SHRI GURU RAM RAI UNIVERSITY

[Estd. by Govt. of Uttarakhand, vide Shri Guru Ram Rai University Act no. 03 of 2017 & recognized by UGC u/s (2f) of UGC Act 1956]

SYLLABUS FOR

Bachelor of Optometry

With CO, and PO Mapping

School of Paramedical Sciences

(W.E.F 2022-2023)

Bachelor Optometry

OUTCOME BASED EDUCATION

Programme outcome (POs)

Students will be able to

PO 1	Acquire knowledge to perform theability to diagnose and manage various vision Abnormalities including refractiveerrorsaswellas various eye diseases
PO2	Demonstrate the application abilities Developing the ability to practice various sub-specialities of Eye care Industry like contact lens, spectacle dispensing, orthoptics, low vision management
PO3	Design and Development of basic skills on environmental consciousness and society &community eye concerns in achieving the goal of vision for all..
PO4	Develop an understanding to conduct investigation of complex problems.
PO5	Demonstrate an understanding of learning to upgrade one-self with eye care innovations
PO6	Developing and applying various skills in eye care system and taking entrepreneurial decisions.
PO7	Applying systematized problem-solving techniques to identify and correct procedural errors to verify the accuracy of ophthalmic diagnosis obtained
PO8	Demonstrate the application abilities regarding eye tests to determine the ocular problems and explain their clinical significance and pathophysiology
PO9	**i**ndividual and Team Work **:** Extend the concepts of the ability to communicate effectively both with the patients as well as with in the organization for effective team work
PO10	Assist the student to learn to maintain collaborative relationship with the members of other disciplines to improve health care
PO11	Implement and follow standard protocols while doing various Work effectively in teams to develop national programs for the prevention of blindness
PO12	Maintenance : Application of advanced technical skills to make appropriate and effective on-the-job professional decisions. Performance and interpretation of commonly employed procedures in the ophthalmology department.

Bachelor's in Optometry Ist year

Course code	**:**	BSO-101
Course Name	**:**	Human Anatomy& Physiology
Semester /Year	**:**	Ist Year

	L	T	P	C
	2			2

Course Content

Unit -1:	**Introduction:** and termionology of Human Body, body parts and areas. Terms of location and position, body cavities and their membranes, Dorsal cavity, ventral cavity, planes and section.
Unit -2	**Embryology:** and development of human body, body parts and their areas.
Unit-3	**Cells**: Structure function and location, prokaryotic and eukaryotic cells, cell organelles, cell division, tissue, types, structure location and functions of epithelial tissue, connective tissue, muscles tissue and nerve tissue. The Integumentary system: structure and functions of the skin , subcutaneous tissue.
Unit-4	**The Skeletal system**: General Introduction , Classification Joints- Types of joints & Movements. Basic Anatomy of Important Muscles.
Unit-5	**Central Nervous system**: Nervous system Division , Nerve Tissue, Types of Neurons, Nerve and Nerve tracts, The nerve impulse, The spinal cord, The brain Meninges and cerebrospinal fluid and cranial nerves
Unit -6	**Autonomic Nervous system**: The Senses sensory pathway, characteristics of sansations, cutaneous senses, muscle sense, sense of taste, sense of smell, hunger and thirst, The eye and The ear.
Unit -7	**Circulatory System**: heart structure and function, blood vessels and valves, mechanism of circulation, cardiac cycle, heart sounds, heart rate, pulse rate, blood pressure. Blood, its composition and function, function of RBC, WBC & platelets, Lymphatic system: lymph, its composition and function, lymphatictissue
Unit -8	**The Endocrine and excretory system**- Chemistry of harmones, Regulation of Harmones Secretion, The pituitary gland, Thyroid Gland, Parathroid Glands, Pancreas, Adernal Glands and other endocrine glands. Excretory system : General Introduction of broken down components of metabolism- Urine, sweat or feces.
Unit -9	**Digestive system**-General introduction of digestive system includes the mouth, pharynx, esophagus, stomach, small intestine, large intestine, rectum, anus, salivary glands, liver, gallbladder and pancreas.
Unit-10	**Respiratory system**-General introductions of organs, tissues. It includes lungs and blood vessels.
Unit -11	**Vitamins and Protiens**- Types and role of vitamins and proteins in human body.

Course outcomes (COs):

Uponsuccessfulcompletionofthecourseastudentwillbeableto

CO1	To understand the concept & terminology of Human anatomy & Physiology
CO2	To explain the structure, function & location of cells, tissues and major human organs system/part
CO3	To classify the function of various organ systems and employing its knowledge to identify diseases related to them.
CO4	To explain interrelation between different organ system.
CO5	To differentiate various organs and organ system.
CO6	To justify the various joints, muscle and nerves.

Text Book

1. B. D Chourasia's Human Anatomy Fifth edition

2. Vikram singh's Textbook of anatomy

Refrance book-

1. **Atlas of anatomy**
2. **Osteology**

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	2	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	--	-	1		-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:** BSO-101P
Course Name	**:** Human Anatomy& Physiology Practical
Semester /Year	**:** Ist Year

	L	**T**	**P**	**C**
			2	1

Unit -1:	**Introduction:** and termionology of Human Body, body parts and areas. Terms of location and position, body cavities and their membranes, Dorsal cavity, ventral cavity, planes and section.
Unit -2	**Embryology:** and development of human body, body parts and their areas.
Unit-3	**Cells**: Structure function and location, prokaryotic and eukaryotic cells, cell organelles, cell division, tissue, types, structure location and functions of epithelial tissue, connective tissue, muscles tissue and nerve tissue. The Integumentary system: structure and functions of the skin , subcutaneous tissue.
Unit-4	**The Skeletal system**: General Introduction , Classification Joints- Types of joints & Movements. Basic Anatomy of Important Muscles.
Unit-5	**Central Nervous system**: Nervous system Division , Nerve Tissue, Types of Neurons, Nerve and Nerve tracts, The nerve impulse, The spinal cord, The brain Meninges and cerebrospinal fluid and cranial nerves
Unit -6	**Autonomic Nervous system**: The Senses sensory pathway, characteristics of sansations, cutaneous senses, muscle sense, sense of taste, sense of smell, hunger and thirst, The eye and The ear.
Unit -7	**Circulatory System**: heart structure and function, blood vessels and valves, mechanism of circulation, cardiac cycle, heart sounds, heart rate, pulse rate, blood pressure. Blood, its composition and function, function of RBC, WBC & platelets, Lymphatic system: lymph, its composition and function, lymphatictissue
Unit -8	**The Endocrine and excretory system**- Chemistry of harmones, Regulation of Harmones Secretion, The pituitary gland, Thyroid Gland, Parathroid Glands, Pancreas, Adernal Glands and other endocrine glands. Excretory system : General Introduction of broken down components of metabolism- Urine, sweat or feces.
Unit -9	**Digestive system**-General introduction of digestive system includes the mouth, pharynx, esophagus, stomach, small intestine, large intestine, rectum, anus, salivary glands, liver, gallbladder and pancreas.
Unit-10	**Respiratory system**-General introductions of organs, tissues. It includes lungs and blood vessels.
Unit -11	**Vitamins and Protiens**- Types and role of vitamins and proteins in human body.

Course outcomes (COs):

Uponsuccessfulcompletionofthecourseastudentwillbeableto

CO1	**To understand the structural differences between skeletal, smooth and cardiac muscles.**
CO2	**To understand the parts of circulatory system.**
CO3	To Demonstrate the various parts of male and female reproductive system
CO4	To understand the various joints
CO5	**To understand the digestive and excretory system.**
CO6	To analyze the parts of respiratory system.

Text Book

1. B. D Chourasia's Human Anatomy Fifth edition

2. Vikram singh's Textbook of anatomy

Refrance book-

3. **Atlas of anatomy**
4. **Osteology**

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	2	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	--	-	1		-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:** BSO-102
Course Name	**:** Ocular anatomy, Pathology & Microbiology
Semester /Year	**:** Ist Year

	L	T	P	C
	4			2

Ocular Anatomy

Unit-1	Embryology of the eye in general Eye ball & coats of eyeball
Unit-2	Development of eye in general
Unit-3	Cornea Extra Ocular muscles
Unit 4	Iris Cilliary body Choroid
Unit 5	Anterior chamber Limbus
Unit 6	Eye lids parts and their structure Glands of eyelid Vitrous Choroid
Unit 7	Retina gross anatomy Layers of retina
Unit -8	Visual pathway

	Lesions of visual pathway
Unit-9	Aqueous Humour Aqueous hunour outflow
Unit-10	Symathetic System Parasympathathetics system
Unit-11	Lacrimal apparatus- parts, structure Lacrimal passage
Unit 12	Higher visual centres

Ocular pathology and microbiology

Unit-1	Morphology and principles of cultivating bacteria.
Unit -2	Sterilization and disinfections used in hospital and ophthalmic practice.
Unit 3	Understanding about the characteristics of bacteria, viruses, fungai and parasites.
Unit 4	Common bacterial infections of eye.
Unit 5	Common fungal infections of eye.
Unit 6	Common viral infections of eye.
Unit 7	Common parasitic infections of eye.
Unit 8	Blood cells and Blood collection techniques Infection in general
Unit 9	Bleeding time, clothing time Urine collection method Physical examination of urine Chemical examination of Urine Microscope Examination of urine

Unit 10	Grossing of tissue Tissue processing select cutting Staining Haematoxylins & special stains

Text book-

1-Fundamentals of Microbiology Jeffrey C. Pommerville

Refrance book-

1-Fundamentals of Microbiology Jeffrey C. Pommerville

2-Parson. Ramanjit Sihota

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO1	To understanding relationship between different ocular structure.
CO2	To compare the concepts and terminology of ocular anatomy
CO3	To demonstrate the structure, functions and locations of different parts of eye.
CO4	. To recognize the different ocular structure.
CO5	To gain essential knowledge about the characteristics of bacteria ,virus and fungi
CO6	To analyzing the clinical features of blood cells.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-		-	2	-	-	-	-

CO4	-	-	-	-	1	-	-	-	-	-	-	-
CO5	-	-	1	-	-	-	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:**	BSO-102P
Course Name	**:**	Ocular anatomy, Pathology & Microbiology Practical
Semester /Year	**:**	Ist Year

	L	**T**	**P**	**C**
			2	1

Ocular Anatomy

Unit-1	Embryology of the eye in general Eye ball & coats of eyeball
Unit-2	Development of eye in general
Unit-3	Cornea Extra Ocular muscles
Unit 4	Iris Cilliary body Choroid
Unit 5	Anterior chamber Limbus
Unit 6	Eye lids parts and their structure Glands of eyelid Vitrous Choroid
Unit 7	Retina gross anatomy Layers of retina

Unit -8	Visual pathway Lesions of visual pathway
Unit-9	Aqueous Humour Aqueous hunour outflow
Unit-10	Symathetic System Parasympathathetics system
Unit-11	Lacrimal apparatus- parts, structure Lacrimal passage
Unit 12	Higher visual centres

Ocular pathology and microbiology practical

Unit-1	Morphology and principles of cultivating bacteria.
Unit -2	Sterilization and disinfections used in hospital and ophthalmic practice.
Unit 3	Understanding about the characteristics of bacteria, viruses, fungai and parasites.
Unit 4	Common bacterial infections of eye.
Unit 5	Common fungal infections of eye.
Unit 6	Common viral infections of eye.
Unit 7	Common parasitic infections of eye.
Unit 8	Blood cells and Blood collection techniques Infection in general
Unit 9	Bleeding time, clothing time Urine collection method Physical examination of urine Chemical examination of Urine

	Microscope Examination of urine
Unit 10	Grossing of tissue Tissue processing select cutting Staining Haematoxylins & special stains

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO1	To demonstrate the orbital structure.
CO2	To compare the concepts and terminology of ocular anatomy
CO3	To analyze the blood report and blood smear.
CO4	To understand the clinical features of bleeding disorder.
CO5	To gain essential knowledge about the characteristics of bacteria ,virus and fungi

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-		-	2	-	-	-	-
CO4	-	-	-	-	1	-	-	-	-	-	-	-
CO5	-	-	1	-	-	-	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:** BSO-103
Course Name	**:** Ocular physiology & biochemistry
Semester /Year	**:** Ist Year

	L	**T**	**P**	**C**
	3			3

Unit 1	General physiology of the eye - An introduction Aqueous humor and vitrous: Intra ocular pressure
Unit 2	Maintenance of Transparency of the Cornea Maintenance of Transparency of the Lens
Unit 3	Visual stimulus Visual acuity and their principal of measurement Visual perception, An over view of binocular vision. Visual pathway, papillary pathway Contrast sensitivity Visual field
Unit 4	Extra ocular muscles Saccades and pursuit Fixatory eye movement
Unit 5	Iris & pupil Crystalline lens and accommodation, mechanism of accommodation- presbyopia Retina physiology & Rodpsin cycle, Night vision and colour visison
Unit 6	Higher Visual Centres Electrophysiological Aspects of lens and cornea

Ocular Biochemistry

Unit 1	Ocular Biochemistry: Various aspects of the eye- Cornea, lens, aqueous, vitrous, retina and pigment rhodopsin
Unit 2	Metabolism – carbohydrates, protins, lipids
Unit 3	Tears film and Ph

Unit 5	Minerals- Na, K, Ca, P, Fe, Cu and Se (requirements availability and properties) with respect to the eye

Text book-

1-Adler's Physiology of eye 11 edition-Leonard A levin

Refrance Book-

Ophthalmology A K khurana

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO1	To understanding the concepts and terminology of ocular physiology.
CO2	To understanding function of various ocular structures.
CO3	To understanding the role of minerals with respect to eyes.
CO4	To recognize the different ocular structure.
CO5	To creating the phenomenon of vision.
CO6	To remembering the extra ocular parts.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	-	1	1	-	-	-	-	-	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	1	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	2	-	-	-	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry Ist year

Course code	**:**	BSO-103P
Course Name	**:**	Ocular physiology & biochemistry Practical
Semester /Year	**:**	Ist Year

	L	**T**	**P**	**C**
			2	1

Ocular Physiology

Unit 1	General physiology of the eye - An introduction Aqueous humor and vitrous: Intra ocular pressure
Unit 2	Maintenance of Transparency of the Cornea Maintenance of Transparency of the Lens
Unit 3	Visual stimulus Visual acuity and their principal of measurement Visual perception, An over view of binocular vision. Visual pathway, papillary pathway Contrast sensitivity Visual field
Unit 4	Extra ocular muscles Saccades and pursuit Fixatory eye movement
Unit 5	Iris & pupil Crystalline lens and accommodation, mechanism of accommodation- presbyopia Retina physiology & Rodpsin cycle, Night vision and colour visison
Unit 6	Higher Visual Centres Electrophysiological Aspects of lens and cornea

Ocular Biochemistry Practical

Unit 1	Ocular Biochemistry: Various aspects of the eye- Cornea, lens, aqueous, vitrous, retina and pigment rhodopsin
Unit 2	Metabolism – carbohydrates, protins, lipids
Unit 3	Tears film and pH

Unit 4	Minerals- Na, K, Ca, P, Fe, Cu and Se (requirements availability and properties) with respect to the eye

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO1	To understanding the concepts and terminology of ocular physiology.
CO2	To understanding function of various ocular structures.
CO3	To understanding the role of minerals with respect to eyes.
CO4	To recognize the different ocular structure.
CO5	To creating the phenomenon of vision.
CO6	To remembering the extra ocular parts.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	-	1	1	-	-	-	-	-	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	1	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	2	-	-	-	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:**	BSO-104
Course Name	**:**	Optics
Semester /Year	**:**	Ist Year

	L	T	P	C

	2			2

Course Content

Unit 1	Introduction: Light, Mirror, Reflection, Refraction and Absorption □ Prisms: Definition, properties, Refraction through prisms, Thickness difference, Base-apex notation, uses, nomenclature and units; Fresnel's prisms, rotary prisms.
Unit 2	Lenses: Definition, units, terminology used to describe, form of lenses, Lens shape, size and types i.e.spherical, cylindrical and Sphero-cylindrical Transpositions: Simple, Toric and Spherical equivalent
Unit 3	Measurement of visual acuity with different methods.
Unit 4	Intensity of polarized light Malus'Law; polarizers and analyzers; Methods of producing polarized light; Brewster's angle. Birefringence; ordinary and extraordinary rays Relationship between amplitude and intensity
Unit 5	Coherence- Interference; constructive interference, destructive interference; fringes; fringe width.Double slits, multiple slits, gratings. Diffraction; diffraction by a circular aperture; Airy's disc
Unit 6	Emmetropia & Ammetropia: Myopia, Hypermetropia, Astigmatism □ Spherical Ammetropia correction □ Aperture stop: Entrance and Exitpupil
Unit 7	Properties of an Ideal Ophthalmic Lens material. □ Current Ophthalmic Lens materials-Crown glass, CR-39, Polycarbonate &Trivex. □ Lens Surfacing □ Defects of optical lenses. □ Lens types & design (spheric, aspheric, lenticular lenses) □ High index lens □ Revision of Aberrations and its correction
Unit 8	Reflection and refraction of light- laws of reflection and refraction. Total internal reflection. Refractive index -Its relation with wavelength, Fermat's and Huygen's Principle, Derivation of laws of reflection and refraction (Snell's law) from these principles
Unit 9	Principal and procedure of retinoscopy and their types. Objective and subjective method of refraction.
Unit 10	Accommodation & Convergence -1, Far point, near point, range, amplitude of accommodation

Text books-

1. **Borish's Clinical Refraction**

2.Duke elder Practice of refraction

Refrance books –

1. **Theories and practice of Optics and refraction- A K khurana**
2. **Optics & Refraction L.P Aggarwal**

Course outcomes (COs):

Uponsuccessfulcompletionofthecourseastudentwillbeableto-

CO1	To understanding the concepts and theories of light, its nature & properties
CO2	To analyze the theories of interference, polarization & Diffraction
CO3	To creating the concept of schematic and Reduce eye and Visual acuity
CO4	To analyzing the concept of Image formation by different types of lenses
CO5	To remembering the concept of refractive error and its management options
CO6	To evaluating the concept of Accommodation & Presbyopia

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	-	-	-	-	-	-	-	-	-	-
CO3	1	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	1	-	-	-	-	-	-	-	-	-
CO5	3	-	-	--	-	1	-	-	-	-	-	-
CO6	2	-	-	-	-	-	-	-	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry Ist year

Course code	**:**	BSO-104P
Course Name	**:**	Optics Practical
Semester /Year	**:**	Ist Year

	L	T	P	C
			2	1

Course Content

Unit 1	Introduction: Light, Mirror, Reflection, Refraction and Absorption □ Prisms: Definition, properties, Refraction through prisms, Thickness difference, Base-apex notation, uses, nomenclature and units; Fresnel's prisms, rotary prisms.
Unit 2	Lenses: Definition, units, terminology used to describe, form of lenses, Lens shape, size and types i.e.spherical, cylindrical and Sphero-cylindrical Transpositions: Simple, Toric and Spherical equivalent
Unit 3	Measurement of visual acuity with different methods.
Unit 4	Intensity of polarized light and analyzers; Methods of producing polarized light; Brewster's angle. Birefringence; ordinary and extraordinary rays Relationship between amplitude and intensity
Unit 5	Coherence- Interference; constructive interference, destructive interference; fringes; fringe width. Double slits, multiple slits, gratings. Diffraction; diffraction by a circular aperture; Airy's disc
Unit 6	Emmetropia & Ammetropia: Myopia, Hypermetropia, Astigmatism □ Spherical Ammetropia correction □ Aperture stop: Entrance and Exitpupil
Unit 7	Properties of an Ideal Ophthalmic Lens material. □ Current Ophthalmic Lens materials-Crown glass, CR-39, Polycarbonate &Trivex. □ Lens Surfacing □ Defects of optical lenses. □ Lens types & design (spheric, aspheric, lenticular lenses) □ High index lens □ Revision of Aberrations and its correction
Unit 8	Reflection and refraction of light- laws of reflection and refraction. Total internal reflection. Refractive index -Its relation with wavelength, Fermat's and Huygen's Principle, Derivation of laws of reflection and refraction (Snell's law) from these principles
Unit 9	Principal and procedure of retinoscopy and their types. Objective and subjective method of refraction.
Unit 10	Accommodation & Convergence -1, Far point, near point, range, amplitude of accommodation

Course outcomes (COs):

Upon successful completion of the course a student will be able to-

CO1	To understanding the concepts and theories of light, its nature & properties
CO2	To analyze the theories of interference, polarization & Diffraction
CO3	To creating the concept of schematic and Reduce eye and Visual acuity
CO4	To analyzing the concept of Image formation by different types of lenses
CO5	To remembering the concept of refractive error and its management options
CO6	To evaluating the concept of Accommodation & Presbyopia

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	-	-	-	-	-	-	-	-	-	-
CO3	1	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	1	-	-	-	-	-	-	-	-	-
CO5	3	-	-	--	-	1	-	-	-	-	-	-
CO6	2	-	-	-	-	-	-	-	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry2nd year

Course code	**:** BSO-201
Course Name	**:** Pharmacology & Pharmacy
Semester /Year	**:** 2nd Year

	L	T	P	C
	1	1		2

Course content

Unit 1	General Pharmacology: Introduction & sources of drugs, Routes of drug administration.
Unit 2	Systemic pharmacology- ANS, drugs affecting pupillary size and light reflex, intraocular tension, Accommodation.
Unit 3	General & local anesthetics, : Antiviral, antifungal, antibiotics; steroids,
Unit 4	Ocular Pharmacology: Ocular preparations, Ocular pharmacokinetics, methods of drug administration andspecial drug delivery system, Ocular toxicology, Miotics and Mydriatics drugs, Anti-cataract agents, .contact lens solution, Ocular Lubricants, Dyes use in Ophthalmology, Viscoelastic agents
Unit 5	Diagnostic & Therapeutic applications of drugs used in Ophthalmology: Diagnostic Drugs & biological agents used in ocular surgery, Anesthetics used in ophthalmic procedure Anti- glaucoma drugs; Pharmacotherapy of ocular infections– Bacterial, viral, fungal
Unit 6	How to prepare following eye drops: a. Vancomycin eye drops b. Ceftazidine eye drops c.Fortified tobramycin eye drops d.Fortified Cefazoline eye drops e. EDTA eye drops f. Ascorbate eye drops g. Mitomycin eye drops h. Voriconazole eye drops i. Sodium citrate eye drops, MK Media preparation.

Text book-

1. Dr. R L Sharma Ophthalmic pharmacology and therapies
2. Dr. S k Gupta Clinical Ocular Pharmacology & Therapeutics

Refrence book-

1. ComprehensiveOphthalmology A K khurana
2. **Parson**. Ramanjit Sihota

Course outcomes (Cos):

Upon successful completion of the course a student will be able to

CO1	To understanding the concept & terminologies of Pharmacology and ocular preparations.
CO2	To remembering the routes of drug administration in ophthalmology
CO3	To applying of different pharmaceutical agents in the management of Ocular diseases.
CO4	To applying diagnostic and therapeutic drugs in ophthalmology.
CO5	To creating the procedure for installing cycloplegics and mydratics to see the effect of drugs.
CO6	To remembering various ways of disinfection

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	1	-	-	-	-	2	-	-	-	-

CO2	2	-	-	1	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	2	-	-	-	-	-
CO4	-	-	-	-	-	-	-	2	-	-	-	-
CO5	1		-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry2nd year

Course code	**:**	BSO-201P
Course Name	**:**	Pharmacology & Pharmacy Practical
Semester /Year	**:**	2nd Year

	L	T	P	C
			2	1

Course content

Unit 1	General Pharmacology: Introduction & sources of drugs, Routes of drug administration.
Unit 2	Systemic pharmacology- ANS, drugs affecting pupillary size and light reflex, intraocular tension, Accommodation.
Unit 3	General & local anesthetics, : Antiviral, antifungal, antibiotics; steroids,
Unit 4	Ocular Pharmacology: Ocular preparations, Ocular pharmacokinetics, methods of drug administration andspecial drug delivery system, Ocular toxicology, Miotics and Mydriatics drugs, Anti-cataract agents, .contact lens solution, Ocular Lubricants, Dyes use in Ophthalmology, Viscoelastic agents
Unit 5	Diagnostic & Therapeutic applications of drugs used in Ophthalmology: Diagnostic Drugs & biological agents used in ocular surgery, Anesthetics used in ophthalmic

	procedure Anti- glaucoma drugs; Pharmacotherapy of ocular infections– Bacterial, viral, fungal
Unit 6	How to prepare following eye drops: a. Vancomycin eye drops b. Ceftazidine eye drops c.Fortified tobramycin eye drops d.Fortified Cefazoline eye drops e. EDTA eye drops f. Ascorbate eye drops g. Mitomycin eye drops h. Voriconazole eye drops i. Sodium citrate eye drops, MK Media preparation.

Course outcomes (Cos):

Upon successful completion of the course a student will be able to

CO1	To understanding the concept & terminologies of Pharmacology and ocular preparations.
CO2	To remembering the routes of drug administration in ophthalmology
CO3	To applying of different pharmaceutical agents in the management of Ocular diseases.
CO4	To applying diagnostic and therapeutic drugs in ophthalmology.
CO5	To creating the procedure for installing cycloplegics and mydratics to see the effect of drugs.
CO6	To remembering various ways of disinfection

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	1	-	-	-	-	2	-	-	-	-
CO2	2	-	-	1	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	2	-	-	-	-	-
CO4	-	-	-	-	-	-	-	2	-	-	-	-
CO5	1		-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry2nd year

Course code	**:** BSO-202

Course Name	**:** Refraction (Including prescription making and fitting of glasses)
Semester /Year	**:** 2nd Year

	L	T	P	C
	1	1		2

Unit 1	Subjective Refraction Principle and fogging Fixed astigmatic dial (Clock dial), Combination of fixed and rotator block test), J.C.C dial (Fan) Duo chrometest Binocular balancing- alternate occlusion, prism dissociation, dissociate Duo chrome balance, Borish dissociated fogging
Unit 2	Describe Emmetropia & Ammetropia, Classification of refractive error.
Unit 3	Refractive errors- Myopia Hypermetropia Astigmatism Aphakia/Pseudo-phakia
Unit 4	Presbyopia Accommodation Convergence – Far point, near point, ranges. Amplitude of accommodation
Unit 5	Accommodation & Convergence – Methods of measurements NPA,NPC, AC/A ratio.
Unit 6	Optics and Principal of Retinoscopy and their Procedure. Keratoconus

Text books-

2. **Borish's Clinical Refraction**

2.Duke elder Practice of refraction

Refrance books –

3. **Theories and practice of Optics and refraction- A K khurana**
4. **Optics & Refraction L.P Aggarwal**

Course outcomes (Cos):

Upon successful completion of the course a student will be able to

CO1	To understand the names of various optical content of eye & their measurements..
CO2	To analyzing about various refractive anomalies of the eye.
CO3	To applying all the theoretical skills on practical purpose.
CO4	To evaluating the concept of different types and design of ophthalmic lenses.
CO5	To understanding the various aspects of measuring visual acuity
CO6	To creating knowledge about various optical defects of eye.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	2	-	-	-	-	-	-	-
CO2	1	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	3			-	-	-	-	-	-	-	-
CO5	3	-	2	-	-	-	-	-	-	-	-	-
CO6	-	2	-	-	-	-	-	-	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry2nd year

Course code	**:** BSO-202P
Course Name	**:** Refraction (Including prescription making and fitting of glasses)

Semester /Year : 2nd Year

	L	T	P	C
			2	1

Unit 1	SubjectiveRefraction Principle andfogging Fixed astigmatic dial (Clock dial), Combination of fixed and rotator block test), J.C.C dial (Fan) Duo chrometest Binocular balancing- alternate occlusion, prism dissociation, dissociate Duo chrome balance, Borish dissociated fogging
Unit 2	Describe Emmetropia & Ammetropia, Classification of refractive error.
Unit 3	Refractive errors- Myopia Hypermetropia Astigmatism Aphakia/Pseudo-phakia
Unit 4	Presbyopia Accommodation Convergence – Far point, near point, ranges. Amplitude of accommodation
Unit 5	Accommodation & Convergence – Methods of measurements NPA,NPC, AC/A ratio.
Unit 6	Optics and Principal of Retinoscopy and their Procedure. Keratoconus

Course outcomes (Cos):

Upon successful completion of the course a student will be able to

CO1	To understand the names of various optical content of eye & their

	measurements..
CO2	To analyzing about various refractive anomalies of the eye.
CO3	To applying all the theoretical skills on practical purpose.
CO4	To evaluating the concept of different types and design of ophthalmic lenses.
CO5	To understanding the various aspects of measuring visual acuity
CO6	To creating knowledge about various optical defects of eye.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	2	-	-	-	-	-	-	-
CO2	1	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	3			-	-	-	-	-	-	-	-
CO5	3	-	2	-	-	-	-	-	-	-	-	-
CO6	-	2	-	-	-	-	-	-	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry2nd year

Course code	**:**	BSO-203
Course Name	**:**	Investigative Ophthalmology
Semester /Year	**:**	2nd Year

	L	T	P	C
	1	1		2

Unit 1	Binocular Vision and Space perception. Relative subjective visual direction. Retino motor value, Grades of BSV, SMP and Correspondence, Fusion, Diplopia, Horopter, Physiological Diplopia and Suppression, Stereopsis, Panum's area, BSV. Stereopsis and monocular clues –significance, clinical applications. Theories of Binocular vision
Unit 2	Anatomy of Extra Ocular Muscles. Recti and Obliques, LPS, Innervation & Blood Supply, Physiology of Ocular movements. Center of rotation, Axes of Fick. Action of individual muscle. Laws of ocular motility Sherrington's law, Hering's law, Uniocular & Binocular movements - fixation, saccadic & pursuits. Version & Vergence. Fixation &field of fixation
Unit 3	Convergent strabismus- Accommodative convergent squint- Classification, Investigation and Management, Non accommodative Convergent squint- Classification, Investigation and Management, Divergent Strabismus-Classification, A& V phenomenon, Investigation and Management.
Unit 4	Investigations: History and symptoms, Head Posture, Diplopia , . Charting, PBCT, Nine directions, Binocular field of vision, Amblyopia and Treatment of Amblyopia Maddox rod Maddox wing Synoptophore
Unit 5	. Disorders of accommodation

Text book-
1. Theory and Practice of Squint and orthoptics-A K Khurana
2. Strabismus simplified-Pradeep sharma

Refrence book-
1 Theory and Practice of Squint and orthoptics -A K Khurana
2 Parson. Ramanjit Sihota

Course outcomes (Cos):

Upon successful completion of the course a student will be able to

CO1	To remembering the general concept of orthoptics.
CO2	To understanding the anatomy of extra ocular muscles and their movement.
CO3	To evaluating the pediatric visual acuity and rerfraction.
CO4	To analyzing the causes and treatment of amblyopia.
CO5	To understad the uses of synaptophore and its advantages.
CO6	To analyzing the binocular single vision and their grades.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	2	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	2	--	-	-	-	-	-	-	-	-	-
CO6	3	-	-	-	-	-	-	-	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry2nd year

Course code	**:**	BSO-203P
Course Name	**:**	Investigative Ophthalmology Practical
Semester /Year	**:**	2nd Year

	L	T	P	C
			2	1

Unit 1	Binocular Vision and Space perception. Relative subjective visual direction. Retino motor value, Grades of BSV, SMP and Correspondence, Fusion, Diplopia, Horopter, Physiological Diplopia and Suppression, Stereopsis, Panum's area, BSV. Stereopsis and monocular clues –significance, clinical applications. Theories of Binocular vision
Unit 2	Anatomy of Extra Ocular Muscles. Recti and Obliques, LPS, Innervation & Blood Supply, Physiology of Ocular movements. Center of rotation, Axes of Fick. Action of individual muscle. Laws of ocular motility Sherrington's law, Hering's law, Uniocular & Binocular movements - fixation, saccadic & pursuits. Version & Vergence. Fixation &field of fixation
Unit 3	Convergent strabismus- Accommodative convergent squint- Classification, Investigation and Management, Non accommodative Convergent squint- Classification, Investigation and Management, Divergent Strabismus-Classification, A& V phenomenon, Investigation and Management.
Unit 4	Investigations: History and symptoms, Head Posture, Diplopia , . Charting, PBCT, Nine directions, Binocular field of vision, Amblyopia and Treatment of Amblyopia Maddox rod Maddox wing Synoptophore
Unit 5	. Disorders of accommodation

Course outcomes (Cos):

Upon successful completion of the course a student will be able to

CO1	To remembering the general concept of orthoptics.
CO2	To understanding the anatomy of extra ocular muscles and their movement.
CO3	To evaluating the pediatric visual acuity and rerfraction.

CO4	To analyzing the causes and treatment of amblyopia.
CO5	To understad the uses of synaptophore and its advantages.
CO6	To analyzing the binocular single vision and their grades.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	2	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	2	--	-	-	-	-	-	-	-	-	-
CO6	3	-	-	-	-	-	-	-	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry2nd year

Course code	**:** BSO-204
Course Name	**:** Ophthalmic Instrument & appliances
Semester /Year	**:** 2nd Year

	L	**T**	**P**	**C**
	1	1		2

Unit 1	Indirect Ophthalmoscope Direct Ophthalmoscope Slit Lamp Fundus Camera
Unit 2	Lensometer. Lens gauge Tonometer – Contact and Non contact Auto-refractometer Keterometer
Unit 3	Biometry

	Perimeter – Manual & automated Placido disc
Unit 4	Contrast sensitivity tests Glare acuity tests Colour vision tests
Unit 5	Syringing Gonioscopy Nerve fiber analyzer

Text book-
1. Ophthalmology book. A K khurana
2.Text book of ophthalmology for paramedical courses Sanjeev Agarwal

Refrence book-
1. A K khurana Ophthalmology
2.Parson. Ramanjit Sihota

Course outcomes (Cos):

Upon successful completion of the course a student will be able to

CO1	To understanding the method of using indirect ophthalmoscope and their advantage
CO2	To evaluating the difference between contact and non contact tonometer.
CO3	To explaining the advantage of automated perimetry over manual.
CO4	To Understanding the use of lensometer.
CO5	To evaluating nerve fibre layer.
CO6	To evaluating the knowledge of slit lamp examination.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

CO1	2	-	-	3	-	-	2	-	-	-	-	-
CO2	-	-	-	-	-	-	2	-	-	-	-	-
CO3	-	2	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3		-	-	-	-	-	-	-	-
CO5	1	-	-	-	-	-	-	3		-	-	-
CO6	2	-	-	-	-	-	-	-	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry2nd year

Course code	**:**	BSO-204P
Course Name	**:**	Ophthalmic Instrument & appliances Practical
Semester /Year	**:**	2nd Year

	L	T	P	C
			2	1

Unit 1	Indirect Ophthalmoscope Direct Ophthalmoscope Slit Lamp Fundus Camera
Unit 2	Lensometer. Lens gauge Tonometer – Contact and Non contact Auto-refractometer Keterometer
Unit 3	Biometry Perimeter – Manual & automated Placido disc
Unit 4	Contrast sensitivity tests Glare acuity tests Colour vision tests
Unit 5	Syringing Gonioscopy Nerve fiber analyzer

Course outcomes (Cos):

Upon successful completion of the course a student will be able to

CO1	To understanding the method of using indirect ophthalmoscope and their advantage
CO2	To evaluating the difference between contact and non contact tonometer.
CO3	To explaining the advantage of automated perimetry over manual.
CO4	To Understanding the use of lensometer.
CO5	To evaluating nerve fibre layer.
CO6	To evaluating the knowledge of slit lamp examination.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	3	-	-	2	-	-	-	-	-
CO2	-	-	-	-	-	-	2	-	-	-	-	-
CO3	-	2	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3		-	-	-	-	-	-	-	-
CO5	1	-	-	-	-	-	-	3		-	-	-
CO6	2	-	-	-	-	-	-	-	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry3rd year

Course code	**:**	BSO-301
Course Name	**:**	Clinical advance optics & orthoptics
Semester /Year	**:**	3rd Year

	L	T	P	C
	1	1		2

Unit 1	Binocular Vision and Space perception. Relative subjective visual direction. Retino motor value, Grades of BSV, SMP and Correspondence, Fusion, Diplopia, Horopter, Physiological Diplopia and Suppression, Stereopsis, Panum's area, BSV. Stereopsis and monocular clues –significance, clinical applications. Theories of Binocular vision
Unit 2	Convergent strabismus- Accommodative convergent squint- Classification, Investigation and Management, Non accommodative Convergent squint- Classification, Investigation and Management, Divergent Strabismus-Classification, A& V phenomenon, Investigation and Management.
Unit 3	Vertical strabismus-Classification, Investigation and Management, Paralytic Strabismus--Classification, Investigation and Management, Distinction from comitant and restrictive Squint
Unit 4	Investigations: History and symptoms, Head Posture, Diplopia Charting, Hess chart, PBCT, Nine directions, Binocular field of vision, Amblyopia and Treatment of Amblyopia, Nystagmus.
Unit 5	Disorders of accommodation Neural aspects of binocular vision Neural aspects of binocular vision.

Text book-

1. Theory and Practice of Squint and orthoptics A K Khurana

2. Strabismus simplified Pradeep sharma

Refrence book-

1Theory and Practice of Squint and orthoptics A K Khurana

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO1	To evaluating the measurement of angle of squint.
CO2	To remembering the disorders of accommodation.
CO3	To understanding the convergence anomalies and their clinical significance.
CO4	To evaluating the causes, treatment and management of amblyopia.
CO5	To creating the difference between paralytic and non paralytic squint.
CO6	To understanding the classification of strabismus.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	3	-	2	-	-	-	1	-	-	-	-
CO2	-	-	-	3	-	-	2	-	-	-	-	-
CO3	-	-	-	3	-	-	2	-	-			-
CO4	2	3	-	-	-	-	-	-	-			-
CO5	-	3	-	-	-	-	-	2	-			-
CO6	-	3	-	-	-	-	-	2	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry3rd year

Course code	**:**	BSO-301P
Course Name	**:**	Clinical advance optics & orthoptics Practical
Semester /Year	**:**	3rd Year

	L	T	P	C

			2	1

Unit 1	Binocular Vision and Space perception. Relative subjective visual direction. Retino motor value, Grades of BSV, SMP and Correspondence, Fusion, Diplopia, Horopter, Physiological Diplopia and Suppression, Stereopsis, Panum's area, BSV. Stereopsis and monocular clues –significance, clinical applications. Theories of Binocular vision
Unit 2	Convergent strabismus- Accommodative convergent squint- Classification, Investigation and Management, Non accommodative Convergent squint- Classification, Investigation and Management, Divergent Strabismus-Classification, A& V phenomenon, Investigation and Management.
Unit 3	Vertical strabismus-Classification, Investigation and Management, Paralytic Strabismus--Classification, Investigation and Management, Distinction from comitant and restrictive Squint
Unit 4	Investigations: History and symptoms, Head Posture, Diplopia Charting, Hess chart, PBCT, Nine directions, Binocular field of vision, Amblyopia and Treatment of Amblyopia, Nystagmus.
Unit 5	Disorders of accommodation Neural aspects of binocular vision Neural aspects of binocular vision

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO1	To evaluating the measurement of angle of squint.
CO2	To remembering the disorders of accommodation.
CO3	To understanding the convergence anomalies and their clinical significance.
CO4	To evaluating the causes, treatment and management of amblyopia.
CO5	To creating the difference between paralytic and non paralytic squint.
CO6	To understanding the classification of strabismus.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	3	-	2	-	-	-	1	-	-	-	-
CO2	-	-	-	3	-	-	2	-	-	-	-	-
CO3	-	-	-	3	-	-	2	-	-			-
CO4	2	3	-	-	-	-	-	-	-			-
CO5	-	3	-	-	-	-	-	2	-			-
CO6	-	3	-	-	-	-	-	2	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry3rd year

Course code	**:**	BSO-302
Course Name	**:**	Clinical Refraction & contact lens
Semester /Year	**:**	3rd Year

	L	T	P	C
	1	1		2

Unit 1	Refractive errors- Myopia Hypermetropia Astigmatism Aphakia/Pseudo-phakia
Unit 2	Optics and Principal of Retinoscopy and their Procedure. Keratoconus Accommodation & Convergence – Methods of measurements NPA,NPC, AC/A ratio.
Unit 3	Review of Anatomy & Physiology of Tear film, cornea□ □ Definition of Contact lens &various Classification□ □ Optics & design of RGP Contact Lenses□ □ Vertex distance calculation
Unit 4	□ Introduction & types of Contact lens materials □ Properties of various Contact lens materials - Physiological, Physical, Optical □ Manufacturing technique of CL

	□ Indication & contraindication of RGP and soft Contact lens □ Selection of parameters of RGP and soft contact lens □ Effect of change in parameters of RGP and soft contact lens
Unit 5	Insertion & removable of RGP □ Pre- fitting evaluation □ Fitting assessments (dynamic & static) □ Properties of Types of fit (steep, optimal, flat) □ Tear lens calculation □ Calculation (SAM, FAP) & finalization of RGP □ Calculation & finalization of RGP
Unit 6	Common handling instructions □ Do's & Don't of RGP □ Care & maintenance of RGP □ Cleaning □ Rinsing □ Disinfecting (one step & two step) □ Protein removers □ MPS
Unit 7	Types of contact lens deposit □ Complications □ Inflammation & staining related □ Oedema & Hypoxia related □ Mechanical & pressure related □ Management of Complication Cosmetic Contact Lenses Low Vision Aids

Text book-

1.Theories and practice of Optics and refraction

2.Contact lens Primer Monika Chaudhary

Refrance book–

1.Theories and practice of Optics and refraction-A K khurana

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO1	To understanding about soft contact lenses material and their properties
CO2	To analyzing complication and their management of contact lenses
CO3	To remembering the management of refractive error.
CO4	To evaluating the indications and contraindications of contact lenses
CO5	To analyzing the pre post operative refractive error.
CO6	To understanding the concept of convergence.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	3	-		-	-	-	-	-	-	-	-
CO2	-	-	-	3		-	-	-	-	-		-
CO3	-	3	-	-	-	-	1	-	-	-	-	-
CO4	-	1	-		-	-	-	-	-	-	-	-
CO5	-	1	-		2	--	1	-	-	-	-	-
C06	-	2	-		-	-	-	-	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry3rd year

Course code	**:**	BSO-302P
Course Name	**:**	Clinical Refraction & contact lens Practical
Semester /Year	**:**	3rd Year

	L	T	P	C
			2	1

Unit 1	Refractive errors- Myopia Hypermetropia Astigmatism Aphakia/Pseudo-phakia
Unit 2	Optics and Principal of Retinoscopy and their Procedure. Keratoconus Accommodation & Convergence – Methods of measurements NPA,NPC, AC/A ratio.
Unit 3	Review of Anatomy & Physiology of Tear film, cornea Definition of Contact lens &various Classification Optics & design of RGP Contact Lenses Vertex distance calculation
Unit 4	Introduction & types of Contact lens materials Properties of various Contact lens materials - Physiological, Physical, Optical Manufacturing technique of CL Indication & contraindication of RGP and soft Contact lens

	□ Selection of parameters of RGP and soft contact lens □ Effect of change in parameters of RGP and soft contact lens
Unit 5	Insertion & removable of RGP □ Pre- fitting evaluation □ Fitting assessments (dynamic & static) □ Properties of Types of fit (steep, optimal, flat) □ Tear lens calculation □ Calculation (SAM, FAP) & finalization of RGP □ Calculation & finalization of RGP
Unit 6	Common handling instructions □ Do's & Don't of RGP □ Care & maintenance of RGP □ Cleaning □ Rinsing □ Disinfecting (one step & two step) □ Protein removers □ MPS
Unit 7	Types of contact lens deposit □ Complications □ Inflammation & staining related □ Oedema & Hypoxia related □ Mechanical & pressure related □ Management of Complication Cosmetic Contact Lenses Low Vision Aids

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO1	To understanding about soft contact lenses material and their properties
CO2	To analyzing complication and their management of contact lenses
CO3	To remembering the management of refractive error.
CO4	To evaluating the indications and contraindications of contact lenses
CO5	To analyzing the pre post operative refractive error.
CO6	To understanding the concept of convergence.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	3	-		-	-	-	-	-	-	-	-
CO2	-	-	-	3		-	-	-	-	-		-
CO3	-	3	-	-	-	-	1	-	-	-	-	-
CO4	-	1	-		-	-	-	-	-	-	-	-

CO5	-	1	-		2	--	1	-	-	-	-	-
C06	-	2	-		-	-	-	-	-	-	-	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry3rd year

Course code	**:**	BSO-303
Course Name	**:**	Community Ophthalmology & Eye bank
Semester /Year	**:**	3rd Year

	L	T	P	C
	1	1		2

Unit 1	Public Health Optometry: Concepts and implementation, Stages of diseases, Dimensions, determinants and indicators of health, Levels of disease prevention and levels of health care patterns, Epidemiology of blindness – Defining blindness and visual impairment.
Unit 2	Eye in primary health care, Contrasting between Clinical and community health programs, Community Eye Care Programs, Community based rehabilitation programs.
Unit 3	Nutritional Blindness with reference to Vitamin A deficiency, Vision 2020: The Right to Sight, Screening for eye diseases, National and International health agencies, NPCB.
Unit 4	Role of an optometrist in Public Health, Organization and Management of Eye Care Programs Service Delivery models, Health manpower and planning & Health Economics, Evaluation and assessment of health programs.
Unit 5	Optometrist role in school eye health programmes, Basics of Tele Optometry and its application in Public Health, Information, Education and Communication for Eye Care programs.

Unit 6	Preservation of Tissue - Procedures and Methods Preservation Media Transport and Storage of Tissue
Unit 7	Publicity- How to donate your eyes Pre operative instruction Post operative instruction

Text Book-

1Comprehensive .Opthalmology text book A K khurana

2.Parsons' Diseases of eye fifth edition- Ramanjit Sihota

Refrance Book-

1.Comprehensive Opthalmology text book- A K khurana

2. Parson Ramanjit Sihota

Course outcomes (Cos):

Upon successful completion of the course a student will be able to

CO1	To understanding the role of optometrist in public health
CO2	To analyzing the basic definition and classification of LOW vision.
CO3	To creating the basic concept of eye banking.
CO4	To understanding the National programme for control of blindness.
CO5	To understanding the National programme for control of blindness.
CO6	To understanding the procedure and storage of eye in EYE BANK. Safety aspects in eye department, OT instruments and sterility.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	3	-	-	-	-	-	-	-	3	3	2
CO2	1	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	3	-	-	-	-	-	-	2	-
CO4	-	-	-	-	-	-	-	-	-	-	3	-
CO5	2	2		-	-	--	-	-	-	-		-
CO6		-	-	-	-	-	-	-	1	-	3	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry3rd year

Course code	**:**	BSO-303P
Course Name	**:**	Community Ophthalmology & Eye bank Practical
Semester /Year	**:**	3rd Year

	L	T	P	C
			2	1

Unit 1	Public Health Optometry: Concepts and implementation, Stages of diseases, Dimensions, determinants and indicators of health, Levels of disease prevention and levels of health care patterns, Epidemiology of blindness – Defining blindness and visual impairment.
Unit 2	Eye in primary health care, Contrasting between Clinical and community health programs, Community Eye Care Programs, Community based rehabilitation programs.
Unit 3	Nutritional Blindness with reference to Vitamin A deficiency, Vision 2020: The Right to Sight, Screening for eye diseases, National and International health agencies, NPCB.

Unit 4	Role of an optometrist in Public Health, Organization and Management of Eye Care Programs Service Delivery models, Health manpower and planning & Health Economics, Evaluation and assessment of health programs.
Unit 5	Optometrists role in school eye health programmes, Basics of Tele Optometry and its application in Public Health, Information, Education and Communication for Eye Care programs.
Unit 6	Preservation of Tissue - Procedures and Methods Preservation Media Transport and Storage of Tissue
Unit 7	Publicity- How to donate your eyes Pre operative instruction Post operative instruction

Course outcomes (Cos):

Upon successful completion of the course a student will be able to

CO1	To understanding the role of optometrist in public health
CO2	To analyzing the basic definition and classification of LOW vision.
CO3	To creating the basic concept of eye banking.
CO4	To understanding the National programme for control of blindness.
CO5	To understanding the National programme for control of blindness.
CO6	To understanding the procedure and storage of eye in EYE BANK. Safety aspects in eye department, OT instruments and sterility.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	3	-	-	-	-	-	-	-	3	3	2
CO2	1	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	3	-	-	-	-	-	-	2	-
CO4	-	-	-	-	-	-	-	-	-	-	3	-
CO5	2	2		-	-	--	-	-	-	-		-
CO6		-	-	-	-	-	-	-	1	-	3	-

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry3rd year

Course code	**:**	BSO-304
Course Name	**:**	Investigation in clinical ophthalmology & Management of OT
Semester /Year	**:**	3rd Year

	L	**T**	**P**	**C**
	1	1		2

Unit 1	Indirect Ophthalmoscope Direct Ophthalmoscope Slit Lamp Fundus Camera	
Unit 2	Lensometer. Lens gauge Tonometer – Contact and Non contact Auto-refractometer Keterometer	
Unit 3	Biometry Perimeter – Manual & automated Placido disc	
Unit 4	Contrast sensitivity tests Glare acuity tests Colour vision tests	

Unit 5	Syringing and lacrimal functions test Gonioscopy Nerve fiber analyzer	
Unit 6	Gonioscopy VKG,ERG,EOG OCT	
Unit 7	Flurescein angiography 21. Introduction to ocular in general 22. Specular microscopy 23. Nerve fibre analyzer	

Text Book-

1.Comprehensive Opthalmology text book-A K khurana

2.Parsons' Diseases of eye fifth edition-Ramanjit Sihota

Refrance Book-

1. ComprehensiveOpthalmology text book -A K khurana

Course outcomes (Cos):

Upon successful completion of the course a student will be able to

CO1	To remembering the syringing and lacrimal functions test.
CO2	To understanding the role of biomicroscopy.
CO3	To Evaluating the anterior and posterior segments in eye.
CO4	To remembering the fundus photography .
CO5	To understanding the ophthalmic drugs uses in OT
CO6	To analyzing the angle of anterior chamber through gonioscopic lenses.

CO-PO Mapping

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	1	1	-	2	-	-	-	-	-
CO2	2	1	-	-	-	-	-	2	-	-	-	-
CO3	-	-	-	-	-	-	-	2	1	-	-	1
CO4	-	-	-	-	-	-	-	2	1	-	-	1
CO5	1	-	-	-	-	-	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	1

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Bachelor's in Optometry3rd year

Course code	**:**	BSO-304P
Course Name	**:**	Investigation in clinical ophthalmology & Management of OT
Semester /Year	**:**	3rd Year

	L	**T**	**P**	**C**
			2	1

Unit 1	Indirect Ophthalmoscope Direct Ophthalmoscope Slit Lamp Fundus Camera	
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CO2	2	1	-	-	-	-	-	2	-	-	-	-
CO3	-	-	-	-	-	-	-	2	1	-	-	1
CO4	-	-	-	-	-	-	-	2	1	-	-	1
CO5	1	-	-	-	-	-	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	1

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated