Recommendations.

Step V: The following documents are to be attached with the Final Project Report.

1) Approval letter from the supervisor (Annexure-IA)

2) Student's declaration (Annexure-IB)

3) Certificate from the Competent Authority of the Organisation / Institution, if the student undertakes the Project Work in any Organisation / Institution.

Guidelines for Evaluation:

Each of the students has to undertake a Project individually under the supervision of a teacher and to submit the same following the guidelines stated below.

Language of Project Report and Viva-Voce Examination may be English. The Project Report must be typed and hard bound.

Failure to submit the Project Report or failure to appear at the Viva-voce Examination will be treated as "Absent" in the Examination. He /she has to submit the Project Report and appear at the Viva-Voce Examination in the subsequent years (within the time period as per University Rules).

No marks will be allotted on the Project Report unless a candidate appears at the Viva-Voce Examination. Similarly, no marks will be allotted on Viva-Voce Examination unless a candidate submits his/her Project Report.

Evaluation of the Project Work to be done jointly by one internal expert and one external expert with equal weightage, i.e., average marks of the internal and external experts will be allotted to the candidate.

Syllabus - Eighth Semester

INTERNSHIP-II (CLINIC-VII) COMPREHENSIVE EYE CARE & REFRACTION

Course Code: OPT2801

Credit Units: 05

Objectives: It is expected that upon completion the student will be able to carry out the standard clinical procedures especially refraction efficiently and safely.

Course Contents:

Upon completion of the course the student must be able to

Module-I: Take down a comprehensive history –

Must be able to communicate effectively with the patient, taking into account his/her physical, emotional, intellectual and cultural background – building a rapport

Must be able to take a structured, efficient, accurate history and symptoms from patients with a range of ophthalmic problems and needs

Must be able to produce comprehensive, legible and organised record keeping with appropriate detail and grading

Must be able to interpret and respond appropriately to patient records and other relevant information

Module-II: Do a complete and proper refraction

Visual acuity estimation.

Must be able to measure visual function of patients of any age with appropriate tests and techniques

Must be able to assess visual function in patients with visual impairment

Lensometry

Retinoscopy

Refraction procedures

Must be able to use subjective and objective techniques to identify and quantify ametropia

Module-III: Do a torch light examination.

Hirschberg test

Module-IV: Do a binocular vision assessment

Ocular motility, cover test

Must be able to assess eye alignment and eye movements

Near point of accommodation, Near point of convergence

Module-V: Do a detailed binocular vision assessment if required in particular cases as per the format given in binocular vision syllabus

Module-VI: Do a pupil evaluation with torch light

Module-VII: Use a slit lamp to do a complete anterior segment examination and posterior segment as required

Must be able to examine for abnormalities in eye and adnexa especially eyelid, conjunctiva, cornea, anterior chamber, lens and fundus using appropriate instruments and techniques

Must be able to interpret signs and symptoms of ocular abnormality

Must be able to perform applanation tonometry and non contact tonometry

8. Must be able to take the decision to dilate the eye as per need

Must be able take the decision to use appropriate ocular drugs diagnostically and to aid refraction and fundus examination.

Must be able to give a preliminary diagnosis

During management the student must be able to advice on, order and be able to dispense the most suitable form of optical correction taking into account durability, comfort, cosmetic appearance, age and lifestyle.

Evaluation Scheme:

Attendance	Record file Log book	Case discussion- I	Case discussion- II	EE Practical	Total
10	20	20	20	30	100

The final evaluation is based on the Clinical skill evaluation practical exam the candidate will be asked to examine a patient with all details. This examination will primarily measures skills, it contains an assessment, management and communication skills, as well as some interpretation of clinical findings.

The study centre will form an integral part of the evaluation and will be based on the regular performance and participation in grand rounds .discussions and presentations.

Text book/ Reference Book

- Grosvenor, Primary Care Optometry , Butterworth-Heinemann,
- A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007
- D B. Elliott :Clinical Procedures in Primary Eye Care,3rd edition, Butterworth-Heinemann, 2007
- BHVI modules

(CLINIC-VII) OPTOMETRIC PROCEDURES & INSTRUMENTS

Course Code: OPT2802

Credit Units: 05

Course Objective:

This course deals with complete theory and practical experience in all basic tests, instrumentation and procedures necessary to evaluate the ocular health status of a patient. The topics include complete optometric procedures and instruments taught in the previous semesters like case history, gross external examination of the eye and adnexa, pupil and muscle functions, anterior and posterior segment examination, tonometry, visual acuity, and visual fields assessment and so on .

The objective of this course is to apply all theoretical knowledge into examination and optometric management of the patient with ocular problems.

The student should learn to operate all instruments and be able to carry out all ophthalmic procedures.

Evaluation Scheme:

The final evaluation is based on the Clinical skill evaluation practical exam the candidate will be asked to examine a patient with all details. This examination will primarily measures skills, it contains an assessment, management and communication skills, as well as some interpretation of clinical findings. It will be assessing the competence of individual optometrists in the practice of optometry

Evaluation Scheme:

Attendance	Record file Log book	Practical	Written test	Viva	Total
10	20	30	30	20	100

The study centre will form an integral part of the evaluation and will be based on the regular performance and participation in grand rounds .discussions and presentations.

PROJECT-DISSERTATION

Course Code: OPT2837

Credit Units: 12

The project evaluation will include assessment at the end of third year (synopsis submission). Midterm review (at the end of 7th semester)

Weightage will be as follows

Synopsis submission = 20% (end of sixth semester)

Mid-Term review = 30 % (end of seventh semester)

Final submission and presentation = 50%

Chapter Scheme and distribution of marks: (submission at end semester)

Chapter 1: Introduction – 10 marks

Chapter 2: Conceptual Framework and literature review – 25 marks

Chapter 3: Presentation, Analysis & Findings -- 25 marks

Chapter 4: Conclusion & Recommendations -- 10 marks

Chapter 5: Bibliography -- 05 marks

Project Report	Power Point Presentation & Viva
75 marks	25 marks

Components of a Project Report

The outcome of Project Work is the Project Report. A project report should have the following components:

1) Cover Page: This should contain the title of the project proposal, to whom it is submitted, for which degree, the name of the author, name of the supervisor, year of submission of the project work, name of the University.

2) Acknowledgement: Various organizations and individuals who might have provided assistance /co-operation during the process of carrying out the study.

3) Table of Content: Page-wise listing of the main contents in the report, i.e., different Chapters and its main Sections along with their page numbers.

4) Abstract: The body of the report should have summary of the project.

a) Introduction: This will cover the background, rationale/ need / justification, brief review of literature, objectives, methodology (the area of the study, sample, type of study, tools for data collection, inclusion & exclusion criteria and method of analysis), Limitations of the Study, and Planning.

b) Conceptual Framework / National and International Scenario: (relating to the topic of the Project).

c) Presentation of Data, Analysis and Findings

d) Conclusion and Recommendations: In this section, the concluding observations based on the main findings and suggestions are to be provided.

5) Bibliography or References: This section will include the list of books and articles which have been used in the project work, and in writing a project report.

6) Annexure: Questionnaires (if any), relevant reports, etc.

(The main text of the Project should normally be in the range of 5000 words. However, there may be annexure in addition to the main text)

The Steps of a Project Report

Step I: Selection of the topic for the project by taking following points into consideration:

Suitability of the topic.

Relevance of the topic

Time available at the disposal.

Feasibility of data collection within the given time limit.

Challenges involved in the data collection (time & cost involved in the data collection, possibility of getting responses, etc.)

Step II: Finalisation of the Topic and preparation of Project Proposal in consultation with the Supervisor.

Step III: Collection of information and data relating to the topic and analysis of the same.

Step IV: Writing the report dividing it into suitable chapters, viz.,

Chapter 1: Introduction,

Chapter 2: Methodology,

Chapter 3: Analysis & Findings

Chapter 4: Conclusion and Recommendations.

Step V: The following documents are to be attached with the Final Project Report.

1) Approval letter from the supervisor (Annexure-IA)

2) Student's declaration (Annexure-IB)

3) Certificate from the Competent Authority of the Organisation / Institution, if the student undertakes the Project Work in any Organisation / Institution.

Guidelines for Evaluation:

Each of the students has to undertake a Project individually under the supervision of a teacher and to submit the same following the guidelines stated below.

Language of Project Report and Viva-Voce Examination may be English. The Project Report must be typed and hard bound.

Failure to submit the Project Report or failure to appear at the Viva-voce Examination will be treated as "Absent" in the Examination. He /she has to submit the Project Report and appear at the Viva-Voce Examination in the subsequent years (within the time period as per University Rules).

No marks will be allotted on the Project Report unless a candidate appears at the Viva-Voce Examination. Similarly, no marks will be allotted on Viva-Voce Examination unless a candidate submits his/her Project Report.

Evaluation of the Project Work to be done jointly by one internal expert and one external expert with equal weightage, i.e., average marks of the internal and external experts will be allotted to the candidate.

INTEGRATIVE SEMINAR DURING THE INTERNSHIP

It serves to teach optometry students how the material in the curriculum relates to their role as optometrist. This will be achieved through a synthesis of lecture, clinical observation, case-based learning and small-group discussion. Once a week, the entire class will attend a one-hour lecture with topics reflective of the ongoing course material being presented in other courses. For two additional hours per week, small seminar group observation and discussion will take place. The seminar meetings will reinforce the lecture concepts through clinical observation and case discussions relating to those observations. Lecture and small-group discussions will include the participation of both basic and clinical science faculty in order to promote integration of the curricular material and to show how the care provided is related to what is currently being learned. This will enable the future clinician to make informed clinical decisions, encourage critical thinking and promote lifelong independent learning.

INTEGRATIVE SEMINAR

Is designed to facilitate the student's transition into clinical internship by using an integrative approach. The course builds upon past Integrative Seminars, providing the student with an environment leading to the development of informed clinical decision making, critical thinking and lifelong independent learning. The student gains a foundation for optometric practice by learning to employ scientific knowledge, utilization of informational resources, doctor-patient interactive skills and clinic participation to form the basis of an individualized patient evaluation, assessment and plan. This will be achieved through a synthesis of group teaching, case-based learning, small-group discussion and clinical experience. Group discussions will include the participation of both basic and clinical science faculty to foster integration of curricular material. As a means of entry into clinical practice, the highest standards of professional conduct and responsibility will be emphasized throughout the course.

The interns are required to complete one quarter of senior seminar.

The seminar meets over four hours each week to provide a small group-learning environment focused on clinical case presentations derived from the participants' clinical experience.

This grand-rounds format will provide a basis for integration and critical analysis of current clinical research with the goal of increasing the participants' understanding, use and communication of evidence-based clinical information.