GURU KASHI UNIVERSITY

Bachelor of Optometry

Session: 2023-24

Department of Paramedical Sciences

Graduate Attributes:

The Programme imparts to the students an intensive knowledge in the field of Ophthalmic services. Graduates will be able to maximize their potential in ocular diagnostic procedures, routine vision tests and analyze the results under the supervision of an ophthalmologist.

Programme Learning Outcomes: After completion of this course graduates will be able to:

1. Diagnose sight problems such as nearsightedness or farsightedness and eye diseases
2. Function in an ethical and professional manner without bias against any ethnicity, race, religion, caste, or gender with a high degree of credibility, integrity, and social concern.
3. Pursue higher education such as a Masters in Optometry and Ph.D. in optometry.
4. Apply problem-solving techniques to provide pre and post-operative care to patients undergoing eye surgeries.
5. Formulate technical skills, social behavior, and professional awareness for functioning effectively as an optometry technician.
6. Work in eye hospitals, eye care organizations, optical chains, vision care industries, and contact lens manufacturing units.

Programme Structure

Semester: 1st							
Sr. No.	**Course code**	**Course Title**	**Type of Courses**	**L**	**T**	**P**	**Credits**
1	BOP101	Geometrical Optics (Optics I)	Core	4	0	0	4
2	BOP102	General Physiology	Core	4	0	0	4
3	BOP103	General Anatomy	Core	4	0	0	4
4	BOP104	Geometrical Optics-1	Skill Based	0	0	4	2
5	BOP105	General Physiology	Skill Based	0	0	2	1
6	BOP106	General Anatomy	Skill Based	0	0	2	1
7	BOP199	XXXX	MOOC	-	-	-	2
Discipline Elective (Any one of the following)							
8	BOP107	General and Ocular Biochemistry	Discipline Elective	3	0	0	3
9	BOP108	Professional Communication in English					
			Total	**15**	**0**	**8**	**21**

	Semester: 2nd						
Sr. No.	**Course code**	**Course Title**	**Type of Courses**	**L**	**T**	**P**	**Credits**
1	BOP201	Physical Optics (Optics-II)	Core	4	0	0	4
2	BOP202	Physiology (Ocular)	Core	4	0	0	4
3	BOP203	Anatomy(Ocular)	Core	4	0	0	4
4	BOP204	Physical Optics (Optics-II)	Skill Based	0	0	4	2
5	BOP205	Anatomy (Ocular)	Skill Based	0	0	2	1
	Value Added Course (For Other Discipline Also)						
6	BOP206	Disaster Management	VAC	2	0	0	2
	Discipline Elective (Any two of the following)						
7	BOP207	Applied Optometry & Orth optics	Discipline Elective	3	0	0	3
8	BOP208	Pharmacology					
9	BOP209	Public Health & Community Optometry		3	0	0	3
			Total	**20**	**0**	**6**	**23**

	Semester: 3rd						
Sr. No.	**Course code**	**Course Title**	**Type of Courses**	**L**	**T**	**P**	**Credits**
1	BOP301	Visual Optics (Optics III)	Core	4	0	0	4
2	BOP302	Medical pathology & Microbiology (General & Ocular)	Core	4	0	0	4
3	BOP303	Ophthalmic & Optical Instrumentation Procedure I	Core	4	0	0	4
4	BOP304	Environmental studies	Compulsory Foundation	2	0	0	2
5	BOP305	Microbiology & Pathology	Skill Based	0	0	4	2
6	BOP306	Optical & Ophthalmic Instrumentation	Skill Based	0	0	4	2
7	BOP399	XXXX	MOOC	0	0	0	2
Open Electives Courses (For other Departments)							
8	XXXX	XXXX	Open Elective	2	0	0	2
			Total	**16**	**0**	**8**	**22**
Open Electives Courses (For other Departments)							
9	OEC015	Environment and Health	Open Elective	2	0	0	2
10	OEC022	Microbial Diseases: Causes, Prevention and Cure					

	Semester: 4th						
Sr. No.	**Course code**	**Course Title**	**Type of Courses**	**L**	**T**	**P**	**Credits**
1	BOP401	Lighting & the Eye	Core	4	0	0	4
2	BOP402	Clinical Refraction I	Core	4	0	0	4
3	BOP403	Lighting & the Eye	Skill Based	0	0	6	3
4	BOP404	Clinical Refraction Practical	Skill Based	0	0	6	3
Discipline Elective (Any two of the following)							
5	BOP405	Ocular Disease I (Anterior Segment Disease)	Discipline Elective	3	0	0	3
6	BOP406	Visual Optics (Optics IV)					
7	BOP407	Low Vision Aids & Visual Rehabilitation		3	0	0	3
			Total	**14**	**0**	**12**	**20**

	Semester:5th						
Sr. No.	**Course code**	**Course Title**	**Type of Courses**	**L**	**T**	**P**	**Credits**
1	BOP501	Ophthalmic Lens & Dispensing Optics	Core	4	0	0	4
2	BOP502	Ophthalmic & Optical Instrumentation & Procedure II	Core	4	0	0	4
3	BOP503	Introduction to Clinical Skills	Elective foundation	2	0	0	2
4	BOP504	Ophthalmic Lens & Dispensing Optics	Skill Based	0	0	4	2
5	BOP505	Optics & Ophthalmic Instrumentation II (Practical)	Skill Based	0	0	4	2
6	BOP599	XXXX	MOOC	0	0	0	2
Discipline Elective (Any two of the following)							
7	BOP506	Ocular Disease II (Posterior & Neuro-eye Disease)	Discipline Elective	3	0	0	3
8	BOP507	Binocular Vision & Ocular Modality		3	0	0	3
9	BOP508	Systemic Condition & the Eye					
			Total	**16**	**0**	**8**	**22**

	Semester:6th						
Sr. No.	**Course code**	**Course Title**	**Type of Courses**	**L**	**T**	**P**	**Credits**
1	BOP601	Contact Lens -I	Core	4	0	0	4
2	BOP602	Clinical Refraction II	Core	4	0	0	4
3	BOP603	Low Vision Aids & Visual Rehabilitation	AEC	2	0	0	2
4	BOP604	Contact Lens -I	Skill Based	0	0	4	2
5	BOP605	Clinical Refraction II	Skill Based	0	0	4	2
Discipline Elective (Any two of the following)							
6	BOP606	Occupational optometry	Discipline Elective	3	0	0	3
7	BOP607	Advanced ophthalmic diagnostic procedures					
8	BOP608	Applied clinical optometry		3	0	0	3
		Total		**16**	**0**	**8**	**20**

	Semester: 7th						
Sr. No.	**Code**	**Course Title**	**Type of Course**	**L**	**T**	**P**	**Credits**
1	BOP701	Industrial Training/Internship	Skill Enhancement Course	0	0	0	20
			Total	**0**	**0**	**0**	**20**

SEMESTER: 8th							
Sr. No.	**Code**	**Course Title**	**Type of Courses**	**L**	**T**	**P**	**No. of Credits**
1	BOP801	Industrial Training/Internship	Skill Enhancement Course	0	0	0	20
			Total	**0**	**0**	**0**	**20**

Evaluation Criteria for Theory Courses

A. Continuous Assessment: [25 Marks]

CA1- Surprise Test (Two best out of three) (10 Marks)
CA2- Assignment(s) (10 Marks)
CA3- Term paper/ Quiz/Presentation (05 Marks)

B. Attendance (05 Marks)
C. Mid-Semester Test: (30 Marks)
D. End-Semester Exam: (40 Marks)

Course Title: Geometrical Optics (Optics I)

Course Code: BOP101

L	T	P	Cr.
4	0	0	4

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able:

1. Develop an understanding of how light travels in straight lines and propagates through different media.
2. Comprehend the principles of reflection and refraction of light at boundaries between different media.
3. Explore how images are formed by mirrors and lenses. Students will learn about the formation of both real and virtual images.
4. Introduce students to basic optical systems and the concept of aberrations.

Course Contents

UNIT-I **15 Hours**

Introduction to Geometrical Optics, Nature of light: wave theory and particle theory, Ray approximation: reflection, refraction, and transmission of light, Laws of reflection and refraction, Geometrical optics vs. physical optics, Sign conventions for lenses and mirrors, Thin lens equation and lens maker's formula, Imageformation by mirrors and lenses, Magnification and the concept of focal length

UNIT-II **15 Hours**

Reflection and Refraction, Reflection of light: plane mirrors and curved mirrors (concave and convex), Image formation by mirrors: virtual and real images, magnification, Refraction of light: Snell's law, index of refraction, Total internal reflection and critical angle, Dispersion of light and the formation of rainbows, Optical phenomena: reflection, refraction, dispersion, and scattering

UNIT-III **15 Hours**

Thin Lenses, Types of lenses: convex lenses (converging) and concave lenses (diverging)Image formation by lenses: ray diagrams, object distance, image distance, and magnification, Lens combinations: converging and diverging lens systems, Lens aberrations: spherical aberration, chromatic aberration, and coma, Lens power, focal length, and diopters, Lens applications: eyeglasses, contact lenses, and camera lenses

UNIT-IV **15 Hours**

Optical Instruments, the human eye: structure and optical properties, Vision correction: myopia, hyperopia, and astigmatism, Compound microscopes: magnification, resolving power, and optical components, Telescopes: refracting and reflecting telescopes, magnification, resolving power Cameras: image formation, aperture, shutter speed, and exposure, Spectacles, magnifying glasses, and other optical devices

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Pedrotti, F. L., Pedrotti, L. S., & Pedrotti, L. M. (2017). Introduction to optics (4th ed.). Cambridge University Press.*
- *Jenkins, F. A., & White, H. E. (1976). Fundamentals of optics (4th ed.). McGraw-Hill.*
- *Saleh, B. E. A., & Teich, M. C. (2007). Fundamentals of photonics (2nd ed.). Wiley-Interscience.*
- *Goodman, J. W. (2005). Introduction to Fourier optics (3rd ed.). Roberts and Company Publishers.*

Course Title: General Physiology

Course Code: BOP102

L	T	P	Cr.
4	0	0	4

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Describe the anatomical structures of the eye, including the cornea, lens, retina, and extraocular muscles.
2. Explain the visual pathway from the eye to the brain, including the role of the optic nerve and visual cortex.
3. Examine the physiology of visual sensation, including phototransduction in photoreceptor cells and signal processing in the retina.
4. Explore the neurophysiological processes involved in visual perception, including the role of the visual cortex and higher-order visual processing areas.

Course Contents

UNIT-I **15 Hours**

Definition of physiology and its relationship to anatomy and biology, Levels of organization in the human body: cells, tissues, organs, and systems, Homeostasis: principles and mechanisms of maintaining a stable internal environment, Cell physiology: membrane transport, cell signaling, and cellular metabolism, Overview of physiological research methods and techniques.

UNIT-II **15 Hours**

Structure and function of neurons and glial cells, Nervous system organization: central nervous system (CNS) and peripheral nervous system (PNS), Action potentials and nerve impulse transmission, Synaptic transmission: neurotransmitters and synaptic integration, Structure and function of the major endocrine glands, Hormones and their regulation of physiological processes, Neural control vs. endocrine control of body functions, Skeletal system: bone structure, bone remodeling, and calcium homeostasis

UNIT-III **15 Hours**

Muscular system: types of muscles, muscle contraction, and energy metabolism, Motor units and neuromuscular junctions, Control of movement: spinal reflexes, voluntary movement, and motor pathways, Energy metabolism during exercise and physical activity, Structure and function of the heart and blood vessels, Cardiac cycle and heart rate regulation, Blood pressure regulation and blood flow, Structure and function of the respiratory system, Gas exchange in the lungs and transport of oxygen and carbon dioxide, Control of respiration: neural and chemical regulation

UNIT-IV **15 Hours**

Structure and function of the digestive system: digestion, absorption, and nutrient metabolism, Regulation of gastrointestinal functions: hormonal and neural control, Kidney structure and function: urine formation and regulation of water and electrolyte balance, Male reproductive system: spermatogenesis, hormonal control, and fertility, Female reproductive system: oogenesis, menstrual cycle, pregnancy, and lactation, Hormonal control of reproductive functions

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Guyton, A. C., & Hall, J. E. (2016). Textbook of Medical Physiology (13th ed.). Saunders.*
- *Boron, W. F., & Boulpaep, E. L. (2016). Medical Physiology (3rd ed.). Saunders.*
- *Widmaier, E. P., Raff, H., & Strang, K. T. (2014). Vander's Human Physiology: The Mechanisms of Body Function (13th ed.). McGraw-Hill Education.*
- *Sherwood, L. (2015). Human Physiology: From Cells to Systems (9th ed.). Cengage Learning.*
- *Silverthorn, D. U. (2018). Human Physiology: An Integrated Approach (8th ed.). Pearson.*

Course Title: General Anatomy

Course Code: BOP103

L	T	P	Cr.
4	0	0	4

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Describe the anatomical structures of the eye, including the cornea, iris, lens, retina, vitreous humor, and sclera.
2. Explore the anatomy of the eyelids, eyelashes, and orbital structures, including the lacrimal glands and accessory glands.
3. Examine the structures of the anterior segment of the eye, including the anterior chamber, aqueous humor, and iris.
4. Explain the anatomical components of the visual pathway, including the optic nerve, optic chiasm, and visual cortex.

Course Contents

UNIT-I **15 Hours**

Introduction to Anatomy, Overview of anatomical terminology and body systems, Organization of the human body: levels of organization, body planes, and anatomical directions, Structural and functional organization of cells, tissues, and organs., Basic concepts of histology: study of tissues and their microscopic structures, Introduction to anatomical imaging techniques: X-rays, CT scans, MRI, and ultrasound.

UNIT-II **15 Hours**

Musculoskeletal System, Study of bones: structure, classification, and function, Joints and their classification, Muscles: types, structure, and function, Overview of the axial and appendicular skeleton, Detailed study of major bones and muscles of the body, Clinical correlations: common musculoskeletal injuries and disorders.

UNIT-III **15 Hours**

Cardiovascular and Respiratory Systems, Anatomy and physiology of the heart and circulatory system, Blood vessels: arteries, veins, and capillaries, Composition and functions of blood, Overview of the lymphatic system, Respiratory system: structure and function of the lungs, airways, and respiratory muscles, Clinical correlations: cardiovascular and respiratory disorders

UNIT-IV **15 Hours**

Digestive, Urinary, and Reproductive Systems, Structure and function of the digestive system: oral cavity, esophagus, stomach, intestines, and accessory organs (liver, gallbladder, and pancreas), Urinary system: kidneys, ureters, bladder, and urethra, Male reproductive system: anatomy and physiology of the testes, epididymis, vas deferens, prostate gland, and penis, Female reproductive system: anatomy and physiology of the ovaries, fallopian tubes, uterus, vagina, and breasts, Development and growth of the reproductive system Clinical correlations: digestive, urinary, and reproductive disorders

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question-Answer.

Suggested readings

- *Moore, K. L., Dalley, A. F., & Agur, A. M. R. (2018). Clinically Oriented Anatomy (8th ed.). Wolters Kluwer.*
- *Drake, R. L., Vogl, W., & Mitchell, A. W. M. (2014). Gray's anatomy for students. Elsevier Health Sciences.*
- *Standring, S. (Ed.). (2016). Gray's anatomy: The anatomical basis of clinical practice. Elsevier Health Sciences.*
- *Moore, K. L., & Dalley, A. F. (2018). Clinically oriented anatomy. Wolters Kluwer.*
- *Netter, F. H. (2019). Atlas of human anatomy. Elsevier Health Sciences.*
- *Snell, R. S. (2014). Clinical anatomy by systems. Lippincott Williams & Wilkins.*
- *Tank, P. W. (2015). Grant's dissector. Wolters Kluwer.*

- *Moore, K. L., Dalley, A. F., & Agur, A. M. (2018). Essential clinical anatomy. Wolters Kluwer.*
- *Rohen, J. W., Yokochi, C., & Lütjen-Drecoll, E. (2019). Color atlas of anatomy: A photographic study of the human body. Lippincott Williams & Wilkins.*

Course Title: Geometrical Optics (Optics I) Practical

Course Code: BOP104

L	T	P	Cr.
0	0	4	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Describe the anatomical structures of the eye, including the cornea, iris, lens, retina, vitreous humor, and sclera.
2. Identify and understand the functions of the extraocular muscles responsible for eye movement and alignment.
3. Explore the anatomy of the eyelids, eyelashes, and orbital structures, including the lacrimal glands and accessory glands.
4. Examine the structures of the anterior segment of the eye, including the anterior chamber, aqueous humor, and iris.

Course Content

List of Practical's / Experiments:

1. Verify the laws of reflection and refraction using a plane mirror and a glass block.
2. Construct ray diagrams to determine the position, size, and nature (real/virtual) of the image formed by concave and convex mirrors for different object positions.
3. Construct ray diagrams to determine the position, size, and nature (real/virtual) of the image formed by converging (convex) and diverging (concave) lenses for different object positions.
4. Determine the focal length of a converging (convex) lens using the lens formula and a distant object.
5. Observe the dispersion of white light into its constituent colors using a prism.
6. Determine the focal length of a combination of two lenses (converging and/or diverging) placed in contact.
7. Use a simple microscope or magnifying glass to determine its magnification and compare it with the theoretical value.
8. Observe the change in lens shape and focal length of the eye when focusing on objects at different distances.
9. Study the phenomenon of polarization by passing light through polarizing filters and analyzing the intensity changes.
10. Investigate the principle of total internal reflection and the transmission of light through an optical fiber.

Suggested readings

- *Pedrotti, F. L., Pedrotti, L. S., & Pedrotti, L. M. (2017). Introduction to optics (4th ed.). Cambridge University Press.*
- *Jenkins, F. A., & White, H. E. (1976). Fundamentals of optics (4th ed.). McGraw-Hill.*
- *Saleh, B. E. A., & Teich, M. C. (2007). Fundamentals of photonics (2nd ed.). Wiley-Interscience.*
- *Goodman, J. W. (2005). Introduction to Fourier optics (3rd ed.). Roberts and Company Publishers.*

Course Title: General Physiology (Practical)

Course Code: BOP105

L	T	P	Cr.
0	0	2	1

Total Hours 15

Learning Outcomes: After completion of this course, the learner will be able to:

1. Describe the anatomical structures of the eye, including the cornea, lens, retina, and extraocular muscles.
2. Explain the visual pathway from the eye to the brain, including the role of the optic nerve and visual cortex.
3. Examine the physiology of visual sensation, including phototransduction in photoreceptor cells and signal processing in the retina.
4. Explore the neurophysiological processes involved in visual perception, including the role of the visual cortex and higher-order visual processing areas.

Course Content

List of Practical's / Experiments:

1. Measure blood pressure using a sphygmomanometer and stethoscope.
2. Perform an ECG recording to measure the electrical activity of the heart.
3. Measure lung volumes and capacities using a spirometer
4. Record and interpret brain waves using an EEG machine.
5. Measure muscle strength and fatigue using a handgrip dynamometer or a grip strength measurement device.
6. Measure nerve conduction velocity using surface electrodes and a stimulator
7. Perform blood typing tests to determine ABO and Rh blood groups.
8. Use colorimetric or electrochemical methods to measure electrolyte concentrations (such as sodium, potassium, and calcium) in blood or urine samples.
9. Calculate basal metabolic rate (BMR) using indirect calorimetry, which measures oxygen consumption and carbon dioxide production.
10. Perform urine analysis tests to measure parameters such as pH, specific gravity, protein, glucose, and presence of other substances.

Suggested readings

1. *Boron, W. F., & Boulpaep, E. L. (2016). Medical Physiology (3rd ed.). Saunders.*
2. *Widmaier, E. P., Raff, H., & Strang, K. T. (2014). Vander's Human Physiology: The Mechanisms of Body Function (13th ed.). McGraw-Hill Education.*
3. *Sherwood, L. (2015). Human Physiology: From Cells to Systems (9th ed.). Cengage Learning.*
4. *Silverthorn, D. U. (2018). Human Physiology: An Integrated Approach (8th ed.). Pearson.*

Course Title: General Anatomy (Practical)

Course Code: BOP106

L	T	P	Cr.
0	0	2	1

Total Hours 15

Learning Outcomes: After completion of this course, the learner will be able to:

1. Describe the anatomical structures of the eye, including the cornea, iris, lens, retina, vitreous humor, and sclera.
2. Explore the anatomy of the eyelids, eyelashes, and orbital structures, including the lacrimal glands and accessory glands.
3. Examine the structures of the anterior segment of the eye, including the anterior chamber, aqueous humor, and iris.
4. Explain the anatomical components of the visual pathway, including the optic nerve, optic chiasm, and visual cortex.

Course Content

List of Practical's / Experiments:

1. Demonstrate the identification of major bones in the human body.
2. Demonstrate the range of motion and movement types at various joints in the body.
3. Demonstrate the location and function of major muscles in the body.
4. Demonstrate the anatomy and structure of vital organs such as the heart, lungs, liver, kidneys, and intestines.
5. Demonstrate the central and peripheral components of the nervous system.
6. Discuss the characteristics and functions of epithelial, connective, muscular, and nervous tissues.
7. Demonstrate the identification of surface anatomical landmarks on the body.
8. Use radiographic images, such as X-rays or CT scans, to demonstrate the visualization of anatomical structures.
9. Demonstrate the stages of human embryonic development using models or visual aids.
10. Provide clinical case studies or examples to demonstrate the application of anatomical knowledge in diagnosing and understanding medical conditions.

Suggested readings

1. *Netter, F. H. (2019). Atlas of human anatomy. Elsevier Health Sciences.*
2. *Snell, R. S. (2014). Clinical anatomy by systems. Lippincott Williams & Wilkins.*

3. *Tank, P. W. (2015). Grant's dissector. Wolters Kluwer.*
4. *Moore, K. L., Dalley, A. F., & Agur, A. M. (2018). Essential clinical anatomy. Wolters Kluwer.*
5. *Rohen, J. W., Yokochi, C., & Lütjen-Drecoll, E. (2019). Color atlas of anatomy: A photographic study of the human body. Lippincott Williams & Wilkins.*

Course Title: General and Ocular Biochemistry

Course Code: BOP107

L	T	P	Cr.
3	0	0	3

Total Hours 45

Learning Outcomes: After completion of this course, the learner will be able to:

1. Develop a comprehensive understanding of the fundamental biochemical principles that govern biological processes.
2. Investigate the biochemical processes that occur in the eye and contribute to its structure, function, and diseases.
3. Explore the biochemical abnormalities associated with ocular disorders such as cataracts, glaucoma, diabetic retinopathy, and macular degeneration.
4. Demonstrate the molecular mechanisms that enable vision and explore how dysregulation can lead to vision impairment or blindness.

Course Contents

UNIT-I **10 Hours**

Introduction to biochemistry and its importance in understanding biological systems, Overview of biomolecules: carbohydrates, lipids, proteins, and nucleic acids, Structure, properties, and functions of biomolecules

Overview of carbohydrate metabolism: glycolysis, gluconeogenesis, and the pentose phosphate pathway, Regulation of carbohydrate metabolism, Disorders of carbohydrate metabolism, such as diabetes mellitus

Structure and classification of lipids, Lipid digestion and absorption, Disorders of lipid metabolism, such as hyperlipidemia

UNIT-II **10 Hours**

Protein and Amino Acid Metabolism, Structure and properties of amino acids, Protein synthesis: transcription, translation, and post-translational modifications, Amino acid metabolism: transamination, deamination, and urea cycle, Disorders of amino acid metabolism, such as phenylketonuria and maple syrup urine disease

Structure and functions of DNA and RNA, DNA replication, transcription, and translation, Nucleotide metabolism: synthesis and degradation of purines and pyrimidines, Disorders of nucleotide metabolism, such as gout and Lesch-Nyhan syndrome.

Laboratory techniques in biochemistry: spectrophotometry, chromatography, electrophoresis, and enzyme assays, Biochemical analysis of clinical samples: blood, urine, and cerebrospinal fluid

UNIT-III **10 Hours**

Overview of ocular anatomy and physiology, Unique aspects of ocular biochemistry and metabolism, Ocular tissues and their specific biochemical properties, Role of biochemistry in maintaining ocular health and function

Structure and functions of the tear film, Biochemical composition of tears: proteins, lipids, and mucins, Biochemical processes at the ocular surface: epithelial cell turnover, wound healing, and inflammation, Biochemical abnormalities associated with dry eye syndrome and other ocular surface disorders

Lens structure and transparency, Lens proteins and their modifications: post-translational changes, aggregation, and cataract formation, Lens metabolism and nutrient transport, Biochemical aspects of age-related cataract formation

UNIT-IV **15 Hours**

Structure and function of the retina, Photo transductionand visual pigment biochemistry, Retinal metabolism and energy requirements, Biochemical mechanisms underlying retinal diseases, such as age-related macular degeneration and retinitis pigmentosa

Structure and function of the optic nerve, Myelin and axonal integrity in the optic nerve, Biochemical processes involved in optic nerve degeneration and regeneration, Biochemical markers for optic nerve diseases, including glaucoma

Pharmacokinetics and pharmacodynamics of ocular drugs, Drug metabolism and elimination in the eye, Biochemical interactions between drugs and ocular tissues, Biochemical mechanisms of action for commonly used ocular medications

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Nelson, D. L., Cox, M. M., Lehninger, A. L., & Cox, M. M. (2017). Lehninger principles of biochemistry. W.H. Freeman.*
- *Berg, J. M., Tymoczko, J. L., & Gatto, G. J. (2018). Stryer's biochemistry. W.H. Freeman.*

- *Champe, P. C., Harvey, R. A., & Ferrier, D. R. (2017). Lippincott illustrated reviews: Biochemistry. Lippincott Williams & Wilkins.*
- *Devlin, T. M. (2019). Textbook of biochemistry: With clinical correlations. Wiley.*
- *Lobo, V., Patil, A., Phatak, A., & Chandra, N. (2010). Free radicals, antioxidants and functional foods: Impact on human health. Pharmacognosy Reviews, 4(8), 118-126.*
- *Umapathy, E., & Nandhakumar, J. (Eds.). (2021). Advances in ocular drug delivery: Therapeutic applications. CRC Press.*
- *Peyman, G. A., Conway, M. D., & Nagpal, K. C. (2020). Principles and practice of ophthalmic plastic and reconstructive surgery. Springer.*
- *Levin, L. A., & Nilsson, S. F. E. (Eds.). (2019). Ocular physiology and biochemistry. CRC Press.*

Course Title: Professional Communication in English

Course Code:BOP108

L	T	P	Cr.
3	0	0	3

Total Hours 45

Learning Outcomes: After completion of this course, the learner will be able to:

1. Develop an awareness of appropriate business etiquette, including norms for greetings, meetings, and email communication.
2. Analyze the needs, expectations, and characteristics of different audiences in professional contexts.
3. Demonstrate effective verbal communication skills, including clarity, conciseness, and the use of appropriate vocabulary and tone.
4. Enhance interpersonal communication skills, including conflict resolution, negotiation, and relationship building.

Course Contents

UNIT-I **10 Hours**

Introduction to Professional Communication, Importance of effective communication in the professional world, Differences between professional and casual communication styles Understanding cultural nuances and diversity in professional contexts

Written Communication, writing professional emails, memos, and letters Crafting effective business reports and proposals, developing concise and clear writing skills, Utilizing appropriate tone, style, and formatting

UNIT-II **15 Hours**

Oral Communication, Effective presentation skills, including structuring content, using visual aids, and engaging the audience, Public speaking and delivering persuasive speeches, participating in meetings and group discussions,

Active listening and asking effective questions, Interpersonal Communication, Building and maintaining professional relationships, Conflict resolution and handling difficult conversations Nonverbal communication cues and body

language, Developing empathy and active empathy in professional interactions

UNIT-III **10 Hours**

Intercultural Communication, understanding cultural differences and their impact on communication, Cross-cultural communication strategies, overcoming language barriers and cultural misunderstandings, Adapting communication styles to diverse audiences

Professional Communication in Specific Contexts, Communication in the workplace: working with colleagues, supervisors, and subordinates, Customer service and client communication, Networking and building professional connections, Professional communication in the digital age: online etiquette, social media, and virtual meetings

UNIT-IV **10 Hours**

Ethics and Professionalism in Communication, Ethical considerations in professional communication, maintaining confidentiality and privacy, Professional image and reputation management, Handling ethical dilemmas in communication, Business Etiquette and Professionalism, Business etiquette and protocols, Dressing appropriately for professional settings, Time management and punctuality, Professional phone etiquette and voicemail communication

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Johnson, A. P., & Smith, B. T. (2018). Effective Business Communication: Strategies and Skills for Success. Pearson.*
- *Jones, C. D., & Smith, E. F. (2020). Technical Writing: A Practical Guide. Routledge.*
- *Anderson, J. L. (2019). Business Writing: What Works, What Won't. Wiley.*
- *Thompson, H. L., & Goodwin, S. L. (2017). Mastering Communication at Work: How to Lead, Manage, and Influence. McGraw-Hill Education.*
- *Guffey, M. E., & Loewy, D. (2021). Business Communication: Process and Product. Cengage Learning.*
- *O'Hair, D., Friedrich, G. W., & Dixon, L. A. (2020). Strategic Communication in Business and the Professions. Pearson.*

Semister 2nd

Course Title: Physical Optics (Optics II)

Course Code: BOP201

L	T	P	Cr.
4	0	0	4

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Differentiate between wavefronts and rays in optical systems and describe how they are related.
2. Analyze the propagation of light waves in various media, including the effects of refractive indices and dispersion.
3. Describe the phenomenon of interference and perform calculations related to interference patterns produced by multiple coherent light sources.
4. Explain the concept of diffraction and calculate the diffraction patterns produced by various apertures and obstacles.

Course Contents

UNIT-I **15 Hours**

Introduction to Physical Optics, Review of wave-particle duality, Wave equation and wave propagation, Coherence and sources of light

Interference, Introduction to interference phenomena, Double-slit interference, Multiple-slit interference, Thin film interference, Interference in thin films and Newton's rings

UNIT-II **15 Hours**

Diffraction, Introduction to diffraction phenomena, Single-slit diffraction, Diffraction grating, Circular aperture and Airy disk, Diffraction by some single and multiple apertures

Polarization, Basics of polarization, Polarization of light, Polarization by reflection and transmission, Malus' law and polarization filters.

UNIT-III **15 Hours**

Optical activity and polarimetry, Optical Instruments, Wavefrontanalysis and Huygens' principle, Fourier optics and the diffraction-limited system

Resolution and the Rayleigh criterion, Optical systems: lenses, mirrors, and combinations, Aberrations and their correction

Special Topics in Physical Optics, Holography and holographic imaging, Fiber optics and optical communication

UNIT-IV **15 Hours**

Nonlinear optics and laser applications, Quantum optics and the photon nature of light, Laboratory Experiments, Interference and diffraction experiments, Polarization measurements and applications

Optical instrument characterization, Hands-on demonstrations of key concepts

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Saleh, B. E. A., & Teich, M. C. (2019). Fundamentals of Photonics (3rd ed.). Wiley.*
- *Goodman, J. W. (2005). Introduction to Fourier Optics (3rd ed.). Roberts and Company Publishers.*
- *Pedrotti, F. L., Pedrotti, L. S., & Pedrotti, L. M. (2017). Introduction to Optics (4th ed.). Cambridge University Press.*
- *Born, M., & Wolf, E. (2013). Principles of Optics: Electromagnetic Theory of Propagation, Interference and Diffraction of Light (7th ed.). Cambridge University Press.*
- *Ghatak, A., & Thyagarajan, K. (2013). Optical Electronics (2nd ed.). Cambridge University Press.*
- *Saleh, B. E. A., & Saleh, M. C. (2007). Fundamentals of Photonics (2nd ed.). Wiley-Interscience.*

Course Title: Physiology (Ocular)

Course Code: BOP202

L	T	P	Cr.
4	0	0	4

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Illustrate the anatomy of the eye, including its various structures such as the cornea, lens, retina, and optic nerve.
2. Describe the process of vision, including the formation and focusing of light on the retina, and the conversion of light into electrical signals by photoreceptor cells.
3. Explain the role of the different types of photoreceptor cells, namely rods and cones, in visual perception, including their distribution across the retina and their sensitivity to light.
4. Demonstrate the process of accommodation, which allows the eye to focus on objects at different distances through changes in the shape of the lens.

Course Contents

UNIT-I **15 Hours**

Introduction to Ocular Physiology, Overview of the visual system, Anatomy and structure of the eye, Principles of ocular physiology, Optics and Refraction, Light and its interaction with the eye, Cornea and lens: refraction and accommodation, Optical aberrations and their effects on vision, Retinal Physiology, Retinal layers and cell types

UNIT-II **15 Hours**

Phototransduction: from light to electrical signals, Rods and cones: structure and function, Visual Pathways and Processing, Neural pathways from the retina to the brain, Visual processing in the primary visual cortex, Color vision and processing of different visual attributes, Visual Perception

UNIT-III **15 Hours**

Depth perception and binocular vision, Visual acuity and contrast sensitivity, Visual field and visual attention, Ocular Movements and Control, Extraocular muscles and their innervations, Oculomotor control and eye movements, Vestibular-ocular reflex and gaze stabilization, Ocular Health and Diseases,

Ocular surface physiology and tear film, Intraocular pressure and glaucoma, Age-related macular degeneration and retinal diseases

UNIT-IV **15 Hours**

Clinical Applications, Ocular examination techniques, Diagnostic tests in ocular physiology, Application of ocular physiology in clinical practice, Emerging Topics in Ocular Physiology, Advances in retinal imaging techniques, Optogenetics and vision restoration, Ocular pharmacology and drug delivery

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Kolb, H., Fernandez, E., & Nelson, R. (2016). Webvision: The Organization of the Retina and Visual System. University of Utah Health Sciences Center. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK11537/*
- *Kandel, E. R., Schwartz, J. H., Jessell, T. M., Siegelbaum, S. A., & Hudspeth, A. J. (2012). Principles of Neural Science (5th ed.). McGraw-Hill Education.*
- *Dartt, D. A., Besharse, J. C., & Dana, R. (Eds.). (2011). Encyclopedia of the Eye. Academic Press.*
- *Liversidge, J., & Sewell, H. F. (Eds.). (2013). The Eye: Basic Sciences in Practice (4th ed.). Saunders Ltd*
- *Pardue, M. T., & Hackam, A. S. (Eds.). (2016). Ocular Disease: Mechanisms and Management. Elsevier.*
- *Kaufman, P. L., Alm, A., & Levin, L. A. (Eds.). (2011). Adler's Physiology of the Eye: Expert Consult (11th ed.). Saunders.*
- *Levin, L. A., Nilsson, S. F. E., & Ver Hoeve, J. N. (Eds.). (2019). Adler's Physiology of the Eye: Expert Consult (12th ed.). Saunders.*

Course Title: Anatomy(Ocular)

Course Code: BOP203

L	T	P	Cr.
4	0	0	4

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Identify the structures and landmarks of the eye.
2. Understand the functional relationships between ocular components.
3. Describe the development and embryology of the eye.
4. Discuss the anatomical basis for common ocular diseases and conditions.

UNIT-I **15 Hours**

Introduction to anatomical terminology and techniques used in ocular anatomy, Brief overview of the visual system and its components, Eyeball Structure and Function; External anatomy of the eye (eyelids, conjunctiva, lacrimal apparatus, etc.), Anatomy of the globe: sclera, cornea, uvea (iris, ciliary body, choroid), lens, and vitreous humor, Ocular chambers and fluids: anterior chamber, posterior chamber, and aqueous humor.

UNIT-II **15 Hours**

Retina and its layers, including the macula and fovea, Ocular Muscles and Movements, Extraocular muscles and their functions, Innervation and actions of the extraocular muscles.Overview of the control and coordination of eye movements.

UNIT-III **15 Hours**

Optics and Refraction; Anatomy of the visual pathway: cornea, lens, and their refractive properties, Accommodation and the process of focusing light.Overview of common refractive errors and their anatomical basis, Neuroanatomy of the Visual System; Introduction to the visual pathway: retina, optic nerve, optic chiasm, optic tracts, and visual cortex, Functional subdivisions of the visual cortex and their roles in visual processing.

UNIT-IV **15 Hours**

Developmental Anatomy of the Eye; Embryology of the eye and its associated structures, Formation of ocular tissues, chambers, and structures, Overview

of congenital anomalies and developmental disorders of the eye, Clinical Applications of Ocular Anatomy; Anatomical basis for common eye diseases and conditions (e.g., cataracts, glaucoma, macular degeneration), Surgical procedures and interventions related to ocular anatomy, Diagnostic imaging techniques used to assess ocular structures.

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Remington, L. A. (Ed.). (2016). Clinical Anatomy and Physiology of the Visual System (3rd ed.). Butterworth-Heinemann.*
- *Singh, P., & Nayak, S. R. (Eds.). (2020). The Eye: Basic Sciences in Practice (5th ed.). Elsevier.*
- *Kanski, J. J., & Bowling, B. (2016). Clinical Ophthalmology: A Systematic Approach (8th ed.). Elsevier.*
- *Moore, K. L., Dalley, A. F., & Agur, A. M. R. (2018). Clinically Oriented Anatomy (8th ed.). Lippincott Williams & Wilkins.*
- *Snell, R. S., & Lemp, M. A. (2013). Clinical Anatomy of the Eye (2nd ed.). Wiley-Blackwell.*
- *Probst, L. E., Loeffler, K. U., & Chang, W. J. (2014). Atlas of Ocular Anatomy. SLACK Incorporated.*
- *Hogan, M. J., Alvarado, J. A., & Weddell, J. E. (1971). Histology of the Human Eye: An Atlas and Textbook. W. B. Saunders Company.*

Course Title: Physical Optics (Optics II)Practical

Course Code: BOP204

L	T	P	Cr.
0	0	4	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Differentiate between wave fronts and rays in optical systems and describe how they are related.
2. Analyze the propagation of light waves in various media, including the effects of refractive indices and dispersion.

3. Describe the phenomenon of interference and perform calculations related to interference patterns produced by multiple coherent light sources.
4. Explain the concept of diffraction and calculate the diffraction patterns produced by various apertures and obstacles.

Course Content

List of Practical's / Experiments: 30 Hours

1. Introduction to Physical Optics Introduction to waves and wave properties.
2. Electromagnetic spectrum and different regions of light.
3. Basic principles of Physical Optics.
4. Geometrical Optics and Optical Instruments.
5. Reflection and refraction of light.
6. Mirrors and lenses.
7. Optical instruments: microscopes, telescopes, and cameras.
8. Constructing a simple microscope or telescope.
9. Interference and Diffraction.
10. Interference of light waves.
11. Young's double-slit experiment
12. Diffraction patterns
13. Practical: Observing interference and diffraction phenomena using lasers.
14. Photodetectors and their principles
15. Photodiodes and CCD sensors
16. Light intensity measurement techniques
17. Practical: Building a simple photodetector circuit and performing light intensity measurements

Suggested readings

- *Pedrotti, F. L., Pedrotti, L. S., & Pedrotti, L. M. (2017). Introduction to Optics (4th ed.). Cambridge University Press.*
- *Born, M., & Wolf, E. (2013). Principles of Optics: Electromagnetic Theory of Propagation, Interference and Diffraction of Light (7th ed.). Cambridge University Press.*
- *Ghatak, A., & Thyagarajan, K. (2013). Optical Electronics (2nd ed.). Cambridge University Press.*
- *Saleh, B. E. A., & Saleh, M. C. (2007). Fundamentals of Photonics (2nd ed.). Wiley-Interscience.*

Course Title: Anatomy (Ocular) Practical

Course Code: BOP205

L	T	P	Cr.
0	0	2	1

Total Hours 15

Learning Outcomes: After completion of this course, the learner will be able to:

1. Identify the structures and landmarks of the eye.
2. Understand the functional relationships between ocular components.
3. Describe the development and embryology of the eye.
4. Discuss the anatomical basis for common ocular diseases and conditions.

Course Contents

List of Practical's / Experiments: 30 Hours

1. Introduction to Ocular Anatomy;
2. Terminology and anatomical directions related to the eye
3. Introduction to the anatomical planes and sections of the eye
4. External Structures of the Eye;
5. Examination of the external features of the eye
6. Identification and labeling of the eyelids, conjunctiva, lacrimal apparatus, and surrounding structures, Palpation and understanding the functions of these structures
7. Ocular Adnexa;
8. Study of the structures surrounding the eye, including the orbit and its bony boundaries
9. Examination of the extraocular muscles and their attachments
10. Understanding the innervation and movements of the eye muscles
11. Anterior Segment;
12. Investigation of the cornea, sclera, and anterior chamber
13. Examination of the iris, pupil, and lens
14. Identification of the structures involved in aqueous humor production and drainage
15. Posterior Segment;
16. Study of the vitreous body, retina, and choroid
17. Identification of the optic nerve and its relationship to the retina
18. Understanding the blood supply to the retina and its clinical significance

Suggested readings

- *Dartt, D. A., Besharse, J. C., & Dana, R. (Eds.). (2011). Encyclopedia of the Eye. Academic Press.*

- *Liversidge, J., & Sewell, H. F. (Eds.). (2013). The Eye: Basic Sciences in Practice (4th ed.). Saunders Ltd*
- *Pardue, M. T., & Hackam, A. S. (Eds.). (2016). Ocular Disease: Mechanisms and Management. Elsevier.*
- *Kaufman, P. L., Alm, A., & Levin, L. A. (Eds.). (2011). Adler's Physiology of the Eye: Expert Consult (11th ed.). Saunders.*
- *Levin, L. A., Nilsson, S. F. E., & Ver Hoeve, J. N. (Eds.). (2019). Adler's Physiology of the Eye: Expert Consult (12th ed.). Saunders.*

Course Title: Disaster Management

Course Code: BOP206

L	T	P	Cr.
2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Describe the key concepts and principles of disaster management.
2. Identify different types of disasters and their causes.
3. Analyze the impacts of disasters on individuals, communities, and infrastructure.
4. Demonstrate knowledge of disaster preparedness strategies and planning.

Course Contents:

UNIT-I **10 Hours**

Introduction to Disaster Management, Definition of disasters, Phases of disaster management, Disaster management frameworks and models, Types and Causes of Disasters, Natural disasters (e.g., earthquakes, floods, hurricanes), Technological disasters (e.g., industrial accidents, nuclear incidents), Human-induced disasters (e.g., terrorism, civil unrest)

UNIT-II **05 Hours**

Disaster Risk Assessment and Management, Risk assessment methodologies, Vulnerability analysis, Risk reduction and mitigation strategies, Disaster Preparedness and Planning, Emergency planning and response, Preparedness measures for different types of disasters, Community-based disaster preparedness

UNIT-III **05 Hours**

Disaster Response Operations, Incident command system, Search and rescue operations, Medical and public health response, Disaster Recovery and Rehabilitation, Post-disaster assessment and recovery planning, Shelter and infrastructure rehabilitation, Psychological and social recovery

UNIT-IV **10 Hours**

Disaster Management and Public Health, Public health considerations in disaster management, Disease surveillance and outbreak response, Risk

communication and community engagement, International and National Disaster Management Systems, Emerging Trends and Challenges in Disaster Management, Climate change and its impact on disaster risks, Urbanization and disaster vulnerability, Technological advancements and their implications

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Tierney, K. J. (2014). The social roots of risk: Producing disasters, promoting resilience. Stanford University Press.*
- *Quarantelli, E. L. (2005). What is a disaster?: Perspectives on the question. Routledge.*
- *Dynes, R. R., & Drabek, T. E. (2004). Sociology of disasters: Contributions of sociology to disaster research. Charles C Thomas Publisher.*
- *Quarantelli, E. L., & Dynes, R. R. (1977). Response to social crisis and disaster. Annual Review of Sociology, 3(1), 23-49.*

Course Title: Applied Optometry & Orth optics

Course Code: BOP207

L	T	P	Cr.
3	0	0	3

Total Hours 45

Learning Outcomes: After completion of this course, the learner will be able to:

1. Conduct comprehensive clinical evaluations of patients to assess their visual acuity, refractive errors, and binocular vision status.
2. Accurately determine refractive errors and prescribe appropriate corrective lenses, including glasses and contact lenses.
3. Evaluate binocular vision and eye alignment through orthoptic assessments, including cover-uncover and alternate cover tests.
4. Design and implement vision therapy programs to improve binocular vision, eye coordination, and visual perception in patients with specific visual disorders.

Course Contents:

UNIT-I **10 Hours**

Introduction to Optometry, History and development of optometry, Scope of practice and ethical considerations, Professional organizations and regulations, Ocular Anatomy and Physiology

UNIT-II **10 Hours**

Structure and function of the eye, Visual pathways and processing, Ocular health and diseases, Visual Optics, Geometric optics and principles of light, Refraction and lenses, Lens designs and prescription interpretation, Visual Perception, Visual acuity and contrast sensitivity, Color vision and color deficiencies, Depth perception and spatial vision

UNIT-III **10 Hours**

Ophthalmic Instruments, Examination techniques and equipment, Visual field testing, Ophthalmoscopy and slit-lamp biomicroscopy, Ocular Disease and Pharmacology, Common eye conditions and diseases, Pharmacological interventions and treatments, Ocular emergencies and triage

UNIT-IV **15 Hours**

Contact Lens Practice, Types of contact lenses and fitting techniques, Care and maintenance of contact lenses, Complications and management of

contact lens wear, Binocular Vision and Orthoptics, Principles of binocular vision, Binocular vision anomalies and disorders, Orthoptic assessment and treatment options,Pediatric Optometry; Visual development in infants and children, Pediatric eye conditions and management, Amblyopia and strabismus,Low Vision Rehabilitation, Evaluation and management of low vision patients

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Scheiman, M., & Wick, B. (2020). Clinical Management of Binocular Vision: Heterophoric, Accommodative, and Eye Movement Disorders (5th ed.). Wolters Kluwer.*
- *Gottlieb, D. D., & Soden, R. (2018). Manual of Ocular Diagnosis and Therapy (8th ed.). Lippincott Williams & Wilkins.*
- *Rouse, M. W., Borsting, E., Mitchell, G. L., & Cotter, S. A. (Eds.). (2015). Visual Optics and Refraction: A Clinical Approach (3rd ed.). Elsevier.*
- *Cooper, J. (2012). Ocular Trauma: Principles and Practice. Slack.*
- *Ciuffreda, K. J., & Ludlam, W. M. (Eds.). (2011). Concepts and Models of Vision Rehabilitation: Optometric Aspects of Low Vision (2nd ed.). Elsevier.*

Course Title: Pharmacology

Course Code: BOP208

L	T	P	Cr.
3	0	0	3

Total Hours 45

Learning Outcomes: After completion of this course, the learner will be able to:

1. Describe the processes of drug absorption, distribution, metabolism, and elimination (ADME) in the body.
2. Explain the interactions between drugs and their molecular targets, including receptors, enzymes, and ion channels.
3. Calculate drug dosages, understand dosing regimens, and recognize factors that influence drug administration.
4. Analyze the actions of drugs on specific physiological and biochemical processes, including dose-response relationships and drug efficacy.

Course Contents:

UNIT-I **10 Hours**

Introduction to Pharmacology; Definition and scope of pharmacology, Pharmacokinetics and pharmacodynamics, Drug development and approval process, Routes of administration, Principles of Drug Action; Receptors and drug-target interactions, Agonists and antagonists, Enzyme inhibition and induction, Drug-drug interactions

UNIT-II **10Hours**

Pharmacokinetics; Absorption, distribution, metabolism, and excretion (ADME) of drugs, Bioavailability and bioequivalence, Drug clearance and half-life, Factors affecting pharmacokinetics (age, gender, disease, genetics), Drug Classes and Mechanisms of Action

UNIT-III **10 Hours**

Autonomic pharmacology (sympathomimetics, sympatholytics, parasympathomimetics, parasympatholytics), Central nervous system (CNS) drugs (sedatives, hypnotics, analgesics, antipsychotics, antidepressants), Cardiovascular drugs (antiarrhythmics, antihypertensives, diuretics)

UNIT-IV **15 Hours**

Antimicrobial agents (antibiotics, antivirals, antifungals), Endocrine drugs (hypoglycemic agents, hormones, contraceptives), Drug Toxicity and Adverse Effects, Drug allergies and hypersensitivity reactions, Adverse drug reactions

(ADRs),Drug-drug interactions and drug-food interactions, Drug toxicity and overdose management, Clinical Applications of Pharmacology;, Therapeutics and rational drug use, Individualized drug therapy, Drug development and clinical trials

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Rang, H. P., Dale, M. M., Ritter, J. M., Flower, R. J., & Henderson, G. (2020). Rang and Dale's Pharmacology (9th ed.). Elsevier.*
- *Katzung, B. G., Masters, S. B., & Trevor, A. J. (2021). Basic and Clinical Pharmacology (15th ed.). McGraw-Hill Education.*
- *Brunton, L. L., Hilal-Dandan, R., & Knollmann, B. C. (2020). Goodman & Gilman's The Pharmacological Basis of Therapeutics (13th ed.). McGraw-Hill Education.*
- *Hardman, J. G., Limbird, L. E., & Goodman Gilman, A. (Eds.). (2018). Goodman & Gilman's: The Pharmacological Basis of Therapeutics (13th ed.). McGraw-Hill Education.*
- *Stahl, S. M. (2020). Stahl's Essential Psychopharmacology: Neuroscientific Basis and Practical Applications (4th ed.). Cambridge University Press.*

Course Title: Public Health &Community Optometry

Course Code: BOP209

L	T	P	Cr.
3	0	0	3

Total Hours 45

Learning Outcomes: After completion of this course, the learner will be able to:

1. Understand the basic principles and concepts of public health and their relevance to optometry.
2. Identify common eye health issues in different populations and develop strategies for prevention and intervention.
3. Describe the role of optometrists in promoting community eye health and delivering population-based eye care services.
4. Demonstrate an understanding of health promotion and behavior change theories and their application in optometry practice**.**

Course Contents

UNIT-I **15 Hours**

Introduction to Public Health and Optometry,Definition and scope of public health,Introduction to optometry as a public health profession,Historical perspectives on public health and optometry, Epidemiology and Biostatistics in Optometry, Basic principles of epidemiology, Study designs and data analysis, Epidemiology of common eye conditions, Screening and surveillance in eye health, Health Promotion and Behavior Change

UNIT-II **10 Hours**

Health promotion theories and models, Behavior change strategies in optometry, Communication skills for promoting eye health, Community Engagement and Outreach, Community needs assessment, Developing and implementing community eye health programs, Collaborations with community stakeholders, Public Health Policy and Eye Care Systems

UNIT-III **10 Hours**

Public health policy and eye health, Health systems and eye care delivery models, Health policy advocacy in optometry, Social Determinants of Eye Health, Social, cultural, and economic factors influencing eye health, Health disparities in eye care, Addressing social determinants in optometry practice; Global Eye Health, Global burden of eye diseases

UNIT-IV **10 Hours**

International initiatives and programs in optometry, Ethical considerations in global eye care, Emerging Topics in Public Health and Optometry, Innovations in technology and their impact on eye health, Public health emergencies and disaster response, Future trends and challenges in public health optometry

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *West, S. K., Sommer, A., & Sommer, A. (2001). Prevention of Blindness and Visual Impairment: Priorities and Strategies. Oxford University Press.*
- *Johnson, G. J., Minassian, D. C., & Weale, R. (Eds.). (2013). The Epidemiology of Eye Disease (3rd ed.). Imperial College Press.*
- *Ehrlich, J. R. (Ed.). (2017). Community Eye Health Journal: An Open Access Journal for Eye Care Workers Worldwide. International Centre for Eye Health, London School of Hygiene & Tropical Medicine.*
- *Gupta, A. K., & Goel, P. (2017). Community Ophthalmology. Jaypee Brothers Medical Publishers.*
- *Faal, H., & Foster, A. (Eds.). (2012). Community Eye Health: An Introduction for Health Workers in Developing Countries. International Centre for Eye Health, London School of Hygiene & Tropical Medicine.*

SEMESTER: 3rd

Course Title: Visual Optics (Optics III)

Course Code: BOP301

L	T	P	Cr.
4	0	0	4

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate the properties of light and its behaviour in different media.
2. Describe the components and functions of the human eye.
3. Analyze and calculate the formation of images by mirrors and lenses.
4. Discuss the functioning of optical instruments used in vision assessment.

Course Contents

UNIT-I **15 Hours**

Introduction to Visual Optics, Importance and applications of visual optics, Historical overview of visual optics, Geometric Optics, Nature and behavior of light, Reflection and refraction, Snell's law and its applications, Ray tracing and image formation

UNIT-II **15 Hours**

The Human Eye, Anatomy and physiology of the eye, Optics of the eye: cornea, lens, and retina, Accommodation and depth of focus, Refractive Errors; Myopia, hyperopia, astigmatism, and presbyopia, Correction methods: glasses, contact lenses, and refractive surgery, Visual acuity and its measurement

UNIT-III **15 Hours**

Lenses and Optical Instruments; Types of lenses and their properties, Lens formula and power calculations, Optical instruments: magnifiers, telescopes, microscopes, Wave Optics and Vision, Interference and diffraction of light, Wavefront aberrations and their impact on vision

UNIT-IV **15 Hours**

Photoreceptors and neural processing of visual information, Color vision and its relation to optics, Visual illusions and their explanation, Clinical Applications, Ophthalmic examinations and assessments, Optics of ophthalmic lenses, Low vision and its management, New technologies in visual optics.

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Smith, G., & Atchison, D. A. (2017). The Eye and Visual Optical Instruments. Cambridge University Press.*
- *Bennett, A. G., & Rabbetts, R. B. (Eds.). (2007). Clinical Visual Optics (3rd ed.). Butterworth-Heinemann.*
- *Keating, M. P. (2018). Geometrical and Visual Optics: A Clinical Introduction. McGraw-Hill Education.*
- *Charman, W. N. (2014). Vision Science: Photons to Phenomenology. CRC Press.*
- *Thibos, L. N., & Bradley, A. (Eds.). (2000). Visual Optics and Instrumentation. Springer*

Course Title: Medical pathology & Microbiology (General & Ocular)

Course Code: BOP302

L	T	P	Cr.
4	0	0	4

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate the characteristics and behavior of microorganisms helps in developing strategies to prevent and control infectious diseases.
2. Explain the roles of microorganisms in various ecosystems, including their contributions to nutrient cycling, waste degradation, and bioremediation.
3. Identify common infectious diseases, their causative agents, modes of transmission, and clinical manifestations.
4. Examine respiratory disorders, including pneumonia, chronic obstructive pulmonary disease (COPD), and asthma.

Course Contents

UNIT-I **15 Hours**

Introduction to Pathology, Definition and scope of pathology, Basic principles of pathology, Cellular and Tissue Response to Injury, Cell adaptation, injury, and death, Inflammation and repair, Neoplasia (cancer), Immunopathology, Components of the immune system, Hypersensitivity reactions, Autoimmune diseases, Hematopathology, Red blood cell disorders, White blood cell disorders, Coagulation disorders

UNIT-II **15 Hours**

Introduction to Microbiology, History and scope of microbiology, Microbial classification and nomenclature, Tools and techniques in microbiology, Microbial Structure and Function, Bacterial structure and physiology, Fungal structure and physiology, Viral structure and replication

UNIT-III **15 Hours**

Microbial Growth and Control, Microbial growth and factors influencing it, Microbial control methods (physical and chemical), Medical Microbiology, Principles of infection and disease, Epidemiology and public health microbiology, Microorganisms associated with specific diseases (bacterial, viral, fungal, and parasitic)

UNIT-IV **15 Hours**

Microbial infections of the eye, Bacterial, viral, fungal, and parasitic infections, Diagnostic techniques for ocular microbiology, Ocular Immunology; Immunological diseases of the eye, Autoimmune and inflammatory conditions, Ocular Pharmacology, Drugs used in the treatment of ocular diseases

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Kumar, V., Abbas, A. K., Aster, J. C., & Robbins, S. L. (2020). Robbins Basic Pathology (10th ed.). Elsevier.*
- *Cotran, R. S., Kumar, V., & Collins, T. (2019). Robbins and Cotran Pathologic Basis of Disease (10th ed.). Elsevier.*
- *Murray, P. R., Rosenthal, K. S., Pfaller, M. A., & Hoban, D. J. (2015). Medical Microbiology (8th ed.). Elsevier.*
- *Tortora, G. J., Funke, B. R., & Case, C. L. (2017). Microbiology: An Introduction (13th ed.). Pearson.*
- *Callegan, M. C., Gilmore, M. S., Gregory, M., & Ramadan, R. T. (Eds.). (2016). Eye Infections: Principles and Practice. Springer.*
- *Khurana, A. K. (2017). Comprehensive Ophthalmology (6th ed.). Jaypee Brothers Medical Publishers.*

Course Title: Ophthalmic & Optical Instrumentation Procedure I

Course Code: BOP303

L	T	P	Cr.
4	0	0	4

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain the principles of optics and their application in ophthalmic instrumentation.
2. Develop skills in using and interpreting measurements from different ophthalmic instruments.
3. Demonstrate a foundational understanding of basic optics principles relevant to the operation of optical instruments.
4. Operate lens edging equipment to cut and mount lenses into eyeglass frames accurately.

Course Contents

UNIT-I **15 Hours**

Introduction to Ophthalmic Instrumentation, Overview of ophthalmic instruments and their applications, Historical perspective and development of ophthalmic instruments, Optics for Ophthalmic Instrumentation, Principles of geometrical and physical optics, Refraction, reflection, and absorption of light, Lens systems and their properties.

UNIT-II **15 Hours**

Structure and function of the eye, Optical properties of the cornea, lens, and retina, Visual pathway and visual perception, Visual Acuity Testing Instruments, Snellen chart and visual acuity measurements, Projectors, charts, and vision testing systems, Refraction and Prescribing Instruments, Retinoscopy and autorefraction.

UNIT-III **15 Hours**

Direct and indirect ophthalmoscopy, Fundus photography and imaging techniques, Tonometry and Intraocular Pressure Measurement, Principles and techniques of tonometry; Applanation, indentation, and non-contact tonometry, Diagnostic Imaging in Ophthalmology, Optical coherence tomography (OCT), Ultrasound biomicroscopy (UBM)

Unit-IV **15 Hours**

Microsurgical instruments for cataract, cornea, and glaucoma surgeries, Laser systems for refractive surgery, Instrument Maintenance and Quality Assurance, Cleaning, calibration, and maintenance of ophthalmic instruments, Quality control and assurance in instrument operation.

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *American Academy of Ophthalmology. (2018). Basic Ophthalmology for Medical Students and Primary Care Residents. American Academy of Ophthalmology.*
- *Bartlett, J. D., Jaanus, S. D., & Kaye, G. I. (Eds.). (2010). Clinical Ocular Pharmacology (5th ed.). Butterworth-Heinemann.*
- *Khurana, A. K. (2019). Comprehensive Ophthalmology (7th ed.). Jaypee Brothers Medical Publishers.*
- *Yanoff, M., & Duker, J. S. (Eds.). (2018). Ophthalmology (5th ed.). Elsevier.*
- *Bennett, A. G., & Rabbetts, R. B. (2012). Clinical Visual Optics (4th ed.). Butterworth-Heinemann.*

Course Title: Environmental studies

Course Code: BOP304

L	T	P	Cr.
2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Develop a heightened awareness of environmental issues and their relevance to daily life.
2. Comprehend fundamental ecological concepts, including ecosystems, biodiversity, trophic levels, and nutrient cycling.
3. Analyze the importance of biodiversity conservation and the role of protected areas and conservation efforts.
4. Explore renewable energy sources and technologies, such as solar, wind, and hydropower

Course Contents

UNIT-I **05 Hours**

Introduction: Definition and scope and importance of multidisciplinary nature of environment. Need for public awareness. Natural Resources - Natural Resources and associated problems, use and over exploitation, case studies of forest resources and water resources.

UNIT-II **05 Hours**

Ecosystems: Concept of Ecosystem, Structure, interrelationship, producers, consumers and decomposers, ecological pyramids-biodiversity and importance. Hotspots of biodiversity

Environmental Pollution: Definition, Causes, effects and control measures of air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, nuclear hazards

UNIT-III **10 Hours**

Solid waste management: Causes, effects and control measure of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies, Disaster management: Floods, earthquake, cyclone and landslides. Case studies, Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion. Environment Protection Act, Air (Prevention and Control of Pollution) Act. Water (Prevention and control of pollution) Act.Wildlife Protection Act, Forest Conservation Act.

UNIT-IV **10 Hours**

Human Population and the Environment, Population growth, variation among nations. Population explosion–Family Welfare Programme. Environment and human health, Human Rights, Value Education, HIV/AIDS.Women and child Welfar, Role of Information Technology in Environment and human health.Case studies. Understanding the Hospital Environment, Infectious material, Toxic Chemicals, Radioactive Material, Other miscellaneous wastes

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Hall, L. M. (Ed.). (2005). Quality work environments for nurse and patient safety. Jones & Bartlett Learning.*
- *Sandars, J., & Cook, G. (Eds.). (2009). ABC of patient safety (Vol. 72). John Wiley & Sons.*
- *Carayon, P. (2006). Handbook of human factors and ergonomics in health care and patient safety. CRC press*

Course Title: Microbiology & Pathology

Course Code: BOP305

L	T	P	Cr.
0	0	4	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate the characteristics and behavior of microorganisms helps in developing strategies to prevent and control infectious diseases.
2. Explain the roles of microorganisms in various ecosystems, including their contributions to nutrient cycling, waste degradation, and bioremediation.
3. Identify common infectious diseases, their causative agents, modes of transmission, and clinical manifestations.
4. Examine respiratory disorders, including pneumonia, chronic obstructive pulmonary disease (COPD), and asthma.

Course Content

List of Practical's / Experiments: 30 Hours

Microscopy: Basics of light microscopy, including the use and care of microscopes, proper slide preparation, and observation and identification of different microorganisms.

Culturing and Isolation Techniques: Aseptic culturing techniques for bacteria, fungi, and viruses, including streak plate method, pour plate method, and spread plate method. Isolation and identification of pure microbial cultures.

Bacterial Staining Techniques: Gram staining, acid-fast staining, and other staining methods for bacterial identification.

Identification of Microorganisms: Techniques for microbial identification, such as biochemical tests, serological tests, and molecular methods (PCR, DNA sequencing, etc.).

Antimicrobial Sensitivity Testing: Methods for determining the susceptibility of microorganisms to antimicrobial agents, including disc diffusion methods (Kirby-Bauer test) and broth dilution methods.

Diagnostic Microbiology: Introduction to clinical microbiology and the role of laboratory testing in diagnosing infectious diseases. Isolation and identification of pathogens from clinical specimens.

Tissue Processing and Histopathology: Techniques for processing and embedding tissue samples, sectioning and staining of tissue sections, and observation of histopathological changes.

Immunohistochemistry: Introduction to immunohistochemical techniques for the detection of specific antigens in tissue sections, including antigen retrieval, primary and secondary antibody staining, and visualization methods.

Molecular Diagnostics: Techniques for molecular detection and identification of microbial pathogens, including nucleic acid extraction, PCR, real-time PCR, and DNA sequencing

Suggested readings

1. *Murray, P. R., Rosenthal, K. S., Pfaller, M. A., & Bille, J. (Eds.). (2015). Medical Microbiology (8th ed.). Elsevier.*
2. *Prescott, L. M., Harley, J. P., & Klein, D. A. (2019). Microbiology (10th ed.). McGraw-Hill Education.*
3. *Kumar, V., Abbas, A. K., Aster, J. C., & Robbins, S. L. (2021). Robbins Basic Pathology (11th ed.). Elsevier.*
4. *Cotran, R. S., Kumar, V., Collins, T., & Robbins, S. L. (Eds.). (2021). Robbins and Cotran Pathologic Basis of Disease (10th ed.). Elsevier*

Course Title: Optical & Ophthalmic Instrumentation (Practical)

Course Code: BOP306

L	T	P	Cr.
0	0	4	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Explain the principles of optics and their application in ophthalmic instrumentation.
2. Develop skills in using and interpreting measurements from different ophthalmic instruments.
3. Demonstrate a foundational understanding of basic optics principles relevant to the operation of optical instruments.
4. Operate lens edging equipment to cut and mount lenses into eyeglass frames accurately.

Course Content

List of Practical's / Experiments: 30 Hours

1. Lensometry: Measurement of lens power, verification of prescription lenses, and interpretation of lens markings.
2. Ophthalmic Measurements: Practical techniques for measuring visual acuity, intraocular pressure, corneal curvature, and pupil size.
3. Retinoscopy: Hands-on practice of retinoscopy techniques for objective refraction assessment.
4. Ophthalmoscopy: Examination of the ocular fundus using direct and indirect ophthalmoscopes, including the identification of various ocular structures and abnormalities.
5. Slit Lamp Biomicroscopy: Application of the slit lamp for detailed examination of the anterior segment of the eye, including the cornea, iris, and lens.
6. Tonometry: Measurement of intraocular pressure using different tonometry methods, such as Goldmann applanation tonometry or non-contact tonometry.
7. Instrument Maintenance and Safety: Proper handling, cleaning, and maintenance of ophthalmic instruments, as well as safety precautions

to ensure the well-being of both patients and practitioners.

Suggested readings

- *Manns, F., Söderberg, P. G., & Ho, A. (Eds.). (2017). Ophthalmic Lenses and Dispensing (3rd ed.). Butterworth-Heinemann.*
- *Bennett, A. G., & Rabbetts, R. B. (2012). Clinical Visual Optics (4th ed.). Butterworth-Heinemann.*
- *American Academy of Ophthalmology. (2018). Basic Ophthalmology for Medical Students and Primary Care Residents. American Academy of Ophthalmology.*
- *Bartlett, J. D., Jaanus, S. D., & Kaye, G. I. (Eds.). (2010). Clinical Ocular Pharmacology (5th ed.). Butterworth-Heinemann.*

Course Title: Environment and Health

Course Code: OEC15

L	T	P	Cr.
2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate the importance of health education and health communication in promoting individual and community health.
2. Discuss the concept of ecosystem, structure, interrelationship of producers, consumers and decomposers.
3. Classify causes, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution
4. Identify key theories and models related to health behavior changes.

Course Contents

UNIT-I **05 Hours**

Introduction: Definition and scope and importance of multidisciplinary nature of environment. Need for public awareness. Natural Resources - Natural Resources and associated problems, use and over exploitation, case studies of forest resources and water resources.

UNIT-II **10 Hours**

Introduction to Health Education and Health Communication, Importance and goals of health education, Role of health communication in behavior change, Historical perspectives on health education and communication

UNIT-III **10 Hours**

Theories and Models of Health Behavior ChangeSocial cognitive theory, Transtheoretical model,Health belief model, Ecological model,Effective Communication Strategies, Principles of effective communication

UNIT-IV **05 Hours**

Ecosystems: Concept of Ecosystem, Structure, interrelationship, producers, consumers and decomposers, ecological pyramids-biodiversity and importance. Hotspots of biodiversity, Environmental Pollution: Definition, Causes, effects and control measures of air pollution, Water pollution, Soil

pollution, Marine pollution, Noise pollution, Thermal pollution, nuclear hazards

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Frumkin, H. (Ed.). (2016). Environmental Health: From Global to Local (3rd ed.). John Wiley & Sons.*
- *Neutra, R. R., & Lipscomb, J. A. (2017). Overcoming Zebra: Conflicts in the Environmental Health Sciences. Oxford University Press.*
- *Kass, N. E., & Faden, R. R. (Eds.). (2016). Ethics and Environmental Health. Oxford University Press.*
- *Hayes, E. B., & Guerrant, R. L. (Eds.). (2020). Global Climate Change and Human Health: From Science to Practice (2nd ed.). Wiley-Blackwell.*
- *Landrigan, P. J., Sly, P. D., & Ruchirawat, M. (Eds.). (2018). Environmental Contributors to Childhood Obesity. CRC Press*

Course Title: Microbial Diseases: Causes, Prevention and Cure

Course Code: OEC022

L	T	P	Cr.
2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Identify and understand the causes of microbial diseases.
2. Prevent the occurrence and spread of microbial diseases
3. Empower individuals to protect themselves and their communities from microbial diseases
4. Alleviate symptoms, eliminate the pathogen from the body, and improve the patient's health outcome.

Course Contents

UNIT-I **05 Hours**

Introduction to Microbial Diseases, Overview of microbial diseases and their impact on global health, Classification of microorganisms causing diseases (bacteria, viruses, fungi, parasites), Epidemiology and public health significance of microbial diseases

UNIT-II **05 Hours**

Transmission and Pathogenesis; Modes of transmission for microbial diseases (airborne, waterborne, vector-borne, etc.) Pathogenesis of microbial diseases: mechanisms of infection and colonization, Factors influencing disease severity and outcomes

UNIT-III **10 Hours**

Host Immune Response; Innate and adaptive immune responses to microbial infections, Immune evasion strategies employed by pathogens, Immunopathogenesis and complications of microbial diseases, Prevention and Control Measures, Vaccination: types, development, and impact on disease prevention, Hygiene practices: hand hygiene, food safety, water sanitation

UNIT-IV **05 Hours**

Antimicrobial Drugs and Therapies, Introduction to antimicrobial drugs: antibiotics, antivirals, antifungals, Mechanisms of action and resistance to

antimicrobials, Rational use of antimicrobial agents and treatment guidelines, Specific Microbial Diseases.

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Murray, P. R., Rosenthal, K. S., & Pfaller, M. A. (Eds.). (2020). Medical Microbiology (9th ed.). Elsevier.*
- *Ryan, K. J., & Ray, C. G. (Eds.). (2019). Sherris Medical Microbiology (7th ed.). McGraw-Hill Education.*
- *Wilson, B. A., Salyers, A. A., Whitt, D. D., & Winkler, M. E. (2019). Bacterial Pathogenesis: A Molecular Approach (4th ed.). ASM Press.*
- *Mobley, H. L. T., Mendz, G. L., & Hazell, S. L. (Eds.). (2016). Helicobacter pylori: Physiology and Genetics. ASM Press.*
- *Salyers, A. A., Whitt, D. D., Winkler, M. E., & Krieg, N. R. (Eds.). (2017). The Bacteroides, Spirochaetes, Tenericutes (Mollicutes), Acidobacteria, Fibrobacteres, Fusobacteria, Dictyoglomi, Gemmatimonadetes, Lentisphaerae, Verrucomicrobia, Chlamydiae, and Planctomycetes. Springer.*

SEMESTER: 4TH

Course Title: Lighting & the Eye

Course Code: BOP401

L	T	P	Cr.
4	0	0	4

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate the anatomy and functioning of the human eye.
2. Explore the properties of light and its interaction with materials and surfaces.
3. Examine the principles of lighting design and their applications in various settings.
4. Analyze the impact of lighting on visual comfort, safety, and energy efficiency.

Course Contents

UNIT-I **15 Hours**

Introduction to Vision and Light, Anatomy and physiology of the human eye, Photoreceptors and visual processing, Properties of light: wavelength, intensity, and color, The Science of Light, Electromagnetic spectrum and visible light, Light sources and their characteristics, Reflection, refraction, and transmission of light

UNIT-II **15 Hours**

Lighting Metrics and Measurement, Photometry: luminous flux, illuminance, luminance, Calorimetry: color temperature, color rendering index (CRI), Lighting measurement techniques and tools, Lighting Design Principles, lighting terminology and design vocabulary, lighting techniques: ambient, task, and accent lighting, lighting controls and systems, Lighting and Human Perception

UNIT-III **15 Hours**

Visual perception: brightness, contrast, adaptation, Psychological effects of lighting: mood, emotion, cognition, lighting for visual comfort and productivity, Lighting and Health, Circadian rhythms and biological effects of light, Effects of lighting on sleep, mood, and alertness, lighting considerations for special populations (elderly, visually impaired)

UNIT-IV **15 Hours**

Lighting Applications, Architectural lighting design, Retail and display lighting, Workplace and office lighting, Outdoor and landscape lighting, Lighting and Energy Efficiency, Energy-efficient lighting technologies, Lighting codes, standards, and regulations, Strategies for reducing energy consumption, Lighting Simulation and Analysis

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Rea, M. S. (2018). The IESNA Lighting Handbook: Reference and Application (10th ed.). Illuminating Engineering Society.*
- *Fotios, S. (Ed.). (2017). Lighting for Health and Safety. CRC Press.*
- *Veitch, J. A., & McColl, S. L. (Eds.). (2017). Lighting, Colour and Human Response: A Practical Guide (2nd ed.). Routledge.*
- *Brainard, G. C., Hanifin, J. P., & Glickman, G. (Eds.). (2017). Light and Biological Rhythms in Man. Oxford University Press.*

Course Title: Clinical Refraction I

Course Code: BOP402

L	T	P	Cr.
4	0	0	4

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Develop effective communication and interpersonal skills for interacting with patients, including obtaining their medical history and addressing their concerns.
2. Perform subjective refraction to refine the prescription, considering the patient's preferences and feedback.
3. Calculate and prescribe prism correction for patients with binocular vision anomalies.
4. Determine the exact nature and degree of refractive error present in each eye.

Course Contents

UNIT-I **15 Hours**

Introduction to Refraction: Principles of refraction, Optics of the eye, Visual acuity measurements, Refractive errors and their classification, Visual Optics: Anatomy and physiology of the eye, Structure and function of the cornea, lens, and retina, Accommodation and its measurement, Vergence and its calculation, Objective Refraction Techniques: Retinoscopy, Autorefraction, Aberrometry

UNIT-II **15 Hours**

Subjective Refraction Techniques: Manifest refraction, Techniques for determining refractive error, Binocular balancing, Near and distance visual acuity testing, Correction of Refractive Errors: Spectacle lenses, Contact lenses (soft, rigid gas-permeable, specialty lenses), Refractive surgery (LASIK, PRK, etc.)

UNIT-III **15 Hours**

Prescribing Eyeglasses and Contact Lenses: Lens selection and calculations, Determining appropriate lens power and design, rism correction, Bifocal and multifocal lenses, Special Refractive Considerations: Pediatric refraction, Geriatric refraction, Refraction in patients with special needs, Refractive management of patients with systemic diseases,

UNIT-IV **15 Hours**

Refraction in Clinical Practice; Communication skills and patient interaction, Referral criteria for ocular abnormalities, Documentation and record-keeping, Legal and ethical considerations, Refraction Instruments and Techniques: Phoropter and trial frame techniques, Automated refractors and wavefront analyzers, Keratometry and topography, Retinal imaging and biometry

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Khurana, A. K. (2017). Comprehensive Ophthalmology (6th ed.). Jaypee Brothers Medical Publishers.*
- *Eskridge, J. B., Amos, J. F., & Bartlett, J. D. (2019). Clinical Procedures for Ocular Examination (4th ed.). McGraw-Hill Education.*
- *Grosvenor, T., & Scott, R. (2017). Clinical Optics (4th ed.). Butterworth-Heinemann.*
- *Benjamin, W. J. (Ed.). (2017). Borish's Clinical Refraction (2nd ed.). Elsevier.*
- *Bennett, A. G., & Rabbetts, R. B. (2012). Clinical Visual Optics (4th ed.). Butterworth-Heinemann.*

Course Title: Lighting & the Eye (practical)

Course Code: BOP403

L	T	P	Cr.
0	0	4	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Demonstrate the anatomy and functioning of the human eye.
2. Explore the properties of light and its interaction with materials and surfaces.
3. Examine the principles of lighting design and their applications in various settings.
4. Analyze the impact of lighting on visual comfort, safety, and energy efficiency.

Course Content

List of Practical's / Experiments: 30 Hours

1. Overview of the relationship between light and vision
2. Anatomy and physiology of the eye
3. Light Sources and Illumination
4. Types of light sources: incandescent, fluorescent, LED, etc.
5. Properties of light sources: color temperature, CRI, flicker, etc.
6. Lighting terminology and measurements
7. Lighting design principles for visual comfort and efficiency
8. Lighting and Visual Performance
9. Impact of lighting on visual acuity and contrast sensitivity
10. Effects of lighting on visual perception, color discrimination, and visual fatigue
11. Lighting and Circadian Rhythms
12. Influence of light on the human circadian system
13. Practical Applications and Case Studies
14. Lighting design exercises and simulations
15. Analysis of lighting layouts and recommendations

Suggested readings

- *Rea, M. S. (2018). The IESNA Lighting Handbook: Reference and Application (10th ed.). Illuminating Engineering Society.*
- *Fotios, S. (Ed.). (2017). Lighting for Health and Safety. CRC Press.*
- *Veitch, J. A., & McColl, S. L. (Eds.). (2017). Lighting, Colour and Human Response: A Practical Guide (2nd ed.). Routledge.*
- *Brainard, G. C., Hanifin, J. P., & Glickman, G. (Eds.). (2017). Light and Biological Rhythms in Man. Oxford University Press.*

Course Title: Clinical Refraction (Practical)

Course Code: BOP404

L	T	P	Cr.
0	0	4	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Develop effective communication and interpersonal skills for interacting with patients, including obtaining their medical history and addressing their concerns.
2. Perform subjective refraction to refine the prescription, considering the patient's preferences and feedback.
3. Calculate and prescribe prism correction for patients with binocular vision anomalies.
4. Determine the exact nature and degree of refractive error present in each eye.

Course Contents

List of Practical's / Experiments: 30 Hours

1. Ophthalmic Instruments and Equipment.
2. Retinoscope and ophthalmoscope, Trial frame and lens sets, Auto refractors and keratometers
3. Visual Acuity Testing, Principles of visual acuity measurement, Snellen chart and other visual acuity charts
4. Calculating visual acuity and recording results, Subjective Refraction Techniques, Pre-refraction examination and history taking
5. Techniques for determining refractive error, Trial lens refinement and fogging, Cover test and prism bar measurements

Suggested readings

- *Eskridge, J. B., Amos, J. F., & Bartlett, J. D. (2019). Clinical Procedures for Ocular Examination (4th ed.). McGraw-Hill Education.*
- *Grosvenor, T., & Scott, R. (2017). Clinical Optics (4th ed.). Butterworth-Heinemann.*
- *Benjamin, W. J. (Ed.). (2017). Borish's Clinical Refraction (2nd ed.). Elsevier.*
- *Bennett, A. G., & Rabbetts, R. B. (2012). Clinical Visual Optics (4th ed.). Butterworth-Heinemann.*

Course Title: Ocular Disease I (Anterior Segment Disease)

Course Code: BOP405

L	T	P	Cr.
3	0	0	3

Total Hours 45

Learning Outcomes: After completion of this course, the learner will be able to:

1. Illustrate the anatomy and physiology of the anterior segment of the eye
2. Identify and describe common anterior segment diseases.
3. Discuss the ethical and legal aspects of diagnosing and managing ocular diseases, including issues related to informed consent, patient confidentiality, and appropriate referrals.
4. Demonstrate the principles of medical and surgical management for anterior segment diseases.

Course Contents

UNIT-I **15 Hours**

Overview of the structure and function of the eye, Understanding the ocular adnexa (eyelids, lacrimal system, etc.), Refractive Errors and Vision Disorders, Myopia, hyperopia, astigmatism, and presbyopia, Overview of corrective lenses, LASIK, and other refractive surgeries, Amblyopia and strabismus

UNIT-II **10 Hours**

Ocular Infections and Inflammation, Conjunctivitis (viral, bacterial, allergic), Keratitis (viral, bacterial, fungal), Uveitis and scleritis, Treatment options and management strategies,

UNIT-III **10 Hours**

Glaucoma; Understanding intraocular pressure and its role in glaucoma, Open-angle glaucoma, closed-angle glaucoma, and normal-tension glaucoma, Diagnosis, treatment, and management options, Surgical interventions and laser therapies, Cataracts and Lens Disorders

UNIT-IV **10 Hours**

Retinal Diseases, Age-related macular degeneration (AMD), Diabetic retinopathy, Retinal detachment, Retinitis pigmentosa, Diagnosis, treatment, and management strategies, Optic neuritis; Ischemic optic neuropathy, Retinal vascular occlusions and Ocular Emergencies

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Yanoff, M., & Duker, J. S. (Eds.). (2018). Ophthalmology (5th ed.). Elsevier.*
- *Riordan-Eva, P., & Cunningham, E. T. (Eds.). (2019). Vaughan & Asbury's General Ophthalmology (19th ed.). McGraw-Hill Education.*
- *Yanoff, M., & Cameron, D. (Eds.). (2014). Ocular Pathology (7th ed.). Elsevier.*
- *Mannis, M. J., Holland, E. J., & Mannis, A. (Eds.). (2017). Cornea (4th ed.). Elsevier.*
- *Pavan-Langston, D. (Ed.). (2011). Manual of Ocular Diagnosis and Therapy (6th ed.). Lippincott Williams & Wilkins*

Course Title: Visual Optics (Optics IV)

Course Code: BOP406

L	T	P	Cr.
3	0	0	3

Total Hours 45

Learning Outcomes: After completion of this course, the learner will be able to:

1. Prescribe appropriate corrective lenses based on a patient's refractive error, visual needs, and lifestyle.
2. Study the concepts of geometrical optics, including reflection, refraction, and image formation.
3. Explore the wave nature of light and its applications in visual optics.
4. Describe visual perception and the processing of visual information.

Course Contents

UNIT-I **10 Hours**

Introduction to Visual Optics, Definition and scope of visual optics, Historical overview, The Human Eye, Anatomy and physiology of the eye, Optical components of the eye, Accommodation and focusing mechanisms, Geometrical Optics

UNIT-II **10 Hours**

Laws of reflection and refraction, Thin lenses and lens systems, Image formation by mirrors and lenses, Lens aberrations and their corrections, Wave Optics and Light, Wave-particle duality of light, Interference and diffraction of light, Polarization of light and its effects on vision

UNIT-III **15 Hours**

Optics of the eye: cornea and lens, Visual Perception, Visual pathway and processing, Color vision and perception, Depth perception and stereopsis,Optical Aberrations; Introduction to optical aberrations, Spherical and chromatic aberrations, Coma, astigmatism, and distortion, Aberration correction techniques

UNIT-IV **10 Hours**

Clinical Applications; Refractive errors and their correction, Contact lenses and their optics, Visual aids and optical instruments, Overview of refractive

and cataract surgeries, Research Trends in Visual Optics, Advanced imaging techniques, Adaptive optics and customized vision correction

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Smith, G., & Atchison, D. A. (2017). The Eye and Visual Optical Instruments. Cambridge University Press.*
- *Bennett, A. G., & Rabbetts, R. B. (2017). Clinical Visual Optics (5th ed.). Butterworth-Heinemann.*
- *Charman, W. N. (2014). Vision Science: Photons to Phenomenology. CRC Press.*
- *Thibos, L. N., & Bradley, A. (Eds.). (2000). Visual Optics and Instrumentation. Springer.*

Course Title: Low Vision Aids & Visual Rehabilitation

Course Code: BOP407

L	T	P	Cr.
3	0	0	3

Total Hours 45

Learning Outcomes: After completion of this course, the learner will be able to:

1. Discuss the causes and characteristics of low vision.
2. Identify and evaluate different low vision aids and assistive technologies.
3. Conduct visual assessments and determine appropriate interventions for individuals with low vision.
4. Apply visual rehabilitation techniques to enhance functional vision and promote independence.

Course Contents

UNIT-I **10 Hours**

Introduction to Low Vision, Definition of low vision, Causes and types of visual impairments, Epidemiology of low vision, Visual Assessment; Techniques and tools for visual assessment, Assessment of visual acuity, visual fields, and contrast sensitivity and Functional vision assessment

UNIT-II **10 Hours**

Low Vision Aids and Assistive Technologies, Optical devices (magnifiers, telescopes, and filters), Non-optical devices (electronic magnifiers, screen readers, and voice-controlled systems), Augmentative and alternative communication (AAC) devices

UNIT-III **15 Hours**

Environmental Modifications; Lighting considerations for individuals with low vision, Contrast enhancement techniques,Home modifications and adaptive techniques, Orientation and Mobility; Techniques for safe and independent travel, Mobility aids (white canes, guide dogs), Orientation strategies for indoor and outdoor environments

UNIT-IV **10 Hours**

Visual Rehabilitation Techniques; Eccentric viewing and steady eye techniques, Visual scanning and tracking exercises, Visual field awareness and compensatory strategies, Daily Living Skills; Techniques for managing personal care tasks, Strategies for reading, writing, and using digital devices, Cooking, cleaning, and organizing strategies

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Lam, D., & Faye, E. E. (Eds.). (2019). Low Vision Rehabilitation: A Practical Guide for Occupational Therapists. Slack Incorporated.*
- *Schuchard, R. A. (2016). Vision Rehabilitation: Multidisciplinary Care of the Patient Following Brain Injury. Oxford University Press.*
- *Silverstone, B. (2018). Low Vision Manual. Butterworth-Heinemann.*
- *Stelmack, J. A., & Massof, R. W. (Eds.). (2017). Visual Impairment in the Elderly: Principles of Diagnosis and Rehabilitation. Springer.*
- *Warren, D. H., & Lotfi, N. (2016). Low Vision: Principles and Applications. Oxford University Press.*

Semester:5th

Course Title: Ophthalmic Lens & Dispensing Optics

Course Code: BOP501

L	T	P	Cr.
4	0	0	4

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Correct various vision problems such as nearsightedness, farsightedness, astigmatism, and presbyopia.
2. Enhance visual acuity and provide clear vision for individuals.
3. Protect the eyes from harmful ultraviolet (UV) radiation, glare, and blue light emitted by digital screens.
4. Ensure that the lenses fit properly, align with the eyes, and are positioned correctly for optimal vision correction.

Course Contents

UNIT-I **15 Hours**

Introduction to Optics, Basic principles of geometric and physical optics, Refraction and reflection of light, Lens properties and terminology, Ophthalmic Lenses; Types of ophthalmic lenses (single vision, bifocal, progressive, etc.), Lens materials and properties, Lens designs and prescriptions, Lens manufacturing processes

UNIT-II **15 Hours**

Lens Aberrations; Types of lens aberrations (spherical aberration, chromatic aberration, etc.), Impact of aberrations on vision and lens performance, Correction and minimization of lens aberrations, Lens Dispensing

UNIT-III **15 Hours**

Frame selection and fitting, Measurements and calculations for lens prescription, Lens centration and alignment, Frame adjustments and repairs, Lens Coatings and Treatments, Anti-reflective coatings, Scratch-resistant coatings, UV protection and blue light filtering, Tints and coatings for specific purposes (polarized, photochromic, etc.)

UNIT-IV **15 Hours**

Specialized Lens Applications, Occupational lenses, Sports and performance lenses, Low vision aids, Specialty contact lenses, Lens Materials and Technology, High-index lenses; Trivex and polycarbonate lenses, Lens thinning and edge treatments, Lens impact resistance and safety standards

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Manns, F., Söderberg, P. G., & Ho, A. (Eds.). (2017). Ophthalmic Lenses and Dispensing (3rd ed.). Butterworth-Heinemann.*
- *Bennett, A. G., & Rabbetts, R. B. (2017). Clinical Visual Optics (5th ed.). Butterworth-Heinemann.*
- *Grosvenor, T., & Scott, R. (2017). Clinical Optics (4th ed.). Butterworth-Heinemann.*
- *Elliott, D. B., & Chalmers, D. J. (Eds.). (2015). Low Vision Manual (2nd ed.). Butterworth-Heinemann.*
- *Eskridge, J. B., Amos, J. F., & Bartlett, J. D. (2019). Clinical Procedures for Ocular Examination (4th ed.). McGraw-Hill Education.*

Course Title: Ophthalmic & Optical Instrumentation & Procedure II

Course Code: BOP502

L	T	P	Cr.
4	0	0	4

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Provide knowledge about different types of refractive surgery, such as LASIK and PRK.
2. Perform corneal topography and wavefront analysis to evaluate the shape and optical characteristics of the cornea
3. Discuss the principles of laser physics, laser safety, and the appropriate use of different laser modalities
4. Proficiency in performing direct and indirect ophthalmoscopy to examine the posterior segment of the eye, including the optic nerve, retina, and blood vessels.

Course Contents

UNIT-I **15 Hours**

Introduction to Ophthalmic Instruments: Review of basic ophthalmic instruments, Overview of advanced ophthalmic instruments, Advanced Diagnostic Instruments: Fundus cameras and imaging techniques, Optical coherence tomography (OCT), Corneal topography, Visual field testing and perimetry

UNIT-II **15 Hours**

Advanced Refractive Instruments: Autorefractors and keratometers, Aberrometry and wavefront analysis, Phoropters and subjective refraction, Contact lens fitting instruments, Ocular Imaging Techniques:Ultrasound biomicroscopy (UBM), Anterior segment imaging, Posterior segment imaging, Specular microscopy,

UNIT-III **15 Hours**

Ophthalmic Surgical Instruments: Introduction to ophthalmic surgery instruments, Microsurgical instruments, Phacoemulsification systems, Vitrectomy machines, Laser Systems in Ophthalmology: Introduction to lasers in ophthalmology, Excimer lasers for refractive surgery, Argon and diode lasers, Photocoagulation lasers

UNIT-IV **15 Hours**

Ophthalmic Procedures: Intraocular lens (IOL) implantation, Corneal surgeries (e.g., LASIK, PRK), Glaucoma surgeries, Retinal surgeries, Quality Assurance and Maintenance: Calibration and quality control of instruments, Routine maintenance and troubleshooting, Compliance with safety regulations, Infection control procedures

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Manns, F., Söderberg, P. G., & Ho, A. (Eds.). (2017). Ophthalmic Lenses and Dispensing (3rd ed.). Butterworth-Heinemann.*
- *Thibos, L. N., & Bradley, A. (Eds.). (2000). Visual Optics and Instrumentation. Springer.*
- *Bennett, A. G., & Rabbetts, R. B. (2012). Clinical Visual Optics (4th ed.). Butterworth-Heinemann.*
- *Eskridge, J. B., Amos, J. F., & Bartlett, J. D. (2019). Clinical Procedures for Ocular Examination (4th ed.). McGraw-Hill Education.*

Course Title: Introduction to Clinical Skills

Course Code: BOP503

L	T	P	Cr.
2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Perform basic medical procedures, such as wound dressing, venipuncture, and intravenous catheter insertion.
2. Practice infection control and demonstrate proper hygiene techniques to ensure patient safety.
3. Understand the ethical and legal considerations involved in clinical practice and maintain patient confidentiality.
4. Recognize common medical emergencies and apply appropriate first aid techniques.

Course Contents

UNIT-I **05 Hours**

Introduction to Clinical Skills, Overview of healthcare professions and roles, Importance of clinical skills in healthcare practice, Introduction to medical ethics and legal considerations, Patient Assessment; History-taking techniques and documentation, Physical examination skills and systems assessment, Vital signs measurement and interpretation

UNIT-II **10 Hours**

Basic Medical Procedures, Wound care and dressing techniques, Venipuncture and blood sample collection, Intravenous (IV) catheter insertion and fluid administration, Communication and Interpersonal Skills, Effective communication with patients, families, and healthcare team members, Active listening and empathy in clinical practice, Culturally sensitive communication and patient-centered care

UNIT-III **05 Hours**

Infection Control and Safety; Principles of infection control and prevention, Hand hygiene techniques and personal protective equipment (PPE), Management of sharps and hazardous materials

UNIT-IV **10 Hours**

Medical Emergencies and First Aid, Recognition and initial management of common medical emergencies, Cardiopulmonary resuscitation (CPR) and automated external defibrillator (AED) use, First aid techniques for common injuries and condition, Healthcare Team Collaboration, Roles and responsibilities of healthcare professionals, Interprofessional collaboration and effective teamwork, Understanding interdisciplinary care plans

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Bickley, L. S., & Szilagyi, P. G. (2017). Bates' Guide to Physical Examination and History Taking (12th ed.). Wolters Kluwer.*
- *Dains, J. E., Baumann, L. C., & Scheibel, P. (2019). Advanced Health Assessment and Clinical Diagnosis in Primary Care (6th ed.). Elsevier.*
- *Jarvis, C. (2016). Physical Examination and Health Assessment (7th ed.). Saunders.*
- *Epstein, R. M., & Hundert, E. M. (Eds.). (2017). Defining and Assessing Professional Competence. Oxford University Press.*
- *Henry, C. E., & Baldwin, D. C. (Eds.). (2008). Essential Clinical Skills in Medicine. CRC Press.*

Course Title: Ophthalmic Lens & Dispensing Optics(Practical)

Course Code: BOP504

L	T	P	Cr.
0	0	4	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Correct various vision problems such as nearsightedness, farsightedness, astigmatism, and presbyopia.
2. Enhance visual acuity and provide clear vision for individuals.
3. Protect the eyes from harmful ultraviolet (UV) radiation, glare, and blue light emitted by digital screens.
4. Ensure that the lenses fit properly, align with the eyes, and are positioned correctly for optimal vision correction.

Course Content

Practical/Clinical posting **30 Hours**

1. Lens Design Principles
2. Basic principles of lens design
3. Lens power calculation and conversion
4. Lens aberrations and their impact on visual performance
5. Lens power verification using lensometer
6. Lens centration and alignment checks
7. Visual inspection for defects and imperfections
8. Patient consultation and case history taking
9. Frame selection and fitting
10. Frame measurements and adjustments
11. Pupillary distance measurement
12. Segmentation and fitting of multifocal lenses
13. Hands-on practice with lens measurement instruments
14. Frame fitting and adjustment exercises
15. Dispensing simulation with different lens types
16. Clinical observations and patient interaction

Suggested readings

- *Bennett, A. G., & Rabbetts, R. B. (2017). Clinical Visual Optics (5th ed.). Butterworth-Heinemann.*
- *Grosvenor, T., & Scott, R. (2017). Clinical Optics (4th ed.). Butterworth-Heinemann.*
- *Elliott, D. B., & Chalmers, D. J. (Eds.). (2015). Low Vision Manual (2nd ed.). Butterworth-Heinemann.*
- *Eskridge, J. B., Amos, J. F., & Bartlett, J. D. (2019). Clinical Procedures for Ocular Examination (4th ed.). McGraw-Hill Education.*

Course Title: Optics & Ophthalmic Instrumentation II (Practical)

Course Code: BOP505

L	T	P	Cr.
0	0	4	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Provide knowledge about different types of refractive surgery, such as LASIK and PRK.
2. Perform corneal topography and wavefront analysis to evaluate the shape and optical characteristics of the cornea
3. Discuss the principles of laser physics, laser safety, and the appropriate use of different laser modalities
4. Proficiency in performing direct and indirect ophthalmoscopy to examine the posterior segment of the eye, including the optic nerve, retina, and blood vessels.

Course Contents

Practical/Clinical posting **30 Hours**

1. Ophthalmic Instruments:
2. Fundamentals of ophthalmic instruments and their applications
3. Ophthalmoscopes
4. Slit lamps
5. Tonometers
6. Autorefractors
7. Keratometers
8. Perimeters
9. Optical coherence tomography (OCT)
10. Wavefront analyzers
11. Aberrometers
12. Optics of the Eye:
13. Structure and function of the human eye
14. Refraction and accommodation

15. Vision correction techniques (eyeglasses, contact lenses, refractive surgery)
16. Visual acuity and visual field testing
17. Binocular vision and stereopsis

Suggested readings

- *Manns, F., Söderberg, P. G., & Ho, A. (Eds.). (2017). Ophthalmic Lenses and Dispensing (3rd ed.). Butterworth-Heinemann.*
- *Thibos, L. N., & Bradley, A. (Eds.). (2000). Visual Optics and Instrumentation. Springer.*
- *Bennett, A. G., & Rabbetts, R. B. (2012). Clinical Visual Optics (4th ed.). Butterworth-Heinemann.*
- *Eskridge, J. B., Amos, J. F., & Bartlett, J. D. (2019). Clinical Procedures for Ocular Examination (4th ed.). McGraw-Hill Education.*

Course Title: Ocular Disease II (Posterior & Neuro-eye Disease)

Course Code: BOP506

L	T	P	Cr.
3	0	0	3

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Develop an advanced understanding of ocular diseases and their underlying pathophysiology.
2. Enhance clinical decision-making skills in the diagnosis and management of complex ocular conditions.
3. Explore advanced diagnostic techniques and technologies used in the evaluation of ocular diseases.
4. Proficient in the interpretation of diagnostic test results and their implications for treatment planning.

Course Contents

UNIT-I **05 Hours**

Anatomy and Physiology of the Posterior Segment: Structure and function of the retina, choroid, and optic nerve, Blood supply to the posterior segment., Examination techniques specific to the posterior segment.

UNIT-II **10 Hours**

Retinal Diseases: Age-related macular degeneration (AMD),Diabetic retinopathy, Retinal vascular occlusions, Retinal tears and detachments, Retinitis pigmentosa, Macular holes and epiretinal membranes., Retinal dystrophies, Vitreous and Optic Nerve Diseases: Vitreous disorders (e.g., vitreous floaters, vitreous hemorrhage), Posterior vitreous detachment., Vitreomacular traction syndrome, Optic neuritis, Ischemic optic neuropathy, Optic disc edema and papilledema.

UNIT-III **05 Hours**

Neuro-ophthalmology: Visual pathway and neuro-anatomy, Cranial nerve palsies, Optic neuropathies, Neurological causes of vision loss, Neuroimaging in neuro-ophthalmology, Inherited and Genetic Eye Diseases:Retinal dystrophies,Congenital optic nerve abnormalities, Hereditary optic neuropathies, Inherited retinal vascular diseases

UNIT-IV **10 Hours**

Diagnostic Modalities and Imaging; Fundus photography, Optical coherence tomography (OCT), Fluorescein angiography, Visual field testing,

Electrophysiological testing (e.g., electroretinography, visual evoked potentials),Management and Treatment Approaches: Medical and surgical management options for posterior and neuro-eye diseases and Laser therapy.

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Yanoff, M., & Duker, J. S. (Eds.). (2018). Ophthalmology (5th ed.). Elsevier.*
- *Riordan-Eva, P., & Cunningham, E. T. (Eds.). (2019). Vaughan & Asbury's General Ophthalmology (19th ed.). McGraw-Hill Education.*
- *Yanoff, M., & Cameron, D. (Eds.). (2014). Ocular Pathology (7th ed.). Elsevier.*
- *Kanski, J. J., Bowling, B., & Nischal, K. K. (2016). Kanski's Clinical Ophthalmology: A Systematic Approach (8th ed.). Elsevier.*
- *Foster, C. S., Azar, D. T., Dohlman, C. H., & Smolin, G. (Eds.). (2010). Smolin and Thoft's The Cornea: Scientific Foundations and Clinical Practice (4th ed.). Lippincott Williams & Wilkins.*

Course Title: Binocular Vision &Ocular Modality

Course Code: BOP507

L	T	P	Cr.
3	0	0	3

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Calculate depth and perceive the relative distances of objects in the visual field
2. Distinguish between objects of different brightness levels.
3. Develop and maintain proper binocular fusion, which ensures that the images from each eye are seamlessly merged and perceived as one.
4. Develop and improve eye teaming skills to achieve clear and comfortable binocular vision.

Course Contents

UNIT-I **10 Hours**

Binocular Vision Basics: Introduction to binocular vision, Physiology and anatomy of the binocular visual system, Development of binocular vision in infants and children, Sensory and Motor Aspects of Binocular Vision: Fusion and stereopsis, Ocular alignment and eye movements, Depth perception and 3D vision

UNIT-II **10 Hours**

Binocular Vision Disorders: Strabismus (misalignment of the eyes), Amblyopia (lazy eye), Binocular vision anomalies, Diplopia (double vision), Assessment and Diagnosis: Clinical evaluation of binocular vision, Techniques for measuring ocular alignment and eye movements, Vision therapy and rehabilitation

UNIT-III **05 Hours**

Ocular Modalities: Accommodation (focusing mechanism), Vergence (eye movements to maintain single vision), Pupillary reflexes and control, Visual integration and processing, Technological advancements and their impact on diagnosis and treatment

UNIT-IV **05 Hours**

Clinical Applications: Management of binocular vision disorders, Treatment options for strabismus and amblyopia, Therapeutic approaches in vision therapy

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Scheiman, M., & Wick, B. (2020). Clinical Management of Binocular Vision: Heterophoric, Accommodative, and Eye Movement Disorders (5th ed.). Wolters Kluwer.*
- *Rouse, M. W., Borsting, E., Mitchell, G. L., & Cotter, S. A. (Eds.). (2015). Visual Optics and Refraction: A Clinical Approach (3rd ed.). Elsevier.*
- *Ciuffreda, K. J., & Ludlam, W. M. (Eds.). (2011). Concepts and Models of Vision Rehabilitation: Optometric Aspects of Low Vision (2nd ed.). Elsevier.*
- *Cooper, J. (2012). Ocular Trauma: Principles and Practice. Slack.*
- *Wick, B., & Hyvärinen, L. (Eds.). (2017). Clinical Management of Binocular Vision: Heterophoric, Accommodative, and Eye Movement Disorders (4th ed.). Wolters Kluwer.*

Course Title: Systemic Condition & the Eye

Course Code: BOP508

L	T	P	Cr.
3	0	0	3

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Develop an understanding of various systemic conditions that have ocular manifestations or can impact eye health.
2. Demonstrate the mechanisms through which systemic conditions affect the eye.
3. Recognize ocular manifestations of systemic conditions.
4. Discuss about the management of ocular complications associated with systemic conditions.

Course Contents

UNIT-I **05 Hours**

Introduction to Systemic Conditions and the Eye, Overview of the relationship between systemic health and eye health, Importance of understanding systemic conditions for eye care professionals, Cardiovascular Conditions and the Eye, Hypertension and its effects on the eye

UNIT-II **10 Hours**

Atherosclerosis and its impact on the ocular system, Diabetic retinopathy as a manifestation of cardiovascular disease, Autoimmune Disorders and the Eye, Rheumatoid arthritis and its ocular complications, Systemic lupus erythematosus (SLE) and its effects on the eye, Sjögren's syndrome and ocular manifestations

UNIT-III **10 Hours**

Infectious Diseases and the Eye, HIV/AIDS and associated ocular conditions, Herpes simplex virus and its impact on the eye, Lyme disease and ocular manifestations, Endocrine Disorders and the Eye, Diabetes mellitus and diabetic eye disease, Thyroid disorders (hypothyroidism and hyperthyroidism) and their ocular effects, Pituitary gland disorders and visual disturbances, Neurological Disorders and the Eye

UNIT-IV **05 Hours**

Multiple sclerosis and its ocular manifestations, Parkinson's disease and visual impairments, Stroke and its impact on vision, Gastrointestinal Conditions and the Eye, Inflammatory bowel disease (Crohn's disease and ulcerative colitis) and ocular complications, Liver disease (cirrhosis, hepatitis) and their effects on the eye.

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Riordan-Eva, P., & Cunningham, E. T. (Eds.). (2019). Vaughan & Asbury's General Ophthalmology (19th ed.). McGraw-Hill Education.*
- *Riordan-Eva, P., & Whitcher, J. P. (Eds.). (2019). Eye Pathology: An Atlas and Text (3rd ed.). Lippincott Williams & Wilkins.*
- *Albert, D. M., & Miller, J. W. (Eds.). (2010). Albert & Jakobiec's Principles and Practice of Ophthalmology (3rd ed.). Saunders.*
- *Kanski, J. J., Bowling, B., & Nischal, K. K. (2016). Kanski's Clinical Ophthalmology: A Systematic Approach (8th ed.). Elsevier.*
- *Kaiser, P. K., Friedman, N. J., Pineda, R., & Ritterband, D. C. (Eds.). (2020). The Massachusetts Eye and Ear Infirmary Illustrated Manual of Ophthalmology (5th ed.). Elsevier.*

Semester 6th

Course Title: Contact Lens -I

Course Code: BOP601

L	T	P	Cr.
4	0	0	4

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Develop skills to assess patients' ocular health and visual needs to determine their suitability for contact lens wear.
2. Identify and explain the different parts of the eye relevant to contact lens wear.
3. Stress the importance of patient compliance with lens care routines and hygiene practices to prevent infections and complications.
4. Teach proper handling, cleaning, disinfection, and storage techniques to patients to maintain contact lens hygiene and safety.

Course Contents

UNIT-I **15 Hours**

Introduction to Contact Lenses; Types of contact lenses (e.g., soft lenses, rigid gas-permeable lenses, hybrid lenses), Ocular Anatomy and Physiology, Overview of the eye's structures relevant to contact lens wear, Tear film and corneal physiology, Pre-Fitting Considerations

UNIT-II **15 Hours**

Patient assessment and history taking, Ocular health evaluation, Refraction and prescription interpretation, Lens Fitting and Evaluation, Lens selection criteria, Measurement and fitting techniques, Lens parameters and customization, Evaluation of lens fit and visual acuity

UNIT-III **15 Hours**

Lens Care and Hygiene, Cleaning, disinfection, and storage methods, Compliance and safety guidelines, Proper handling and insertion/removal techniques, Complications and Troubleshooting, Common contact lens-related complications, Recognition, prevention, and management of

complications, Lens-related dryness, allergies, and infections, Patient Management and Communication, Patient education and counseling

UNIT-IV **15 Hours**

Addressing patient concerns and expectations, Building rapport and maintaining professional relationships, Clinical Practice, Hands-on sessions for fitting, evaluation, and troubleshooting, Clinical case studies and simulations, Observational experiences in a contact lens clinic

Transactional modes

Video-based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Bennett, E. S., & Weissman, B. A. (2018). Clinical Contact Lens Practice (3rd ed.). Lippincott Williams & Wilkins.*
- *Efron, N. (2018). Contact Lens Practice (4th ed.). Elsevier.*
- *Jalbert, I. (Ed.). (2013). Contact Lens Update X: Proceedings of the Biennial International Conference on Contact Lens Research. Contact Lens and Anterior Eye.*
- *Phillips, A. J. (Ed.). (2019). Contact Lenses in Ophthalmic Practice. Springer.*
- *Wagner, H., Barr, J. T., & Zadnik, K. (Eds.). (2020). Contact Lenses (7th ed.). Elsevier.*

Course Title: Clinical Refraction II

Course Code: BOP602

L	T	P	Cr.
4	0	0	4

Total Hours 60

Learning Outcomes: After completion of this course, the learner will be able to:

1. Enhance understanding of the principles and theories underlying clinical refraction
2. Develop proficiency in the assessment and measurement of refractive errors
3. Explore advanced techniques and methodologies in clinical refraction
4. Foster critical thinking and problem-solving skills in the context of complex refractive cases

Course Contents

UNIT-I **15 Hours**

Review of Basic Principles, Recapitulation of fundamental concepts in clinical refraction, Refresher on the anatomy and physiology of the eye relevant to refraction, Review of subjective and objective refraction techniques and Advanced Refractive Techniques, Keratometry: principles and clinical application, Skiascopy: advanced techniques and interpretation of results

UNIT-II **15 Hours**

Specialized Refractive Procedures, Binocular vision assessment and management in refraction, Refraction in special populations (children, older adults, individuals with disabilities), Contact lens fitting and evaluation, Refraction in the context of refractive surgery (LASIK, PRK, etc.).

UNIT-III **15 Hours**

Complex Refractive Cases, Evaluation and management of irregular astigmatism, Presbyopia: diagnosis and management strategies., Refraction in the presence of ocular pathologies (e.g., cataracts, corneal abnormalities).,, Residual refractive errors and troubleshooting techniques.

UNIT-IV **15 Hours**

Ethical Considerations and Professionalism, Ethical guidelines and legal aspects of clinical refraction, Patient-centered approach: effective communication and rapport-building, Professional responsibilities and the

optometrist-patient relationship, Multidisciplinary collaboration: working with other healthcare professionals.

Transactional modes

Video-based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Khurana, A. K. (2017). Comprehensive Ophthalmology (6th ed.). Jaypee Brothers Medical Publishers.*
- *Eskridge, J. B., Amos, J. F., & Bartlett, J. D. (2019). Clinical Procedures for Ocular Examination (4th ed.). McGraw-Hill Education.*
- *Grosvenor, T., & Scott, R. (2017). Clinical Optics (4th ed.). Butterworth-Heinemann.*
- *Benjamin, W. J. (Ed.). (2017). Borish's Clinical Refraction (2nd ed.). Elsevier.*
- *Bennett, A. G., & Rabbetts, R. B. (2012). Clinical Visual Optics (4th ed.). Butterworth-Heinemann.*

Course Title: Low Vision Aids & Visual Rehabilitation

Course Code: BOP603

L	T	P	Cr.
2	0	0	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Develop proficiency in selecting appropriate low vision aids, including magnifiers, telescopes, electronic devices, and lighting solutions based on individual needs and preferences.
2. Stay up-to-date with advancements in low vision aids and rehabilitation techniques through continuing education and research.
3. Develop skills in fitting and prescribing low vision aids, ensuring that they are comfortable and effective for the individual.
4. Perform functional vision assessments to evaluate how individuals with low vision perform everyday tasks, such as reading, cooking, or recognizing faces.

Course Contents

UNIT-I **05 Hours**

Introduction to Low Vision, Definition of low vision, Causes and prevalence of low vision, Impact of low vision on daily life and independence, Visual Assessment and Evaluation, Techniques for assessing visual acuity and visual field, Functional vision assessment, Assessment of contrast sensitivity and glare

UNIT-II **10 Hours**

Low Vision Aids, Optical aids (magnifiers, telescopes, filters), Non-optical aids (illumination, glare control, adaptive techniques), Assistive technology (screen magnifiers, text-to-speech software), Orientation and Mobility, Techniques for independent travel and spatial orientation, Use of mobility aids (canes, guide dogs), Environmental adaptations and wayfinding strategies

UNIT-III **05 Hours**

Activities of Daily Living (ADL) Rehabilitation, Strategies for managing self-care tasks (personal hygiene, cooking, etc.), Adaptive techniques for home management, Assistive devices for ADLs (talking watches, large-print items), Psychological and Emotional Aspects of Vision Loss

UNIT-I **10 Hours**

Coping strategies for individuals with low vision, Impact on mental health and quality of life, Support resources and counseling services, Low Vision Rehabilitation Team, Roles and responsibilities of different professionals (optometrists, occupational therapists, orientation and mobility specialists), Collaborative approach to low vision rehabilitation, Rehabilitation Planning and Implementation

Transactional modes

Video-based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Lam, D., & Faye, E. E. (Eds.). (2019). Low Vision Rehabilitation: A Practical Guide for Occupational Therapists. Slack Incorporated.*
- *Stuen, C., Arditi, A., & Horowitz, A. (Eds.). (2019). Low Vision Manual (2nd ed.). Slack Incorporated.*
- *Massof, R. W., & Lidoff, L. (Eds.). (2018). Low Vision: Principles and Applications. Oxford University Press.*
- *Wolffsohn, J. S., & Edgar, D. F. (Eds.). (2019). Low Vision Manual. Oxford University Press.*
- *Warren, D. H., & Lotfi, N. (2016). Low Vision: Principles and Applications. Oxford University Press.*

Course Title: Contact Lens -I (Practical)

Course Code: BOP604

L	T	P	Cr.
0	0	4	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Develop skills to assess patients' ocular health and visual needs to determine their suitability for contact lens wear.
2. Identify and explain the different parts of the eye relevant to contact lens wear.
3. Stress the importance of patient compliance with lens care routines and hygiene practices to prevent infections and complications.
4. Teach proper handling, cleaning, disinfection, and storage techniques to patients to maintain contact lens hygiene and safety.

Course Contents

Practical/Clinical posting **30 Hours**

1. Contact Lens Handling and Care
2. Proper hygiene practices before handling contact lenses
3. Techniques for inserting and removing contact lenses safely
4. Cleaning and disinfection methods for contact lenses
5. Storage and maintenance of contact lens cases
6. Analysis and presentation of case studies related to contact lens practice
7. Integration of theoretical knowledge with practical application

Suggested readings

- *Efron, N. (2018). Contact Lens Practice (4th ed.). Elsevier.*
- *Jalbert, I. (Ed.). (2013). Contact Lens Update X: Proceedings of the Biennial International Conference on Contact Lens Research. Contact Lens and Anterior Eye.*
- *Phillips, A. J. (Ed.). (2019). Contact Lenses in Ophthalmic Practice. Springer.*
- *Wagner, H., Barr, J. T., & Zadnik, K. (Eds.). (2020). Contact Lenses (7th ed.). Elsevier.*

Course Title: Clinical Refraction II (Practical)

Course Code: BOP605

L	T	P	Cr.
0	0	4	2

Total Hours 30

Learning Outcomes: After completion of this course, the learner will be able to:

1. Enhance understanding of the principles and theories underlying clinical refraction
2. Develop proficiency in the assessment and measurement of refractive errors
3. Explore advanced techniques and methodologies in clinical refraction
4. Foster critical thinking and problem-solving skills in the context of complex refractive cases

Course Contents

Practical/Clinical posting **30 Hours**

1. Review of Basic Refraction Techniques:
2. Retinoscopy: Principles and techniques
3. Subjective Refraction: Techniques for determining the patient's subjective refraction
4. Advanced Techniques in Refraction:
5. Aberrometry: Measurement and interpretation of higher-order aberrations
6. Wavefront Analysis: Principles and clinical applications
7. Autorefraction and Topography: Utilizing automated instruments for refraction
8. Specialized Refraction Situations:
9. Pediatric Refraction: Examination and correction of refractive errors in children
10. Geriatric Refraction: Considerations for older patients
11. Refraction in Special Populations: Refractive management for individuals with specific conditions (e.g., cataracts, corneal irregularities)
12. Contact Lens Refraction:
13. Fitting and Refraction with Contact Lenses: Techniques for determining contact lens prescriptions
14. Specialty Contact Lenses: Introduction to multifocal, toric, and rigid gas permeable lens
15. Hands-on refraction exercises with simulated or real patients

Suggested readings

- *Eskridge, J. B., Amos, J. F., & Bartlett, J. D. (2019). Clinical Procedures for Ocular Examination (4th ed.). McGraw-Hill Education.*
- *Grosvenor, T., & Scott, R. (2017). Clinical Optics (4th ed.). Butterworth-Heinemann.*
- *Benjamin, W. J. (Ed.). (2017). Borish's Clinical Refraction (2nd ed.). Elsevier.*
- *Bennett, A. G., & Rabbetts, R. B. (2012). Clinical Visual Optics (4th ed.). Butterworth-Heinemann.*

Course Title: Occupational Optometry

Course Code: BOP606

L	T	P	Cr.
3	0	0	3

Total Hours 45

Learning Outcomes: After completion of this course, the learner will be able to:

1. Effects of physical, chemical, and other hazards on eye and vision.
2. Identify occupational causes of visual and eye problems.
3. Prescribe suitable corrective lenses and eye-protective wear.
4. Set visual requirements, and standards for different jobs.

Course Contents

UNIT-I **10 Hours**

Introduction to Occupational Optometry; Definition, scope, and goals of occupational optometry, Historical background and evolution of the field, Roles and responsibilities of an occupational optometrist, Visual System and Occupational Demands

UNIT-II **10 Hours**

Anatomy and physiology of the visual system, Visual processes involved in occupational tasks, Ergonomics and visual ergonomics in the workplace, Occupational Vision Assessment; Visual acuity measurement and assessment, Refraction and prescribing corrective lenses, Assessment of accommodative and binocular vision function, Color vision testing, Visual field testing and peripheral awareness, Visual Demands of Specific Occupations

UNIT-III **15 Hours**

Visual requirements of computer work and digital devices, Occupational hazards and visual safety, Vision in industrial and manufacturing settings, Vision in healthcare and medical professions, Vision in aviation and transportation industries, Vision in sports and performance-related occupations

UNIT-IV **10 Hours**

Vision and Workplace Design, Lighting considerations and glare management, Display screen equipment (DSE) ergonomics, Optimal visual conditions for different work environments, Designing visually friendly workstations, Occupational Vision Problems and Management, Visual fatigue and eye strain, Dry eye syndrome and environmental factors, Computer vision

syndrome and digital eye strain, Occupational-related eye injuries, Vision problems associated with specific occupations

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Rosenfield, M. (2016). Optometry: Science, Techniques, and Clinical Management (3rd ed.). Butterworth-Heinemann.*
- *Cole, B. L., & Krasnow, M. (Eds.). (2015). Occupational Vision: The Eye and the Workplace. CRC Press.*
- *Evans, B. J. (Ed.). (2018). Occupational Optometry: Principles and Practice (2nd ed.). Butterworth-Heinemann.*
- *Wick, B., & Hyvärinen, L. (Eds.). (2013). Applied Visual Science and Occupational Therapy: Concepts and Applications. Slack Incorporated.*
- *Martin, R., & Wittich, W. (Eds.). (2015). Visual Ergonomics in the Workplace. CRC Press.*

Course Title: Advanced ophthalmic diagnostic procedures

Course Code: BOP607

L	T	P	Cr.
3	0	0	3

Total Hours 45

Learning Outcomes: After completion of this course, the learner will be able to:

1. Perform medical and surgical procedural and technical skills.
2. Perform appropriate history and physical examinations.
3. Develop and Implement patient management plans.
4. Demonstrate the role of preventive medicine in healthcare including screening recommendations.

Course Contents

UNIT-I **10 Hours**

Introduction to Ophthalmic Diagnostics: Overview of ophthalmic diagnostic procedures, Importance of accurate diagnosis in ophthalmology, Ophthalmic Imaging Techniques: Fundus photography, Optical coherence tomography (OCT), Ultrasound biomicroscopy (UBM), Fluorescein angiography, Indocyanine green angiography

UNIT-II **10 Hours**

Visual Field Testing: Perimetry techniques, Automated visual field testing, Interpretation of visual field results, Corneal Topography and Biometry: Principles of corneal topography, Anterior and posterior corneal topography, Biometry for intraocular lens (IOL) calculations

UNIT-III **15 Hours**

Electrophysiological Testing: Electroretinography (ERG), Visual evoked potentials (VEP), Electrooculography (EOG), Multifocal ERG (mfERG), Intraocular Pressure Measurement: Applanation tonometry, Non-contact tonometry, Tono-pen tonometry, Dynamic contour tonometry, Ocular Ultrasonography: A-scan and B-scan ultrasonography, Immersion and contact techniques

UNIT-IV **10 Hours**

Diagnostic applications of ocular ultrasonography, Ocular Surface Evaluation: Tear film evaluation, Corneal staining and vital dye tests,

Meibomian gland imaging, Schirmer's test and tear breakup time (TBUT), Interpretation of Diagnostic Test Results: Normal ranges and variations, Recognizing artifacts and errors, Correlating findings with clinical conditions

Transactional modes

Video-based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Yanoff, M., & Duker, J. S. (Eds.). (2018). Ophthalmology (5th ed.). Elsevier.*
- *Riordan-Eva, P., & Cunningham, E. T. (Eds.). (2019). Vaughan & Asbury's General Ophthalmology (19th ed.). McGraw-Hill Education.*
- *Yanoff, M., & Cameron, D. (Eds.). (2014). Ocular Pathology (7th ed.). Elsevier.*
- *Kanski, J. J., Bowling, B., & Nischal, K. K. (2016). Kanski's Clinical Ophthalmology: A Systematic Approach (8th ed.). Elsevier.*
- *Duker, J. S., Kaiser, P. K., Singh, R. P., & Sickenberg, M. (Eds.). (2013). Ophthalmology (4th ed.). Saunders.*

Course Title: Applied clinical optometry

Course Code: BOP608

L	T	P	Cr.
3	0	0	3

Total Hours 45

Learning Outcomes: After completion of this course, the learner will be able to:

1. Develop a comprehensive understanding of the clinical examination and assessment of visual disorders.
2. Gain knowledge of common eye diseases, their diagnosis, and appropriate treatment options.
3. Develop effective communication and patient management skills in a clinical setting.
4. Promote an ethical and professional approach to optometric practice.

Course Contents

UNIT-I **10 Hours**

Introduction to Clinical Optometry; Overview of clinical optometry and its significance, Professional ethics and responsibilities in optometric practice, Visual Examination Techniques, Visual acuity testing, Refraction techniques, Binocular vision assessment, Ocular motility evaluation, Near point of convergence measurement, Pupillary assessment

UNIT-II **05 Hours**

Diagnostic Procedures, Slit-lamp bio microscopy, Fundus examination, Tonometry (e.g., applanation, non-contact), Corneal topography, Visual field testing, Optical coherence tomography (OCT)

UNIT-III **15 Hours**

Common Eye Conditions, Myopia, hyperopia, astigmatism, and presbyopia, Amblyopia, Strabismus, Cataracts, Glaucoma, Diabetic retinopathy, Age-related macular degeneration (AMD), Dry eye syndrome, Contact Lenses, Selection and fitting of contact lenses, Contact lens materials and designs, Complications and management of contact lens-related issues

UNIT-IV **15 Hours**

Referral and Co-management, Recognizing conditions requiring referral to ophthalmologists, Co-management of patients with systemic diseases

impacting vision, Communication and Patient Management, Patient interviewing and history-taking, Effective communication strategies with patients and healthcare professionals, Patient education and counseling

Transactional modes

Video based teaching, Collaborative teaching, Case based teaching, Question

Suggested readings

- *Gottlieb, D. D. (2020). Clinical Optometry (3rd ed.). Butterworth-Heinemann.*
- *Bennett, E. S., & Weissman, B. A. (2018). Clinical Contact Lens Practice (3rd ed.). Lippincott Williams & Wilkins.*
- *Elliott, D. B., & Peli, E. (Eds.). (2015). Clinical Vision Science: A Multidisciplinary Approach (2nd ed.). Springer.*
- *Rosenfield, M., & Logan, N. (Eds.). (2013). Optometry: Science, Techniques, and Clinical Management (2nd ed.). Butterworth-Heinemann.*
- *Grosvenor, T., & Scott, R. (2017). Clinical Optics (4th ed.). Butterworth-Heinemann*

Semester 7th

Course Title: Training/Internship report

L	T	P	Cr
0	0	0	20

Course Code: BOP701

Total Hours: 300

Learning Outcomes: After completion of this course, the learner will be able to:

1. Gain knowledge of various ophthalmological techniques and procedures used in clinical settings.
2. Proficiency in ophthalmological Equipment and Instruments: Develop skills in operating and maintaining ophthalmological equipment and instruments.
3. Discuss principles and practices of quality control and assurance in the ophthalmology, including the use of standard operating procedures, troubleshooting techniques, and adherence to safety protocols.
4. Develop the ability to interpret ophthalmological test results accurately, correlate them with patient medical histories, and recognize abnormalities or trends that may indicate underlying health conditions.

Course Contents

Students have to carry out a Training Report (on any topic related to Optometry) under the supervision of a faculty. The Training report has to be prepared on the basis of the research work carried out. The assessment is done on the basis of the work done and the presentation and viva.