



# **INTEGRAL UNIVERSITY, LUCKNOW**

**INTEGRAL INSTITUTE OF ALLIED HEALTH SCIENCES & RESEARCH**

**DEPARTMENT OF PARAMEDICAL SCIENCES**

**BACHELOR OF OPTOMETRY  
(B.OPTOM)**

**SYLLABUS**

**YEAR/ SEMESTER: II/III**



Integral University, Lucknow  
Department of Paramedical Sciences  
Study and Evaluation Scheme

Program: BOPT

Semester-III

S. N.	Course code	Course Title	Type of Paper	Period Per hr./week/Sem			Evaluation Scheme				Sub. Total	Credit	Total Credits
				L	T	P	CT	TA	Total	ESE			
THEORIES													
1	BO201	Optometric Optics-II & Dispensing Optics	Core	3	1	0	40	20	60	40	100	3:1:0	4
2	BO202	Visual Optics-I	Core	3	1	0	40	20	60	40	100	3:1:0	4
3	BO203	Optometric Instruments	Core	3	1	0	40	20	60	40	100	3:1:0	4
4	BO204	Ocular Diseases-I	Core	3	1	0	40	20	60	40	100	3:1:0	4
5	BO205	General & Ocular Pathology/Microbiology	Core	2	1	0	40	20	60	40	100	2:1:0	3
6	ES101	Environmental Studies	Core	2	1	0	40	20	60	40	100	2:1:0	3
PRACTICAL													
1	BO206	Optometric Optics-II & Dispensing Optics Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
2	BO207	Visual Optics-I - Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
3	BO208	Optometric Instruments - Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
Total				16	06	06	360	180	540	360	900	25	25

S. N.	Course code	Course Title	Type of Paper	Attributes							United Nation Sustainable Development Goal (SDGs)
				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
THEORIES											
1	BO201	Optometric Optics-II & Dispensing Optics	Core	√	√	√			√	√	3,4
2	BO202	Visual Optics-I	Core	√	√	√	√		√	√	3,4
3	BO203	Optometric Instruments	Core	√	√	√	√		√	√	3,4
4	BO204	Ocular Diseases-I	Core	√	√	√	√		√	√	3,4
5	BO205	General & Ocular Pathology/Microbiology	Core	√	√	√	√		√	√	3,4
6	ES101	Environmental Studies	Core					√			6,13,14 & 15
PRACTICAL											
1	BO206	Optometric Optics-II & Dispensing Optics Lab	Core	√	√	√	√		√	√	3,4
2	BO207	Visual Optics-I - Lab	Core	√	√	√	√		√	√	3,4
3	BO208	Optometric Instruments - Lab	Core	√	√	√	√		√	√	3,4

**L:** Lecture      **T:** Tutorials      **P:** Practical      **CT:** Class Test      **TA:** Teacher Assessment **ESE:** End Semester Examination,  
AE= Ability enhancement, DSE- Discipline Specific Elective, **Sessional Total:** Class Test + Teacher Assessment      **Subject Total:** Sessional Total + End Semester Examination (ESE)



## Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	BO201	Title of the Course	OPTOMETRIC OPTICS-II & DISPENSING OPTICS	L	T	P	C
Year	II	Semester	III	3	1	0	4
Pre-Requisite	Ni I	Co-requisite	Nil				
Course Objectives	Skills/knowledge to be acquired at the end of this course: To select the tool power for grinding process. Different types of materials used to make lenses and its characteristics. Lens designs–Bifocals, progressive lens. Tinted, Protective & Special lenses. Spectacle frames –manufacture process & materials.						

Course Outcomes	
CO1	Understanding to select the tool power for grinding process.
CO2	Understanding about different types of materials used to make lenses and its characteristics.
CO3	Understanding about Spectacle frames, various Lens designs,
CO4	Analyzing various dispensing spectacle lens and frames based on the glass prescription
CO5	Evaluating various facial measurements –Inter papillary distance measurement and measuring heights (single vision, multifocal, progressives)

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	OPHTHALMIC LENS	1. Raw materials - History and General Outline. 2. Manufacturing of Ophthalmic Blanks – Glass &Plastics. 3. Terminology used in Lens Workshops. 4. Surfacing process from Blanks to lenses. 5. Glazing & Edging. 6. Definition & Materials (Glass, Plastics, Polycarbonate, Trivex) types and Characteristics. 7. Properties (Refractive index, specific gravity, UV cut off, impact resistance – include drop ball test, Scratch Resistance, Abbe value, Centre thickness.	8	CO1
2	LENS STANDARD	1. Best form of lenses & Safety standards for Ophthalmic lenses (FDA, ANSI, ISI, Others). 2. Design of High-Powered Lenses, Hi-index lenses. 3. Relationship between of Refractive index with the lens thickness, Aspheric lenses. 4. High index lenses, Bifocal designs, their manufacturing & uses (Kryptok, Flat-top & E-bifocal. 5. Advantages & Disadvantages of Bifocal Lens.	8	CO2
3	CORRECTIVE LENSES	1. Progressive Addition Lenses or Multifocal Lens or Pals. 2. Designs of Pals, Advantages & disadvantages of Pals. 3. Marking & measurements related to the dispensing of Pals. 4. Trouble shooting. 5. Lens enhancements (Scratch resistant coatings – spin/dip, Anti-reflection Coating, UV coating, Hydrophobic coating, anti-static coating. 6. Lens defects – Description and Detection.	8	CO3
4	SPECIALITY	1. Glazing & edging (manual & automatic). 2. <b>Special lenses:</b> (i) Lenticulars. (ii) Aspheric. (iii) Fresnel lenses &Prisms. (iv) Aniseikonia lenses. (v) Photochromic. (vi) Polaroids. (vii) Tinted lenses – Tints, filter 3. Tinted lenses – absorptive properties. 4. Tinted lenses – examples and discussions, Special purpose lenses.	8	CO4
5	SPECTACLE FRAMES	1. Components of spectacle prescription & interpretation, transposition, Add and near. 2. Frame selection –based on spectacle prescription, professional requirements, age group, face shape. 3. Neutralization –Hand & lensometer, axis marking, prism marking. 4. Faults in spectacles (lens fitting, frame fitting, patients' complaints, description. 5. Final checking & dispensing of spectacles to customers, counseling on wearing & maintaining of spectacles, Accessories –Bands, chains, boxes, selves, cleaners, screwdriver kit. 6. Special types of spectacle frames: Monocles, Ptois crutches, Industrial safety glasses, Welding glasses Marking (Centration, Bifocal Segment height) & measurements (IPD, VD, etc.)	8	CO5

### Reference Books:

1. Jalie MO: Ophthalmic lens and dispensing, 3<sup>rd</sup> edition, Butterworth–Heinemann,2008.
2. Troy E. Fannin, Theodore Grosvenor: Clinical Optics, 2nd edition, Butterworth – Heinemann, 1996.
3. C W Brooks, IM Borish: System for Ophthalmic Dispensing, 3rdedition, Butterworth- Heinemann, 2000
4. Michael P Keating: Geometric, Physical & Visual Optics, 2nd edition, Butterworth – Heinemann,2002.

### e-Learning Source:

1. <https://www.youtube.com/watch?v=driy5uzFzb4>
2. <https://www.youtube.com/watch?v=p45nuwPe5KU>
3. <https://www.youtube.com/watch?v=ZLQS-1HTTrfQ>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO- PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3	2	3	2	2	1	-	2
CO2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	-	3
CO3	3	2	3	3	3	2	3	2	2	3	2	3	2	3	1	-	2
CO4	3	3	3	3	3	3	3	3	3	3	3	3	3	2	1	-	3
CO5	3	3	3	3	3	3	3	2	3	3	3	3	2	2	1	-	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs										
Course Code	Course Title	Attributes							SDGs No.	
BO201	OPTOMETRIC OPTICS-II & DISPENSING OPTICS	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics		
		√	√	√			√	√	3,4	



## Integral University, Lucknow

<b>Effective from Session: 2023-24</b>							
<b>Course Code</b>	<b>BO202</b>	<b>Title of the Course</b>	<b>VISUAL OPTICS-I</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Year</b>	<b>II</b>	<b>Semester</b>	<b>III</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
<b>Pre-Requisite</b>	<b>Nil</b>	<b>Co-requisite</b>	<b>Nil</b>				
<b>Course Objectives</b>	Upon completion of the course, the student should be able: To understand the fundamentals of optical components of the eye. To gain theoretical knowledge and practical skill on visual acuity measurement, objective and subjective clinical refraction.						

<b>Course Outcomes</b>	
<b>CO1</b>	Understanding the nature and properties of the Light and Mirror.
<b>CO2</b>	Understanding about the various optical constants of the eye in relation with physical properties of the eye.
<b>CO3</b>	Understanding the various aspects of vision and measuring visual acuity.
<b>CO4</b>	Having acknowledged about various optical defects of the eye.
<b>CO5</b>	Analyzing about various refractive anomalies of the eye.

<b>Unit No.</b>	<b>Title of the Unit</b>	<b>Content of Unit</b>	<b>Contact Hrs.</b>	<b>Mapped CO</b>
1	<b>INTRODUCTION</b>	1. Review of Geometrical Optics: Vergence and power. 2. Spherical refracting surface, Spherical mirror, Cardinal points. Schematic eyes 3. Nodal points and clear image size. 4. Spectacle magnification in reduced and corrected eyes.	8	CO1
2	<b>LIGHT PROPERTY</b>	1. Magnification: Types 2. Clinical Relevance of Interference, Diffraction. 3. Polarization, Birefringence. 4. Spherical Aberration and Chromatic aberrations and their application	8	CO2
3	<b>VISUAL OPTICS</b>	1. Optics of Ocular Structure. 2. Ametropia in the actual human eye. The growth of the human eye in emmetropia. Spherical ametropia in adult eye. Genetic aspects of refractive error 3. Aphakia. Reflective error in aphakia. The retinal image size in aphakia 4. Clinical aspects of aphakia.	8	CO3
4	<b>OCULAR DIAGNOSIS</b>	1. Keratometry 2. Lensometry 3. Visual Acuity, Color Vision, Spatial and Temporal Resolution, 4. Science of Measuring visual performance and application to Clinical Optometry 5. Astigmatism: Classification of astigmatism. Correction of astigmatism by spherocylindrical, toric and contact lenses	8	CO4
5	<b>CLINICAL REFRACTION</b>	1. Optical component measurements of various ocular structures and Growth of the eye in relation to refractive errors. 2. Retinoscopy – principle and use. Clinical recording of standard of vision-visual acuity. 3. Review of subjective refractive methods. 4. Problem of review of objective refractive methods Techniques to refine cylindrical power and axis.	8	CO5

<b>Reference Books:</b>																	
1. AHT Unna Cliffe: Visual optics, The Association of British Optician,1987.																	
2. AG Bennett & RB Rabbets: Clinical Visual optics, 3rd edition, Butterworth Heinemann, 1998.																	
3. M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth- Heinemann, USA, 2002.																	
4. H L Rubin: Optics for clinicians, 2 <sup>nd</sup> edition, Triad publishing company. Florida,1974.																	
5. H Obstfeld: Optic in Vision- Foundations of visual optics & associated computations, 2nd edition, Butterworth, UK,1982																	
6. WJ Benjamin: Borich's clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA, 2006.																	
7. T Grosvenor: Primary Care Optometry, 4th edition, Butterworth-Heinemann, USA, 2002.																	
8. Theory and Practice of Optics and Refraction by A.K Khurana. 3 <sup>rd</sup> edition.																	
<b>e-Learning Source:</b>																	
1. <a href="https://www.youtube.com/watch?v=-k4JO03tpGs">https://www.youtube.com/watch?v=-k4JO03tpGs</a>																	
2. <a href="https://www.youtube.com/watch?v=oal-b6ep6KA">https://www.youtube.com/watch?v=oal-b6ep6KA</a>																	
3. <a href="https://www.youtube.com/watch?v=wiYmTAuVimg">https://www.youtube.com/watch?v=wiYmTAuVimg</a>																	

<b>Course Articulation Matrix: (Mapping of COs with POs and PSOs)</b>																	
<b>PO-PSO CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
<b>CO1</b>	1	3	1	2	-	-	-	1	2	-	-	2	2	1	-	1	-
<b>CO2</b>	1	3	1	3	-	-	-	1	3	-	-	3	3	2	-	2	-
<b>CO3</b>	1	3	1	2	-	-	-	1	2	-	-	2	3	1	-	1	-
<b>CO4</b>	1	3	1	2	-	-	-	1	3	-	-	3	2	1	-	1	-
<b>CO5</b>	1	3	1	2	-	-	-	1	2	-	-	2	2	1	-	1	-

**1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

<b>Course Code</b>		<b>Course Title</b>		<b>Attributes &amp; SDGs</b>							<b>SDGs No.</b>	
				<b>Attributes</b>								
				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics		
BO202		VISUAL OPTICS-I		f	f	f	f		f	f	3,4	



## Integral University, Lucknow

Effective from Session: 2023-24

Course Code	BO203	Title of the Course	OPTOMETRIC INSTRUMENTS	L	T	P	C
Year	II	Semester	III	3	1	0	4
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	Upon completion of the course, the student should be able to gain theoretical knowledge and basic practical skill in handling the following instruments: Visual Acuity chart / drum, Retinoscope, Trial Box, Jackson Cross cylinder, Direct ophthalmoscope, slit lamp Biomicroscope, Slit lamp Ophthalmoscopy (+90, 78D), Gonioscope, Tonometer: Applanation Tonometer, Keratometry, Perimeter, Electrodiagnostic instrument (ERG, VEP, EOG), A –Scan Ultrasound, Lensometer						

**Course Outcomes:** After the successful course completion, learners will develop following attributes:

CO1	Understanding and application of the refractive instrument.
CO2	Understanding & design, application and use of refractive instrument use in refraction room.
CO3	Understanding the optics and applying the basic functions of Ophthalmoscope.
CO4	Understanding the optics and applying the basic functions and importance of examination of anterior segment.
CO5	Understanding and applying the various tools to measure ocular condition.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	REFRACTIVE INSTRUMENTS	1. Test charts standards, Choice of test charts. 2. Trial case lenses, Refractor (phoropter) head units. 3. Optical considerations of refractor units, Trial frame design. 4. Near vision difficulties with units and trial frames. 5. Projection charts, Illumination of the consulting room.	8	CO1
2	RETINOSCOPE	1. Retinoscope – types available, Adjustment and special features. 2. Retinoscopy- types and special features. 3. Optometers- principles and details.	8	CO2
3	OPHTHALMOSCOPES AND RELATED DEVICES	1. Design of ophthalmoscopes –illumination and viewing. 2. Ophthalmoscope disc, Filters for ophthalmoscopy, Indirect ophthalmoscope. 3. Tonometer- principles, types, use and interpretation.	8	CO3
4	SLIT LAMP	1. Slit lamp Biomicroscope- Types, systems, parts and working. 2. Slit lamp techniques types- working and application. 3. Slit lamp attachment & accessories. 4. Slit lamp Biomicroscopy Interpretation.	8	CO4
5	FUNDUS EXAMINATION	1. Fundus camera – principles & techniques. 2. Corneal examination, Placido's Disc., Keratometer 3. Exophthalmometer 4. Lensometer	8	CO5

### Reference Books:

1. Optometric Instrumentation. SANTOSH K. KUMAR: (SKK)
2. Optometric Instrumentation - DRAVID B. HENSON (DBH)
3. Clinical Visual Optics - BENNETT & RABBETTS.
4. Visual Optics and Refraction - DAVID O. MICHALES. (DOM)
5. Primary Care Optometry - THEODER GROSVENOR.
6. Practical Orthoptics in treatment of squint - T. KEITH LYLE & SYLVIA JACKSON.

### e-Learning Source:

1. <https://www.youtube.com/watch?v=AdKxOOzlx4Q>
2. <https://www.youtube.com/watch?v=aeOXtaapoJI>
3. <https://www.youtube.com/watch?v=2XZ7y8UF5YI>

### Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	3	2	2	-	-	-	1	2	1	-	2	2	1	-	1	-
CO2	1	3	1	3	-	-	-	2	3	-	-	3	3	2	-	2	-
CO3	1	3	1	2	-	-	-	1	2	2	-	2	3	1	-	1	-
CO4	1	3	1	2	-	-	-	1	3	-	-	3	2	1	-	1	-
CO5	1	3	1	2	-	-	-	1	2	1	-	2	2	1	-	1	-

**1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

### Attributes & SDGs

Course Code	Course Title	Attributes							SDG No.
BO203	OPTOMETRIC INSTRUMENTS	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√	√		√	√	3,4



## Integral University, Lucknow

**Effective from Session: 2023-24**

Course Code	BO204	Title of the Course	OCULAR DISEASES-I	L	T	P	C
Year	II	Semester	III	3	1	0	4
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	At the end of the course the students will be knowledgeable in the following aspects of ocular diseases: Etiology, Epidemiology, Symptoms, Signs, Course sequelae of ocular disease, Diagnostic approach and Management of the ocular diseases.						

### Course Outcomes

CO1	Understanding the concept of different Ocular diseases of anterior segment of Eye.
CO2	Applying the concept of anatomy & Physiology of Eye while understanding the Pathology of different ocular diseases.
CO3	Utilizing the concept of clinical features of the diseases for the differential diagnosis of the anterior segment diseases.
CO4	Analyzing the concept of clinical features of the diseases for the management of anterior segment diseases.
CO5	Understanding the concept of different Ocular diseases of anterior segment of Eye.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>ORBIT</b>	<ol style="list-style-type: none"> <li>Orbital Inflammations (Perceptual cellulites, Orbital cellulitis, cavernous sinus Thrombosis).</li> <li>Developmental Anomalies (craniosynostosis, Craniofacial Dysostosis, Hypertelorism, Median facial cleft syndrome.</li> <li>Proptosis</li> <li>Grave's Ophthalmopathy (Thyroid eye disease)</li> <li>Orbital blow out fractures.</li> <li>Orbital tumors</li> </ol>	8	CO1
2	<b>LIDS</b>	<ol style="list-style-type: none"> <li>Congenital anomalies (Ptosis, Coloboma, Epicanthus, Distichiasis, Cryptophthalmus)</li> <li>Oedema of the eyelids</li> <li>Inflammatory disorders (Blepharitis, External Hordeolum, Chalazion, Internal hordeolum, Molluscum Contagiosum).</li> <li>Lacrimal apparatus ocular conditions</li> <li>The Dry Eye (Sjogren's Syndrome), The watering eye (Etiology, clinical evaluation)</li> <li>Dacryocystitis and Dacryoadenitis</li> </ol>	8	CO2
3	<b>CONJUNCTIVA</b>	<ol style="list-style-type: none"> <li>Inflammations of conjunctiva</li> <li>Degenerative conditions (Pinguecula, Pterygium, Concretions)</li> <li>Hyperemia, Chemosis, xerosis</li> <li>Cysts and Tumors</li> </ol>	8	CO3
4	<b>CORNEA</b>	<ol style="list-style-type: none"> <li>Congenital Anomalies (Megalo cornea, Microcornea, Cornea Plana, Congenital cloudy cornea).</li> <li>Inflammations of the cornea</li> <li>Degenerative conditions of cornea</li> <li>Corneal oedema, Corneal opacity, Corneal Vascularization.</li> <li>Penetrating Keratoplasty.</li> </ol>	8	CO4
5	<b>UVEAL TRACT AND SCLERA</b>	<ol style="list-style-type: none"> <li>Anterior and posterior uveitis with its etiology, clinical features, signs, symptoms, investigations and management.</li> <li>Episcleritis and scleritis.</li> </ol>	8	CO5

### Reference Books:

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, new age international, Ltd. Publishers, New Delhi, 2007
2. Stephen J. Miller: Parsons Diseases of the Eye, 18<sup>th</sup> edition, Churchill Livingstone, 1990
3. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth - Heinemann, 2007.
4. T Grosvenor: Primary Care Optometry, 4th edition, Butterworth - Heinemann, USA, 2002.
5. Theory and Practice of Optics and Refraction by A.K Khurana. 3<sup>rd</sup> edition
6. AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006

### e-Learning Source:

1. <https://www.youtube.com/watch?v=G6NuklbVwJo>
2. [https://www.youtube.com/watch?v=6TXwBwVh\\_V8](https://www.youtube.com/watch?v=6TXwBwVh_V8)
3. [https://www.youtube.com/watch?v=ys8\\_ZEQnYWM](https://www.youtube.com/watch?v=ys8_ZEQnYWM)

### Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	3	2	2	-	-	-	1	2	-	-	2	3	1	2	3	-
CO2	1	3	1	3	-	-	-	2	3	-	-	3	3	-	1	2	-
CO3	1	3	1	2	-	-	-	1	2	-	-	2	2	2	1	2	2
CO4	1	3	1	2	-	-	-	1	3	1	-	3	2	3	1	3	2
CO5	1	3	1	2	-	-	-	1	2	2	-	2	3	1	2	2	2

### 1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

#### Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
BO204	OCULAR DISEASES-I	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	





## Integral University, Lucknow

Effective from Session: 2019-20

Course Code	BO205	Title of the Course	GENERAL & OCULAR PATHOLOGY/MICROBIOLOGY	L	T	P	C
Year	II	Semester	III	2	1	0	3
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	At the end of the course students will acquire knowledge in the following aspects: Inflammation and repair aspects. Pathology of various eye parts and adnexa. To prepare the students to gain essential knowledge about the characteristics of bacteria, viruses, fungi and parasites. To acquire knowledge of the principles of sterilization and disinfection in hospital and ophthalmic practice; To understand the pathogenesis of the diseases caused by the organisms in the human body with particular reference to the eye infections and To understand basic principles of diagnostic ocular Microbiology.						

**Course Outcomes:** After the successful course completion, learners will develop following attributes:

<b>CO1</b>	Understanding the basic concepts of infection, Inflammation and repair
<b>CO2</b>	Understanding the clinical features of various diseases like Tuberculosis, Leprosy, Syphilis
<b>CO3</b>	Understanding the clinical features of Anemia, Leukemia, Bleeding disorders, etc
<b>CO4</b>	Understanding about the characteristics of bacteria, viruses, fungi and parasites.
<b>CO5</b>	Understanding of the pathogenesis of the diseases caused by the organisms in the human body with particular reference to the eye infections.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>INTRODUCTION OF PATHOLOGY</b>	General pathology: Introduction, principle, Pathophysiology of ocular Angiogenesis, Neoplasia, Inflammation and repair.	6	CO1
2	<b>SPECIFIC INFECTIONS OF THE EYE</b>	Infection in general, Specific infections, Tuberculosis, Leprosy, Syphilis	6	CO2
3	<b>CLINICAL PATHOLOGY</b>	Anemia, Leukemia, Bleeding disorders, Examination of blood smears, Circulatory disturbances, Thrombosis, Infarction, Embolism.	6	CO3
4	<b>OVERVIEW OF MICROBIOLOGY</b>	Introduction to microbiology, Introduction to Bacteria, Virus, Fungus and their differentiation, Types of microorganism., Sterilization and disinfection used in laboratory and hospital practice.	6	CO4
5	<b>INFECTIONS OF THE EYE</b>	Common bacterial infections of the eye, Common fungal infections of the eye, Common viral infections of the eye, Common parasitic infections of the eye.	6	CO5

### Reference Books:

1. Ratnakar: Pathology of the eye & orbit, Jaypee brothers Medical Publishers, 1997.
2. CORTON KUMAR AND ROBINS: Pathological Basis of the Disease, 7th Edition, Elsevier, New Delhi, 2004.
3. SR Lakhani Susan AD & Caroline JF: Basic Pathology: An introduction to the mechanism of disease, 1993.
4. KJ Ryan, CG Ray: Sherris Medical Microbiology- An Introduction to infectious Diseases, fourth edition, Mc NGRAW HILL Publisher, New Delhi, 1994 MACKIE & McCartney Practical Medical Microbiology.
5. MJ Pelzer (Jr), ECS Chan, NR Krieg: Microbiology, fifth edition, TATA McGraw-Hill Publisher, New Delhi, 1993
6. BURTON G.R. W: Microbiology for the Health Sciences, third edition, J.P. Lippincott Co., St. Louis, 1988.

### e-Learning Source:

1. <https://www.youtube.com/watch?v=pB26B2CXi2U>
2. [https://www.youtube.com/watch?v=ZUZEgISkRXc&list=PLuqQ0guHqmPsYtCgspJSIo5cghJ\\_0rKBe](https://www.youtube.com/watch?v=ZUZEgISkRXc&list=PLuqQ0guHqmPsYtCgspJSIo5cghJ_0rKBe)
3. <https://www.youtube.com/watch?v=A6wQU4qspCc>

### Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	3	2	2	-	-	-	1	2	1	-	2	2	1	-	1	-
<b>CO2</b>	1	3	1	3	-	-	-	2	3	-	-	3	3	2	-	2	-
<b>CO3</b>	1	3	1	2	-	-	-	1	2	2	-	2	3	1	-	1	-
<b>CO4</b>	1	3	1	2	-	-	-	1	3	-	-	3	2	1	-	1	-
<b>CO5</b>	1	3	1	2	-	-	-	1	2	1	-	2	2	1	-	1	-

**1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

### Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
BO205	GENERAL & OCULAR PATHOLOGY/ MICROBIOLOGY	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	





Effective from Session: 2019-20

Course Code	ES101	Title of the Course	ENVIRONMENTAL STUDIES	L	T	P	C
Year	II	Semester	III	2	1	0	3
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	The student will be made aware of our environment in general, natural resources, ecosystems, environmental pollution and social issues related to environment.						

Course Outcomes	
CO1	To study about the Environment and the ECO system.
CO2	To study about the Natural Resources.
CO3	To study about Biodiversity and Conservation
CO4	To study Environmental pollution, its policies and practices
CO5	To study Human Population and Environmental Ethics.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	INTRODUCTION TO ENVIRONMENT AND ECOSYSTEMS	Environment, its components and segments, Multidisciplinary nature of Environmental studies, Concept of Sustainability and sustainable development, Environmental movements, Ecosystem, Structure & Function, Energy flow in the Ecosystem, Ecological Pyramids and Ecological Succession.	6	CO1
2	NATURAL RESOURCES	Energy Resources: Renewable and nonrenewable, Soil erosion and desertification, Deforestation, Water: Use and over exploitation, Impacts of large Dams, Case studies.	6	CO2
3	BIODIVERSITY AND CONSERVATION	Levels of biological diversity, Hot spots of biodiversity, India as a Mega Diversity Nation, Endangered and endemic species of India, Threats to Biodiversity, Conservation of Biodiversity, Ecosystem and biodiversity services.	6	CO3
4	ENVIRONMENTAL POLLUTION, POLICIES AND PRACTICES	Environmental pollution, Solid waste management, Ill effects of fireworks, Climate change, Ozone layer depletion, acid rain and impacts on human communities and Environment. Environmental Laws: Environment Protection Act, Wildlife protection Act, Forest conservation Act, Convention on Biological Diversity (CBD), Tribal rights, Human wildlife conflicts.	6	CO4
5	HUMAN POPULATION AND THE ENVIRONMENT	Human population growth: Impacts on environment, human health and welfare, Resettlement and rehabilitation of project affected persons, Environmental ethics, Environmental communication and public awareness, case studies.	6	CO5

1. Agarwal, K.C. 2001 Environmental; Biology, Nidi Pub. Ltd. Bikaner.
2. Glick, H.P. 1993 water in crisis, Pacific Institute for studies in dev, Environment & security, Stockholm Env, Institute, Oxford Univ, Press 473p.
3. Cunningham W.P. 2001. Cooper, T.H. Gorhani, E & Hepworth, Environmental encyclopedia, Jacob Publication House, Mumbai
4. Clark R.S. Marine Pollution, Calderon Press Oxford (TB).
5. Brunner R.C. 1989. Hazardous waste incineration, Mc Graw Hill.
6. Bharucha Erach, The Biodiversity of India, Mappin Pub. Pvt. Ltd., Ahmedabad-380, India.
7. De. A.K. Environmental chemistry Willey Eastern Limited.

**e-Learning Source:**

1. <https://www.youtube.com/watch?v=zuSFs85kuJs&list=PLIC0i9IRboHb19v2dF0yuenG7xDOGJLeP>
2. <https://www.youtube.com/watch?v=MQuWITDDecs>
3. [https://www.youtube.com/watch?v=kAHy\\_LdA7-4](https://www.youtube.com/watch?v=kAHy_LdA7-4)

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	3	1	2	-	-	-	1	2	1	-	2	-	1	2	-	3
CO2	2	3	2	2	-	-	-	1	3	1	-	3	-	2	1	-	2
CO3	1	3	1	2	-	-	-	1	2	-	-	2	-	1	2	-	3
CO4	2	3	1	2	-	-	-	1	3	-	-	3	-	2	3	-	3
CO5	1	3	1	2	-	-	-	1	2	1	-	2	-	1	2	-	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

**Attributes & SDGs**

Course Code	Course Title	Attributes							SDGs No.
ES101	ENVIRONMENTAL STUDIES	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4,11,16



## Integral University, Lucknow

Effective from Session: 2023-24

Course Code	BO206	Title of the Course	OPTOMETRIC OPTICS-II & DISPENSING OPTICS	L	T	P	C
Year	II	Semester	III	0	0	2	1
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	Skills/knowledge to be acquired at the end of this course: To select the tool power for grinding process. Different types of materials used to make lenses and its characteristics. Lens designs–Bifocals, progressive lens. Tinted, Protective & Special lenses. Spectacle frames –manufacture process & materials.						

### Course Outcomes

CO1	Understanding to select the tool power for grinding process.
CO2	Understanding about different types of materials used to make lenses and its characteristics.
CO3	Understanding about Spectacle frames, various Lens designs,
CO4	Analyzing various dispensing spectacle lens and frames based on the glass prescription
CO5	Evaluating various facial measurements –Inter pupillary distance measurement and measuring heights (single vision, multifocal, progressives)

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	OPHTHALMIC LENS MATERIALS	Ophthalmic raw materials – history and general outline. Terminology used in lens workshop. Recording and ordering of Ophthalmic lenses.	6	CO1
2	MANUFACTURING OF THE LENSES	Manufacturing of Ophthalmic blanks – Plastics. Plastic lenses – materials types and characteristics.	6	CO2
3	LENS DESIGN AND HIGH-POWERED LENSES	Ophthalmic lens designs – best form lenses, Unusual Lens forms. Design of high-powered lenses.	6	CO3
4	BIFOCAL LENS	Bifocal design, types and manufacture.	6	CO4
5	FAULTS IN LENSES AND OPTOMETRIC DISPENSING	Faults in lenses: description, detection Spectacle repairs –tools, methods, soldering, riveting, frame adjustments. Measuring Inter-pupillary distance (IPD) for distance & near, bifocal height.	6	CO5

### Reference Books:

1. Jalie MO: Ophthalmic lens and dispensing, 3rd edition, Butterworth –Heinemann, 2008.
2. Troy E. Fannin, Theodore Grosvenor: Clinical Optics, 2nd edition, Butterworth – Heinemann, 1996.
3. C W Brooks, IM Borich: System for Ophthalmic Dispensing, 3rd edition, Butterworth - Heinemann, 2007.
4. Michael P Keating: Geometric, Physical & Visual Optics, 2nd edition, Butterworth – Heinemann, 2002

### e-Learning Source:

1. <https://www.youtube.com/watch?v=driy5uzFzb4>
2. <https://www.youtube.com/watch?v=p45nuwPe5KU>
3. <https://www.youtube.com/watch?v=ZLQS-1HTrfQ>

### Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	3	1	2	-	-	-	1	2	-	-	2	-	1	-	1	-
CO2	1	3	1	3	-	-	-	1	3	-	-	3	-	2	-	2	-
CO3	1	3	1	2	-	-	-	1	2	-	-	2	-	1	-	1	-
CO4	1	3	1	2	-	-	-	1	3	-	-	3	-	1	-	1	-
CO5	1	3	1	2	-	-	-	1	2	-	-	2	-	1	-	1	-

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

### Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
BO206	OPTOMETRIC OPTICS-II & DISPENSING OPTICS	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		f	f	f	f		f	f	



Effective from Session: 2023-24

Course Code	BO207	Title of the Course	VISUAL OPTICS- I - LAB	L	T	P	C
Year	II	Semester	III	0	0	2	1
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	Upon completion of the course, the student should be able: To understand the fundamentals of optical components of the eye. To gain theoretical knowledge and practical skill on visual acuity measurement, objective and subjective clinical refraction.						

Course Outcomes	
CO1	Understanding the nature and properties of the Light and Mirror.
CO2	Understanding about the various optical constants of the eye in relation with physical properties of the eye.
CO3	Understanding the various aspects of vision and measuring visual acuity.
CO4	Having acknowledged about various optical defects of the eye.
CO5	Analyzing about various refractive anomalies of the eye.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	VISUAL ACUITY ESTIMATION	1. Visual acuity testing for ametropes and emmetropes. 2. Retinoscopy on eye models	6	CO1
2	TEST FOR ESTIMATING ACCOMMODATION AND CONVERGENCE	1. Measurement of accommodation: near and far points range. 2. Measurement of Convergence – near point & far points range	6	CO2
3	RETINOSCOPY	Practice of Retinoscopy: objective with documentation.	6	CO3
4	RETINOSCOPY: ASTIGMATISM	Practice of Retinoscopy – Emmetropia, spherical ametropia, compound hyperopia, compound myopia	6	CO4
5	RETINOSCOPY IN LOW VISION PATIENTS AND INTERPRETATION	Objective and subjective refraction with spherical powers.	6	CO5

**Reference Books:**

1. MP Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002.
2. HL Rubin: Optics for clinicians, 2nd edition, Triad publishing company. Florida, 1974.
3. H Obstfeld: Optic in Vision- Foundations of visual optics & associated computations, 2nd edition, Butterworth, UK, 1982.
4. WJ Benjamin: Boris's clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA, 2006.
5. T Grosvenor: Primary Care Optometry, 4th edition, Butterworth –Heinemann, USA, 2002.
6. Theory and Practice of Optics and Refraction by A.K Khurana. 3<sup>rd</sup> edition.

**e-Learning Source:**

1. <https://www.youtube.com/watch?v=-kJO03tpGs>
2. <https://www.youtube.com/watch?v=oal-b6ep6KA>
3. <https://www.youtube.com/watch?v=wiYmTAuVimg>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	3	2	2	-	-	-	1	2	1	-	2	-	2	2	1	-
CO2	1	3	1	3	-	-	-	2	3	-	-	3	-	1	1	1	-
CO3	1	3	1	2	-	-	-	1	2	2	-	2	-	1	1	1	-
CO4	1	3	1	2	-	-	-	1	3	-	-	3	-	1	2	1	-
CO5	1	3	1	2	-	-	-	1	2	1	-	2	-	1	1	1	-

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Course Code		Course Title		Attributes & SDGs							SDGs No.	
				Attributes								
BO207		VISUAL OPTICS- I - LAB		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics		
				<i>f</i>	<i>f</i>	<i>f</i>	<i>f</i>		<i>f</i>	<i>f</i>	3,4	



## Integral University, Lucknow

Effective from Session: 2023-24

Effective from Session: 2023-24							
Course Code	BO208	Title of the Course	OPTOMETRIC INSTRUMENTS- LAB	L	T	P	C
Year	II	Semester	III	0	0	2	1
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	Upon completion of the course, the student should be able to gain theoretical knowledge and basic practical skill in handling the following instruments: Visual Acuity chart / drum, Retinoscope, Trail Box, Jackson Cross cylinder, Direct ophthalmoscope, slit lamp Biomicroscope, Slit lamp Ophthalmoscopy (+90, 78D), Gonioscope, Tonometer: Applanation Tonometer, Keratometry, Perimeter, Electrodiagnostic instrument (ERG, VEP, EOG), A –Scan Ultrasound, Lensometer						

Course Outcomes	
CO1	Understanding and application of the refractive instrument.
CO2	Understanding & design, application and use of refractive instrument use in refraction room.
CO3	Understanding the optics and applying the basic functions of Ophthalmoscope.
CO4	Understanding the optics and applying the basic functions and importance of examination of anterior segment.
CO5	Understanding and applying the various tools to measure ocular condition.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>VISUAL ACUITY AND REFRACTION</b>	1. Distance Vision testing 2. Near vision testing. 3. Adjustment of Retinoscope	6	CO1
2	<b>SPECIAL INVESTIGATIONS</b>	1. Retinoscopy- Technique and reflex appreciation 2. Retinoscopy- Neutralization and Interpretation 3. Adjustment of Lensometer	6	CO2
3	<b>VISION SCREENER</b>	1. Tonometer- Procedure and Interpretation. 2. Ophthalmoscopy- Handling, technique and Interpretation.	6	CO3
4	<b>ANTERIOR AND POSTERIOR SEGMENT EVALUATION</b>	1. Keratometer- Handling, technique and Interpretation. 2. Keratometer- Uses and application	6	CO4
5	<b>MICROSCOPE</b>	1. Slit Lamp Biomicroscopy- Parts and Handling. 2. Slit Lamp Biomicroscopy- Calibration and Adjustment. 3. Slit Lamp Biomicroscopy- Techniques types and application. 4. Slit Lamp Biomicroscopy- Evaluation and Interpretation.	6	CO5

### Reference Books:

1. P R Yoder: Mounting Optics in Optical Instruments, SPIE Society of Photo- Optical Instrumentation, 2002.
2. Optometric Instrumentation. SANTOSH K. KUMAR: (SKK)
3. G Smith, D A. Atchison: The Eye and Visual Optical Instruments, Cambridge University Press, 1997.
4. Clinical Visual Optics - BENNETT & RABBETTS.
5. Visual Optics and Refraction - DAVID O. MICHALES. (DOM)
6. Primary Care Optometry - THEODER GROSVENOR.
7. Practical Orthoptics in treatment of squint - T. KEITH LYLE & SYLVIA JACKSON.

### e-Learning Source:

1. <https://www.youtube.com/watch?v=AdKxOOzlx4Q>
2. <https://www.youtube.com/watch?v=aeOXtaapoJI>
3. <https://www.youtube.com/watch?v=2XZ7y8UF5YI>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	3	2	2	-	-	-	1	2	1	-	2	-	2	2	1	-
CO2	1	3	1	3	-	-	-	2	3	-	-	3	-	1	1	1	-
CO3	1	3	1	2	-	-	-	1	2	2	-	2	-	1	1	1	-
CO4	1	3	1	2	-	-	-	1	3	-	-	3	-	1	2	1	-
CO5	1	3	1	2	-	-	-	1	2	1	-	2	-	1	1	1	-

**1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

**Attributes & SDGs**

Course Code	Course Title	Attributes							SDGs No.
BO208	OCULAR INSTRUMENTS- LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		<i>f</i>	<i>f</i>	<i>f</i>	<i>f</i>		<i>f</i>	<i>f</i>	



**INTEGRAL UNIVERSITY, LUCKNOW**  
**INTEGRAL INSTITUTE OF ALLIED HEALTH SCIENCES & RESEARCH**

**DEPARTMENT OF PARAMEDICAL SCIENCES**

**BACHELOR OF OPTOMETRY  
(B.OPTOM)**

**SYLLABUS**

**YEAR/ SEMESTER: II/IV**



Integral University, Lucknow  
Department of Paramedical Sciences  
Study and Evaluation Scheme

Program: BOPT

Semester-IV

S. N.	Course code	Course Title	Type of Paper	Period Per hr/week/sem			Evaluation Scheme				Sub. Total	Credit	Total Credits
				L	T	P	CT	TA	Total	ESE			
THEORIES													
1	B0209	Visual Optics-II	Core	3	1	0	40	20	60	40	100	3:1:0	4
2	B0210	Ocular Diseases-II	Core	3	1	0	40	20	60	40	100	3:1:0	4
3	B0211	Clinical Examination of Visual System	Core	3	1	0	40	20	60	40	100	3:1:0	4
4	B0212	Low Vision Aid & Optometry Investigation	Core	3	1	0	40	20	60	40	100	3:1:0	4
5	B0213	General & Ocular Pharmacology	Core	2	1	0	40	20	60	40	100	2:1:0	3
PRACTICAL													
1	B0214	Visual Optics-II - Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
2	B0215	Clinical Examination of Visual System - Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
3	B0216	Low Vision Aid & Optometry Investigation - Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
4	B0217	Hospital Posting-Lab	Core	0	0	6	40	20	60	40	100	0:0:3	3
Total				14	05	12	360	180	540	360	900	25	25

S. N.	Course code	Course Title	Type of Paper	Attributes							United Nation Sustainable Development Goal (SDGs)
				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
THEORIES											
1	B0209	Visual Optics-II	Core	√	√	√	√		√	√	3,4
2	B0210	Ocular Diseases-II	Core	√	√	√	√		√	√	3,4
3	B0211	Clinical Examination of Visual System	Core	√	√	√	√		√	√	3,4
4	B0212	Low Vision Aid & Optometry Investigation	Core	√	√	√	√		√	√	3,4
5	B0213	General & Ocular Pharmacology	Core	√	√	√	√		√	√	3,4
PRACTICAL											
1	B0214	Visual Optics-II - Lab	Core	√	√	√	√		√	√	3,4
2	B0215	Clinical Examination of Visual System - Lab	Core	√	√	√	√		√	√	3,4
3	B0216	Low Vision Aid & Optometry Investigation - Lab	Core	√	√	√	√		√	√	3,4
4	B0217	Hospital Posting-Lab	Core	√	√	√	√		√	√	3,4

**L:** Lecture      **T:** Tutorials      **P:** Practical      **CT:** Class Test      **TA:** Teacher Assessment **ESE:** End Semester Examination,  
AE= Ability enhancement, DSE- Discipline Specific Elective, **Sessional Total:** Class Test + Teacher Assessment      **Subject Total:** Sessional Total + End Semester Examination (ESE)



## Integral University, Lucknow

Effective from Session: 2023-24											
Course Code	BO209	Title of the Course	VISUAL OPTICS- II	L	T	P	C				
Year	II	Semester	IV	3	1	0	4				
Pre-Requisite	Nil	Co-requisite	Nil	<div>Upon completion of the course, the student should be able:</div> <ul style="list-style-type: none"><li>• To understand the fundamentals of optical components of the eye.</li><li>• To gain theoretical knowledge and practical skill on visual acuity measurement, objective and subjective clinical refraction.</li></ul>							
Course Objectives											
Course Outcomes											
CO1	Understanding about accommodation, its anomalies and their practical significance.										
CO2	Have knowledge about retinoscopy and its procedure.										
CO3	Analyzing the importance of subjective and objective refraction.										
CO4	Understanding about convergence, its anomalies and their clinical significance.										
CO5	Applying the theoretical knowledge on clinical practice.										

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>ACCOMMODATION</b>	1. Accommodation 2. Far point, near point, Range and amplitude of accommodation 3. Mechanism of accommodation, Various Theories of Accommodation., Gullstrand Mechanical model of Accommodation., Variation of accommodation with age. 4. Anomalies of accommodation, 5. Presbyopia-Definition, causes, clinical features & management.	8	CO1
2	<b>OBJECTIVE REFRACTION</b>	1. Streak Retinoscopy- Principle, Procedure, Difficulties and interpretation of findings 2. Transposition (Simple & Toric) and spherical equivalent 3. Various methods of Dynamic Retinoscopy. 4. Radical retinoscopy and near retinoscopy 5. Cycloplegic refraction, Hypermetropia and accommodation	8	CO2
3	<b>Refraction</b>	1. Fogging-Principle, procedure & importance 2. Astigmatic Fan, Astigmatic Dial & JCC 3. Duo chrome test- Binocular balancing- alternate occlusion, prism dissociation, dissociate 4. Borich dissociated fogging 5. Binocular refraction-Variou techniques.	8	CO3
4	<b>EFFECTIVE POWER &amp; MAGNIFICATION</b>	1. Ocular refraction vs. Spectacle refraction. 2. Spectacle magnification vs. Relative spectaclemagnification. 3. Knapp's law. 4. Ocular accommodation vs. Spectacle accommodation. 5. Retinal image blur-Depth of focus and depth of field.	8	CO4
5	<b>MEASUREMENTS OF OPTICAL CONSTANTS OF THE EYE</b>	1. Keratometry, Curvature of the lens. 2. Spectacle magnification vs. Relative spectaclemagnification. 3. Axes and angles of the eye. 4. Basic aspects of vision- Visual acuity, Light and dark adaptation Color vision. 5. Science of measuring visual performance and application to clinical optometry.	8	CO5

### Reference Books:

- Theodore Grosvenor: Primary Care Optometry, 5th edition, Butterworth –Heinemann, 2007.
- Duke –Elder's practice of Refraction.
- AI Lens: Optics, Retinoscopy, and Refractometry: 2nd edition, SLACK Incorporated (p) Ltd, 2006.
- George K. Hans, Kenneth Cuiffreda: Models of the visual system, Kluwer Academic, NY, 2002.
- Leonard Werner, Leonard J. Press: Clinical Pearls in Refractive Care, Butterworth – Heinemann, 2002.
- David B. Elliot: Clinical Procedures in Primary Eye care, 3rd edition, Butterworth – Heinemann, 2007.

### e-Learning Source:

- <https://www.youtube.com/watch?v=ELPyMozXLOU>
- <https://www.youtube.com/watch?v=idQX7MBf3k8&list=PLfnnZvJNUsnogXdXVQNheEzPWGV1uHRqf>
- <https://www.youtube.com/watch?v=dKaQB11I0z0>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	3	1	2	-	-	-	1	1	1	-	3	2	2	1	1	1
CO2	1	3	2	2	-	-	-	1	1	1	-	3	2	2	1	1	1
CO3	1	3	1	2	-	-	-	1	1	1	-	3	2	1	1	1	1
CO4	2	3	1	2	-	-	-	1	1	1	-	3	2	2	1	1	1
CO5	1	3	1	2	-	-	-	1	1	1	-	3	2	1	1	1	1

**1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation Attributes & SDGs**

Course Code	Course Title	Attributes	SDGs
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BO209	VISUAL OPTICS- II	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	No.
		√	√	√	√		√	√	3,4



## Integral University, Lucknow

**Effective from Session: 2019-20**

Effective from Session: 2019-20							
Course Code	BO210	Title of the Course	OCULAR DISEASES-II	L	T	P	C
Year	II	Semester	IV	3	1	0	4
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	At the end of the course the students will be knowledgeable in the following aspects of ocular diseases: Etiology, Epidemiology, Symptoms, and Signs, Course sequelae of ocular disease, Diagnostic approach and Management of the ocular diseases.						

Course Outcomes	
CO1	Understanding the concept of different Ocular diseases of posterior segment of Eye
CO2	Applying the concept of anatomy & Physiology of Eye while understanding the Pathology of different ocular diseases
CO3	Understanding the differential diagnosis of various ocular disease having similar clinical features.
CO4	Utilizing the concept of clinical features of the diseases for the differential diagnosis of the ocular diseases
CO5	Analyzing the concept of clinical features of the diseases for the management of ocular diseases

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>RETINA AND VITREOUS</b>	1. Congenital and Developmental Disorders (Optic Disc: Coloboma, Drusen, Hypoplasia, Medullated nerve fibers; Persistent Hyaloid Artery) 2. Inflammatory disorders (Retinitis: Acute purulent, Bacterial, Virus, mycotic) 3. Retinal Vasculitis (Eales's), Retinal Artery Occlusion (Central retinal Artery occlusion) 4. Retinal Vein occlusion (Ischemic, non-ischemic, Branch retinal vein occlusion) 5. Retinal degenerations: Pigmentosa, Lattice degenerations, Retinoblastoma, Diabetic retinopathy. 6. Macular disorders: Solar retinopathy, central serous retinopathy, cystoid macular edema, Age related macular degeneration., Retinal Detachment: Rhegmatogenous, Tractional, Exudative)	8	CO1
2	<b>OCULAR INJURIES</b>	1. Terminology: Closed globe injury (contusion, lamellar laceration) Open globe injury (rupture, laceration, penetrating injury, perforating injury. 2. Mechanical injuries (Extraocular foreign body, blunt trauma, perforating injury, sympathetic ophthalmitis). 3. Non-Mechanical Injuries (Chemical injuries, Thermal, Electrical, Radiational). Clinical approach towards ocular injury patients.	8	CO2
3	<b>LENS</b>	1. Classification of cataract, Congenital and Developmental cataract 2. Acquired (Senile, Traumatic, Complicated, Metabolic, Electric, Radiational, Toxic) 3. Morphological: Capsular, Subcapsular, Cortical, Supranuclear, Nuclear, Polar 4. Management of cataract (non-surgical and surgical measures; preoperative evaluation, Types of surgeries) 5. Complications of cataract surgery Displacement of lens: Subluxation, Displacement, Lens coloboma, Lenticonus, Microspherophakia.	8	CO3
4	<b>VISUAL PATHWAY</b>	1. Anatomy of visual pathway, Lesions of the visual pathway. 2. Pupillary reflexes and abnormalities (Amaurotic light reflex, Efferent pathway defect, Wernicke's hemianopia pupil, Marcus Gunn pupil. Argyll Robertson pupil, Adie's tonic pupil). 3. Optic neuritis, Anterior Ischemic optic neuropathy, Papilledema, optic atrophy. 4. Cortical blindness, Malingering. 5. Nystagmus, Clinical examination.	8	CO4
5	<b>GLAUCOMA</b>	1. Definitions and classification of glaucoma, Pathogenesis of glaucomatous ocular damage. 2. Congenital glaucoma's, Primary open angle glaucoma. 3. Ocular hypertension, Normal Tension Glaucoma. 4. Primary angle closure glaucoma (Primary angle closure suspect, Intermittent glaucoma, acute congestive, chronic angle closure) 5. Secondary Glaucoma's, Management: common medications, laser intervention and surgical techniques.	8	CO5

**Reference Books:**

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, new age international, Ltd. Publishers, New Delhi, 2007.
2. Stephen J. Miller: Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990
3. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth - Heinemann, 2007.

**e-Learning Source:**

1. <https://www.youtube.com/watch?v=anpivlrat0>
2. <https://www.youtube.com/watch?v=WRlbtXk4Zto>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	3	1	2	-	-	-	1	2	-	-	2	2	1	-	1	1
CO2	1	3	1	3	-	-	-	1	3	-	-	3	3	2	-	1	1
CO3	1	3	1	2	-	-	-	1	2	-	-	2	3	1	-	1	1
CO4	1	3	1	2	-	-	-	1	3	-	-	3	2	1	-	1	1
CO5	1	3	1	2	-	-	-	1	2	-	-	2	2	1	-	1	1

**1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

Course Code	Course Title	Attributes							SDGs No.
BO210	OCULAR DISEASES-II	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		<i>f</i>	<i>f</i>	<i>f</i>	<i>f</i>		<i>f</i>	<i>f</i>	



## Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	BO211	Title of the Course	CLINICAL EXAMINATION OF VISUAL SYSTEM	L	T	P	C
Year	II	Semester	IV	3	1	0	4
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	At the end of the course the students will be skilled in knowing the purpose, set- up and devices required for the test, indications and contraindications of the test, step-by- step procedures, documentation of the findings, and interpretation of the findings of the various clinical optometry procedures.						

Course Outcomes	
<b>CO1</b>	Understanding about the process of history taking and its clinical importance
<b>CO2</b>	Understanding about various clinical examination test available
<b>CO3</b>	Analyzing the importance of pupillary examination in the field of optometry
<b>CO4</b>	Applying all the theoretical knowledge on practical field
<b>CO5</b>	Understanding about the process of history taking and its clinical importance

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>HISTORY TAKING AND VISUAL ACUITY ESTIMATION</b>	1. History taking: for various patients of different ocular conditions 2. Visual acuity measurement: various chart for different age groups 3. Extraocular motility, Cover test, Alternating cover test 4. Hirschberg test, Modified Krimsky and Krimsky test	8	CO1
2	<b>OCULAR EXAMINATION I</b>	1. Pupils Examination: Torch light examination 2. Maddox Rod: Indications, procedures and its interpretation 3. Van Herrick 4. External examination of the eye 5. Various Lid Eversion techniques	8	CO2
3	<b>OCULAR EXAMINATION II</b>	1. Schirmer's test, TBUT: invasive and non-invasive, tear meniscus height. 2. Color Vision: attributes, types, methods to assess and its theories. 3. Stereopsis: types and method to assess 4. Confrontation test: procedure, indications	8	CO3
4	<b>OCULAR EXAMINATION III</b>	1. Photo stress recovery test 2. Slit lamp biomicroscope: principle, its various illumination techniques for different ocular structures. 3. Ophthalmoscopy: Direct and indirect ophthalmoscopy. 4. Tonometry: Applanation, Indentation and Non –Contact Tonometer.	8	CO4
5	<b>OCULAR EXAMINATION IV</b>	1. Tests for lacrimal apparatus 2. Amsler test: indications, contraindications, types and procedures. 3. Contrast sensitivity tests. 4. Saccades and pursuit: Introductions, indications and various tests to assess saccades and pursuits.	8	CO5

### Reference Books:

1. T Grosvenor: Primary Care Optometry, 5th edition, Butterworth–Heineman, USA, 2007
2. A K Khurana: Comprehensive Ophthalmology, 4th edition, new age international(p) Ltd. Publishers, New Delhi, 2007.
3. D B. Elliott: Clinical Procedures in Primary Eye Care, 3rd edition, Butterworth-Heinemann, 2007
4. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth-Heinemann, 2007
5. N B. Carlson, D I Kurtz: Clinical Procedures for Ocular Examination, 3rd edition, McGraw- Hill Medical, 2003.
6. J B Eskridge, J F. Amos, J D. Bartlett: Clinical Procedures in Optometry, Lippincott Williams and Wilkins, 1991
7. N B. Carlson, D I Kurtz: Clinical Procedures for Ocular Examination, 3rd edition, McGraw- Hill Medical, 2003.

### e-Learning Source:

1. <https://www.youtube.com/watch?v=YqL6IMGE5os>
2. <https://www.youtube.com/watch?v=SVuP5Td23AQ>
3. <https://www.youtube.com/watch?v=b-cFIDo68ng>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	2	3	-	2	1	-	-	-	1	1	-	1	2	1	3	2	1
<b>CO2</b>	1	3	-	2	-	-	-	-	1	-	-	1	2	1	3	2	1
<b>CO3</b>	2	3	-	2	-	-	-	-	1	1	-	1	2	1	3	2	1
<b>CO4</b>	1	3	-	1	-	-	-	-	1	-	-	1	2	1	3	2	1
<b>CO5</b>	2	3	-	1	-	-	-	-	1	-	-	1	2	1	3	2	1

### 1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

#### Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
BO211	CLINICAL EXAMINATION OF VISUAL SYSTEM	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		r	r	r	r		r	r	



## Integral University, Lucknow

Effective from Session: 2023-24

Course Code	BO212	Title of the Course	LOW VISION AID & OPTOMETRY INVESTIGATION	L	T	P	C
Year	II	Semester	IV	3	1	0	4
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	At the end of the course the students will be skilled in knowing the purpose, set- up and devices required for the test, indications and contraindications of the test, step-by- step procedures, documentation of the findings, and interpretation of the findings of the various clinical optometry procedures.						

Course Outcomes	
CO1	Understanding the basic definition and classification of Low Vision and Applying various optical and non-optical devices for visual rehabilitation of a low vision Patient.
CO2	Understanding howto do examination of a low vision Patient and the legal aspects of Low Vision in India, as well as applying case studies to for visual rehabilitation of a low vision Patient.
CO3	Understanding the concept of Visual Function, Visual Acuity, Color Vision, etc.
CO4	Applying Various Techniques for Diagnosis and Management of Various Eye Ailments.
CO5	Applying advance techniques for Evaluation of Cornea, Tear Film and Ocular Refraction.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	INTRODUCTION TO LOW VISION	1. Definitions & classification of Low vision, Epidemiology of low vision. 2. Psychological factors; psychosocial impact of low vision. 3. Types of low vision aids – optical aids (Distance & Nearby) 4. Non-optical aids, electronic and assistive devices. 5. Light, glare and contrast in low vision care and rehabilitation.	8	CO1
2	LOW VISION ASSESSMENT	1. Clinical evaluation –History taking, assessment of visual acuity, visual field, selection of low vision aids, instruction & training. 2. Pediatric Low Vision aids – dispensing & prescribing aspects 3. Legal aspects of Low vision in India, Case Analysis. 4. Demonstrating aids 5. Teaching the patient to use aids	8	CO2
3	SPECIAL PROCEDURES I	1. Visual Acuity Testing, Color Vision Testing. 2. Fundus Fluorescein Angiography, Ultrasonography A&B scan 3. Tonometer, Tonometry & Tonography, Visual Field Charting & Perimetry	8	CO3
4	SPECIAL PROCEDURE II	1. Berman's Locator, Cryo Technique, Diathermy 2. Photo-coagulation, Methods of examination (Focal illumination) 3. Slit lamp accessory and attachments	8	CO4
5	CLINICAL PROCEDURES	1. TBUT and Schirmer's Test 2. Ophthalmoscopy, Retinoscopy- Handling and Interpretation. 3. Keratometry- Handling and Interpretation. 4. Ophthalmic Lens Measuring Instruments	8	CO5

### Reference Books:

1. Low Vision Care -EDWIN B. MEHR & ALLAN N. FREID The Professional Press, Chicago 1975.
2. Optometric Management of Visual Handicap - HELEN FARRALL, Blackwell Scientific Publications, London 1991.
3. Art and practice of Low Vision - Second Edition -Paul freeman, Butterworth Heineman.
4. T Grosvenor: Primary Care Optometry, 5th edition, Butterworth -Heineman, USA, 2007.
5. Optometric Instrumentation. SANTOSH K. KUMAR: (SKK)
6. D B. Elliott: Clinical Procedures in Primary Eye Care, 3rd edition, Butterworth- Heinemann, 2007.
7. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth- Heinemann, 2007.

### e-Learning Source:

1. <https://www.youtube.com/watch?v=Sm6d4t873oI>
2. <https://www.youtube.com/watch?v=OmlKEGG5e-E>
3. <https://www.youtube.com/watch?v=TWmaZZDgPX0>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	-	-	1	-	3	3	2	2	-	2	2	-	-	-	-	1
CO2	2	-	-	2	-	3	2	2	1	-	2	3	-	-	-	-	2
CO3	2	-	-	1	-	3	3	1	2	-	1	2	-	-	-	-	1
CO4	2	-	-	1	-	3	3	2	1	-	2	3	-	-	-	-	1
CO5	2	-	-	2	-	3	2	2	1	-	2	2	-	-	-	-	1

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

### Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
BO212	LOW VISION AID & OPTOMETRY INVESTIGATION	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		f	f	f	f		f	f	



## Integral University, Lucknow

**Effective from Session: 2019-20**

Course Code	BO213	Title of the Course	GENERAL & OCULAR PHARMACOLOGY	L	T	P	C
Year	I	Semester	IV	2	1	0	3
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	At the end of the course the students will acquire knowledge in the following aspects: <ul style="list-style-type: none"> <li>• Basic principle of pharmacokinetics &amp; Pharmacodynamics.</li> <li>• Commonly used ocular drugs, mechanism, indications, contraindications, drug dosage and adverse effects.</li> </ul>						

Course Outcomes	
CO1	Understanding the basics of drugs and its different sources as well as pharmaco-dynamics and pharmaco-kinetics.
CO2	Understanding the concept & terminologies of Pharmacology and Ocular preparations.
CO3	Understanding the advantages and disadvantages of general routes of drug administration and routes of drug administration in Ophthalmology.
CO4	Applying of different pharmaceutical agents in the management of Ocular disease as well as managing Ocular Toxicity.
CO5	Analyzing and applying diagnostic and therapeutic drugs in Ophthalmology.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	GENERAL PHARMACOLOGY	1. Mechanisms of drug action. 2. Dose-response relationships. 3. Tachyphylaxis and idiosyncrasy. 4. Pharmacokinetics of drug absorption, distribution, Biotransformation, excretion and toxicity 5. Factors influencing drug metabolism of drug action.	6	CO1
2	ACTION OF SPECIFIC AGENTS	1. Depressants, Anti-coagulants 2. C.N.S. Stimulants and antidepressants 3. Diuretics and hypertensive agents 4. Cardiovascular drugs, Histamines 5. Serotonin, Prostaglandins	6	CO2
3	PRINCIPLES OF OCULAR PHARMACOLOGY	1. General principles of ocular pharmacology 2. Drug actions and effectiveness, Drug safety 3. Factors influencing the objectively demonstrated response 4. Ocular penetration. 5. Routes of ocular penetration	6	CO3
4	OPTOMETRIC DIAGNOSTIC DRUGS	Optometric use of pharmaceuticals: 1. Classification of drug use 2. Topical ophthalmic drugs 3. References and drug indices 4. Hazards of ophthalmic drugs 5. Surface active drugs 6. topical anesthetics Principles and classification of autonomic drugs: 1. Sympathomimetics 2. Sympatholytic 3. Parasympathomimetic 4. Parasympatholytic 5. Diagnostic use of autonomic drug.	6	CO4
5	OPHTHALMOLOGICAL DRUGS USE	1. Anti-glaucoma drugs <ul style="list-style-type: none"> <li>• Drugs for ocular hypertension</li> <li>• Drugs that enhance aqueous outflow</li> <li>• Inhibitors of aqueous secretion</li> </ul> 2. Sulfonamides 3. Antibiotics 4. Corticosteroids 5. Anesthetics 6. Proteolytic enzymes	6	CO5

**Reference Books:**

1. K D Tripathi: Essentials of Medical Pharmacology. 5th edition, Jaypee, New Delhi, 2004
2. Ashok Garg: Manual of Ocular Therapeutics, Jaypee, New Delhi, 1996
3. T J Zimmerman, K S Kooner: Text Book of Ocular Pharmacology, Lippincott-Raven, 1997

**e-Learning Source:**

1. <https://www.youtube.com/watch?v=9-9sRHqgZhE>
2. [https://www.youtube.com/watch?v=2Fz935\\_gC5s](https://www.youtube.com/watch?v=2Fz935_gC5s)
3. <https://www.youtube.com/watch?v=VG4s2dYqRKc>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	-	-	-	-	-	2	-	2	-	-	-	2	-	-	-	-	-
CO2	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-
CO3	-	-	-	-	-	2	-	1	-	1	-	2	-	-	-	-	-
CO4	-	-	-	-	-	2	2	-	-	-	-	2	-	-	-	-	-
CO5	-	-	-	-	-	2	1	1	-	-	1	2	-	-	-	1	1

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Course Code		Course Title		Attributes						SDGs No.	
BO213		GENERAL & OCULAR PHARMACOLOGY		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4, 11



## Integral University, Lucknow

Effective from Session: 2023-24

Effective from Session: 2023-24							
Course Code	BO214	Title of the Course	VISUAL OPTICS- II LAB	L	T	P	C
Year	II	Semester	IV	0	0	2	1
Pre-Requisite	NIL	Co-requisite	Nil				
Course Objectives	Upon completion of the course, the student should be able: <ul style="list-style-type: none"><li>To understand the fundamentals of optical components of the eye.</li></ul> To gain theoretical knowledge and practical skill on visual acuity measurement, objective and subjective clinical refraction						

### Course Outcomes

CO1	Understanding about accommodation, its anomalies and their practical significance.
CO2	Have knowledge about retinoscopy and its procedure.
CO3	Analyzing the importance of subjective and objective refraction.
CO4	Understanding about convergence, its anomalies and their clinical significance.
CO5	Applying the theoretical knowledge on clinical practice.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	RETINOSCOPY	1. History taking 2. Visual Acuity Recording-Distance 3. Visual Acuity Recording-Near	6	CO1
2	DYNAMIC RETINOSCOPY	1. Retinoscopy on the model Eye 2. Retinoscopy on human Eye	6	CO2
3	REFRACTION	1. Cycloplegic refraction, Hypermetropia and accommodation 2. Trial & Error Method	6	CO3
4	SUBJECTIVE REFRACTION TECHNIQUES	1. Fogging Technique 2. Duo chrome 3. JCC	6	CO4
5	MAGNIFICATION	1. Astigmatic Fan, 2. Astigmatic Dial 3. Binocular Balancing	6	CO5

### Reference Books:

- Theodore Grosvenor: Primary Care Optometry, 5th edition, Butterworth –Heinemann, 2007.
- Duke –Elder's practice of Refraction.
- AI Lens: Optics, Retinoscopy, and Refractometry: 2nd edition, SLACK Incorporated (p) Ltd, 2006.
- George K. Hans, Kenneth Cuiffreda: Models of the visual system, Kluwer Academic, NY, 2002.
- Leonard Werner, Leonard J. Press: Clinical Pearls in Refractive Care, Butterworth – Heinemann, 2002.
- David B. Elliot: Clinical Procedures in Primary Eye care, 3rd edition, Butterworth – Heinemann, 2007.

### e-Learning Source:

- <https://www.youtube.com/watch?v=ELPyMozXLOU>
- <https://www.youtube.com/watch?v=idQX7MBf3k8&list=PLfnnZvJNUsnogXdXVQNheEzPWGV1uHRqf>
- <https://www.youtube.com/watch?v=dKaQB11I0z0>

### Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	3	1	2	-	-	-	1	1	1	-	3	2	2	1	1	1
CO2	1	3	2	2	-	-	-	1	1	1	-	3	2	2	1	1	1
CO3	1	3	1	2	-	-	-	1	1	1	-	3	2	1	1	1	1
CO4	2	3	1	2	-	-	-	1	1	1	-	3	2	2	1	1	1
CO5	1	3	1	2	-	-	-	1	1	1	-	3	2	1	1	1	1

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

### Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
BO214	VISUAL OPTICS- II LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		f	f	f	f		f	f	





## Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	BO215	Title of the Course	CLINICAL EXAMINATION OF VISUAL SYSTEM - LAB	L	T	P	C
Year	II	Semester	IV	0	0	2	1
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	At the end of the course the students will be skilled in knowing the purpose, set- up and devices required for the test, indications and contraindications of the test, step-by- step procedures, documentation of the findings, and interpretation of the findings of the various clinical optometry procedures.						

<b>Course Outcomes</b>	
<b>CO1</b>	Understanding about the process of history taking and its clinical importance
<b>CO2</b>	Understanding about various clinical examination test available
<b>CO3</b>	Analyzing the importance of pupillary examination in the field of optometry
<b>CO4</b>	Applying all the theoretical knowledge on practical field
<b>CO5</b>	Understanding about the process of history taking and its clinical importance

<b>Unit No.</b>	<b>Title of the Unit</b>	<b>Content of Unit</b>	<b>Contact Hrs.</b>	<b>Mapped CO</b>
1	<b>VISUAL ACUITY</b>	1. Visual Acuity assessment for different age groups. 2. Refraction: objective and subjective 3. Extra ocular motility testing: Broad H test	6	CO1
2	<b>CLINICAL PROCEDURES I</b>	1. Cover test: cover-uncover and alternating cover test 2. Pupil Examination: Torch light examination 3. External examination of the eye 4. Various Lid Eversion techniques	6	CO2
3	<b>CLINICAL PROCEDURE II</b>	1. Colour vision testing: Ishihara plates, FM D-15 2. Tests to assess stereopsis 3. Photo stress recovery test	6	CO3
4	<b>CLINICAL PROCEDURES III</b>	1. Different illumination techniques to assess individual ocular structures.	6	CO4
5	<b>CLINICAL PROCEDURES IV</b>	1. Ophthalmoscopy 2. Tonometry	6	CO5

### Reference Books:

1. Ananthanarayan R. and Paniker C.K.J. (2009) Textbook of Microbiology. 8th edition, University Press Publication.
2. Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. (2013).
3. Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication.
4. Goering R., Dockrell H., Zuckerman M. and Wakelin D. (2007) Mims' Medical Microbiology. 4 th edition. Elsevier 5. Willey JM, Sherwood LM, and Woolverton C.J. (2013) Prescott, Harley and Klein's Microbiology. 9th edition. McGraw Hill Higher Education .
5. Goldsby RA, Kindt TJ, Osborne BA. (2007). Kuby's Immunology. 6th edition W.H. Freeman and Company, New York.

### e-Learning Source:

1. <https://www.youtube.com/watch?v=anpivljrat0>
2. <https://www.youtube.com/watch?v=WRIBtxk4Zto>
3. <https://www.youtube.com/watch?v=anpivljrat0>

<b>PO-PSO CO</b>	<b>Course Articulation Matrix: (Mapping of COs with POs and PSOs)</b>																
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	1	3	1	2	-	-	-	1	2	-	-	2	2	1	-	1	1
<b>CO2</b>	1	3	1	3	-	-	-	1	3	-	-	3	3	2	-	1	1
<b>CO3</b>	1	3	1	2	-	-	-	1	2	-	-	2	3	1	-	1	1
<b>CO4</b>	1	3	1	2	-	-	-	1	3	-	-	3	2	1	-	1	1
<b>CO5</b>	1	3	1	2	-	-	-	1	2	-	-	2	2	1	-	1	1

**1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

### Attributes & SDGs

<b>Course Code</b>	<b>Course Title</b>	<b>Attributes</b>							<b>SDGs No.</b>
BO215	CLINICAL EXAMINATION OF VISUAL SYSTEM - LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		<i>r</i>	<i>r</i>	<i>r</i>	<i>r</i>		<i>r</i>	<i>r</i>	





## Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	BO216	Title of the Course	LOW VISION AID & OPTOMETRY INVESTIGATION- LAB	L	T	P	C
Year	II	Semester	IV	0	0	2	1
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	At the end of the course the students will be skilled in knowing the purpose, set- up and devices required for the test, indications and contraindications of the test, step-by- step procedures, documentation of the findings, and interpretation of the findings of the various clinical optometry procedures						

<b>Course Outcomes:</b> After the successful course completion, learners will develop following attributes:	
<b>CO1</b>	Understanding the basic definition and classification of Low Vision and Applying various optical and non-optical devices for visual rehabilitation of a low vision Patient.
<b>CO2</b>	Understanding how to do examination of a low vision Patient and the legal aspects of Low Vision in India, as well as applying case studies to for visual rehabilitation of a low vision Patient.
<b>CO3</b>	Understanding the concept of Visual Function, Visual Acuity, Color Vision, etc.
<b>CO4</b>	Applying Various Techniques for Diagnosis and Management of Various Eye Ailments.
<b>CO5</b>	Applying advance techniques for Evaluation of Cornea, Tear Film and Ocular Refraction.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	<b>Visual Acuity</b>	1. Distance Vision testing 2. Near vision testing. 3. Adjustment of Retinoscope 4. Extra ocular motility- Broad H Testing	6	CO1
2	<b>Ocular Motility</b>	1. Cover test- Direct, Cover- Uncover and Alternating 2. Pupils Examination 3. External examination of the eye, Lid Eversion	6	CO2
3	<b>Color Vision Tests</b>	1. Color Vision- Ishihara and D-15 test 2. Stereopsis- TNO test.	6	CO3
4	<b>Ocular Examination</b>	1. Slit Lamp Biomicroscopy- Parts and Handling. 2. Slit Lamp Biomicroscopy- Calibration and Adjustment. 3. Slit Lamp Biomicroscopy- Techniques types and application. 4. Slit Lamp Biomicroscopy- Evaluation and Interpretation.	6	CO4
5	<b>Objective Methods</b>	1. Ophthalmoscopy- Handling, technique and Interpretation. 2. Tonometry- Procedure and Interpretation. 3. Retinoscopy- Neutralization and Interpretation	6	CO5

### Reference Books:

1. Low Vision Care -EDWIN B. MEHR & ALLAN N. FREID The Professional Press, Chicago 1975.
2. Optometric Management of Visual Handicap - HELEN FARRALL, Blackwell Scientific Publications, London 1991.
3. Art and practice of Low Vision - Second Edition -Paul freeman, Butterworth Heineman.
4. T Grosvenor: Primary Care Optometry, 5th edition, Butterworth –Heineman, USA, 2007.
5. Optometric Instrumentation. SANTOSH K. KUMAR: (SKK)
6. D B. Elliott: Clinical Procedures in Primary Eye Care, 3rd edition, Butterworth- Heinemann, 2007.
7. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth- Heinemann, 2007.

### e-Learning Source:

1. <https://www.youtube.com/watch?v=Sm6d4t873oI>
2. <https://www.youtube.com/watch?v=OmlKEGG5e-E>
3. <https://www.youtube.com/watch?v=TWmaZZDgPX0>

Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	2	3	-	2	1	-	-	-	1	1	-	1	2	1	3	2	1
<b>CO2</b>	1	3	-	2	-	-	-	-	1	-	-	1	2	1	3	2	1
<b>CO3</b>	2	3	-	2	-	-	-	-	1	1	-	1	2	1	3	2	1
<b>CO4</b>	1	3	-	1	-	-	-	-	1	-	-	1	2	1	3	2	1
<b>CO5</b>	2	3	-	1	-	-	-	-	1	-	-	1	2	1	3	2	1

**1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

### Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
BO216	LOW VISION AID & OPTOMETRY INVESTIGATION- LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		f	f	f	f		f	f	



## Integral University, Lucknow

**Effective from Session: 2019-20**

Course Code	BO217	Title of the Course	HOSPITAL POSTING- LAB	L	T	P	C
Year	II	Semester	IV	0	0	6	3
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	At the end of the course the students will be skilled in knowing the purpose, set- up and devices required for the test, indications and contraindications of the test, step-by- step procedures, documentation of the findings, and interpretation of the findings of the various clinical optometry procedures						

**Course Outcomes:** After the successful course completion, learners will develop following attributes:

<b>CO1</b>	Analyzing the concept of clinical features of the diseases for the management of ocular diseases
<b>CO2</b>	Understanding about accommodation, its anomalies and their practical significance
<b>CO3</b>	Applying Various Techniques for Diagnosis and Management of Various Eye Ailments.
<b>CO4</b>	Applying advance techniques for Evaluation of Cornea, Tear Film and Ocular Refraction.
<b>CO5</b>	Applying of different pharmaceutical agents in the management of Ocular disease as well as managing Ocular Toxicity.

Unit No.	Title of the Unit	Content of Unit		Contact Hrs.	Mapped CO	
1	Clinical training	Students will improve their skills in clinical procedures, and then progressive interactions with patients and professional personal are monitored as students practice optometry in supervised setting. Additional area includes problem solving and complications of various managements will be inculcated. Students should have exposure to eye bank facilities and must be made aware of eye donation, collection of eyes, preservation, pre and postoperative instructions and latest techniques for preservation of donor cornea. The students will get clinical training on the practical aspects of the following courses namely optometric optic –II & dispensing optics, visual optics – II and ocular disease -II.		60	CO1, CO2, CO3, CO4, CO5	
		History taking 1.General 2. Specific 3.Conditions	30 cases			Can practice on the following complaint: Blurred Vision, Headache, Pain, redness, Watering, Flashes, Floaters, Blacks pots
		Lensometry	100 cases			Simple Sphere, Simple cylinder, Sphero cylinder (90, 180 Oblique degrees), Bifocals, PAL
		Visual Acuity Pinhole acuity	100 cases			Simulation, especially to show and ask the students to interpret the findings.
		Extra ocular Motility	10 cases			
		Cover test	10 cases			Video output Simulation of various conditions.
		Alternate Cover test	10 cases			Video output Simulation of various conditions.
		Hirschberg test	10 cases			Video output Simulation of various conditions.
		Modified Krimsky test	3 cases			Video output Simulation of various conditions.
		Push up test (Amplitude of Accommodation)	10 cases (1 case in presbyopia age)			
		Push up test (Near point of Convergence)	10 cases			
		Stereopsis test	10 cases			
		Tear Break up time	10 cases			
		Amsler’s Grid test	10 cases (simulate)			Simulation of various conditions
		Photo stress test	10 cases (Normal)			
		Color vision test	10 cases			
		Schirmer’s test	10 cases			
		Confrontation test	10 cases			
		Torch light Examination	50 cases			
		Slit lamp examination	10 cases			
Digital tonometry	10 cases					

### Reference Books:

1. A K Khurana: Comprehensive Ophthalmology, 4th edition, new age international(p) Ltd. Publishers, New Delhi, 2007.
2. B. Elliott: Clinical Procedures in Primary Eye Care, 3rd edition, Butterworth-Heinemann, 2007
3. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth- Heinemann, 2007.

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

**1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
BO217	HOSPITAL POSTING-LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		<i>r</i>	<i>r</i>	<i>r</i>	<i>r</i>		<i>r</i>	<i>r</i>	