



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	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 - 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	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 - 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: 2019-20							
Course Code	BO201	Title of the Course	OPTMETRIC OPTICS-II	L	T	P	C
Year	II	Semester	III	3	1	0	4
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 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. Definition & Materials (Glass, Plastics, Polycarbonate, Trilogy) types and Characteristics. 6. Properties (Refractive index, specific gravity, UV cut off, impact resistance – include drop ball test, 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. Calculation of Refractive index Aspheric lenses. 4. High index lenses, Bifocal designs, their manufacturing & uses (Kryptok, Univis D, Executive, Invisible, Occupational).	8	CO2
3	CORRECTIVE LENSES	1. Progressive Addition Lenses. 2. Modified near vision lenses (designs, advantages, limitations). 3. Lens enhancements (Scratch resistant coatings – spin/dip, Anti-reflection 4. Coating, UV coating, Hydrophobic coating, anti-static coating. 5. Lens defects – Description and Detection.	8	CO3
4	SPECIALITY	1. Glazing & edging (manual & automatic). 2. Special lenses: (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	SPECTACLEFRAMES	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	8	CO5

Reference Books:	
1.	Jalie MO: Ophthalmic lens and Dispensing, 3 rd 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-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	3	3	3	3	3	3	3	3	3	3	2	3	2	2	1	-
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.	
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics		
BO201	OPTMETRIC OPTICS-II	√	√	√				√	√	3,4



Integral University, Lucknow

Effective from Session: 2019-20							
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. Optotypes and MTF, Spatial Frequency. 2. Test charts standards, Choice of test charts. 3. Trial case lenses, Refractor (phoropter) head units. 4. Optical considerations of refractor units, Trial frame design. 5. Near vision difficulties with units and trial frames.	8	CO1
2	RETINOSCOPE	1. Retinoscope – types available, Adjustment of Retinoscopes- special features. 2. Objective optometers, Infrared optometer devices. 3. Projection charts, Illumination of the consulting room. 4. Brightness acuity test, Vision analyzer. Pupilometer, Potential Acuity Meter Aberrometer.	8	CO2
3	OPHTHALMOSCOPES AND RELATED DEVICES	1. Design of ophthalmoscopes –illumination. 2. Design of ophthalmoscopes-viewing. 3. Ophthalmoscope disc, Filters for ophthalmoscopy, Indirect ophthalmoscope. 4. Tonometer, Tonometer principles, Types of tonometers and standardization. Use and interpretation of tonometer.	8	CO3
4	SLIT LAMP	1. Slit lamp systems. 2. Viewing microscope systems. 3. Slit lamps in production. 4. Slit lamp accessories. 5. Slit lamp techniques. Slit lamp appearances, Mechanical design instruments.	8	CO4
5	FUNDUS EXAMINATION	1. Fundus Camera, The fundus camera – principles, The fundus camera –techniques. 2. External eye photography -apparatus 3. External eye photography -techniques 4. Corneal examination, Placido’s Disc., Keratometer 5. Exophthalmometer Orthoptic Instruments- haploscopes, home devices–pleoptics	8	CO5

Reference Books:	
1.	David Henson: Optometric Instrumentations, Butterworth-Heinemann, UK,1991.
2.	P R Yoder: Mounting Optics in Optical Instruments, SPIE Society of Photo- Optical Instrumentation, 2002
3.	G Smith, D A. Atchison: The Eye and Visual Optical Instruments, Cambridge University Press,1997
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						SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	
BO203	OPTOMETRIC INSTRUMENTS	√	√	√	√	√	√	3,4



Integral University, Lucknow

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.	Mappe d CO
1	INTRODUCTION TO ENVIRONMENT ANDECOSYSTEMS	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., Ahemdabad-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

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.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
ES101	ENVIRONMENTAL STUDIES					√			3,4,11,16



Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	LT208	Title of the Course	OCULAR 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	VISUAL ACUITY AND REFRACTION	Near vision difficulties with units and trial frames Adjustment of Retinoscope – special features. Special subjective test polarizing and displacement etc.	4	CO1
2	SPECIAL INVESTIGATIONS	Color vision testing devices Field of vision and screening devices Perimeter and visual field Results of field examination	4	CO2
3	VISION SCREENER	Vision screeners – principles Vision screeners – details Analysis of screener results	4	CO3
4	ANTERIOR AND POSTERIOR SEGMENT EVALUATION	Corneal examination- Placido’s Disc., Keratometer The fundus camera – techniques	4	CO4
5	MICROSCOPE	Viewing microscope systems The use of ophthalmoscopes in special cases	4	CO5

Reference Books:	
1. P R Yoder: Mounting Optics in Optical Instruments, SPIE Society of Photo- Optical Instrumentation, 2002.	
2. G Smith, D A. Atchison: The Eye and Visual Optical Instruments, Cambridge University Press, 1997.	
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.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
BO208	OCULAR INSTRUMENTS- LAB	√	√	√	√		√	√	3,4



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DEPARTMENT OF PARAMEDICAL SCIENCES

BACHELOR OF OPTOMETRY
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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	BO209	Visual Optics-II	Core	3	1	0	40	20	60	40	100	3:1:0	4
2	BO210	Ocular Diseases-II	Core	3	1	0	40	20	60	40	100	3:1:0	4
3	BO211	Clinical Examination of Visual System	Core	3	1	0	40	20	60	40	100	3:1:0	4
4	BO212	Low Vision Aid & Optometry Investigation	Core	3	1	0	40	20	60	40	100	3:1:0	4
5	BO213	General & Ocular Pharmacology	Core	2	1	0	40	20	60	40	100	2:1:0	3
PRACTICAL													
1	BO214	Visual Optics-II - Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
2	BO215	Clinical Examination of Visual System - Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
3	BO216	Low Vision Aid & Optometry Investigation - Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
4	BO217	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	BO209	Visual Optics-II	Core	√	√	√	√		√	√	3,4
2	BO210	Ocular Diseases-II	Core	√	√	√	√		√	√	3,4
3	BO211	Clinical Examination of Visual System	Core	√	√	√	√		√	√	3,4
4	BO212	Low Vision Aid & Optometry Investigation	Core	√	√	√	√		√	√	3,4
5	BO213	General & Ocular Pharmacology	Core	√	√	√	√		√	√	3,4
PRACTICAL											
1	BO214	Visual Optics-II - Lab	Core	√	√	√	√		√	√	3,4
2	BO215	Clinical Examination of Visual System - Lab	Core	√	√	√	√		√	√	3,4
3	BO216	Low Vision Aid & Optometry Investigation - Lab	Core	√	√	√	√		√	√	3,4
4	BO217	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: 2019-20							
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				
Course Objectives	Upon completion of the course, the student should be able: <ul style="list-style-type: none"> 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 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	ACCOMMODATION	1. Accommodation & Presbyopia 2. Far and near point of accommodation 3. Range and amplitude of accommodation 4. Mechanism of accommodation, Variation of accommodation with age 5. Anomalies of accommodation, Presbyopia	8	CO1
2	OBJECTIVE REFRACTION	1. Streak Retinoscopy- Principle, Procedure, Difficulties and interpretation of findings 2. Transposition and spherical equivalent 3. Dynamic retinoscopy various methods 4. Radical retinoscopy and near retinoscopy 5. Cycloplegic refraction, Hypermetropia and accommodation	8	CO2
3	Refraction	1. Principle and fogging 2. Fixed astigmatic dial (Clock dial), Combination of fixed and rotator dial (Fan and block test), J.C.C 3. Duo chrome test- Binocular balancing- alternate occlusion, prism dissociation, dissociate 4. Duo chrome balance, Borich dissociated fogging 5. Binocular refraction- Various techniques Mechanism of accommodation, Variation of accommodation with age.	8	CO3
4	EFFECTIVE POWER & MAGNIFICATION	1. Ocular refraction vs. Spectacle refraction. 2. Spectacle magnification vs. Relative spectacle magnification. 3. Axial vs. Refractive emmetropia, Knapp's law. 4. Ocular accommodation vs. Spectacle accommodation. 5. Retinal image blur-Depth of focus and depth of field.	8	CO4
5	MEASUREMENTS OF OPTICAL CONSTANTS OF THE EYE	1. Keratometry, Curvature of the lens and ophthalmometry. 2. Spectacle magnification vs. Relative spectacle magnification. 3. Axial and axis of the eye. 4. Basic aspects of vision- Visual acuity, Light and dark adaptation Color vision, Septal and temporal resolution. 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 No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
BO209	VISUAL OPTICS- II	√	√	√	√		√	√	3,4



Integral University, Lucknow

Effective from Session: 2019-20							
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 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.
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. Model of low vision service. 3. Pre-clinical evaluation of low vision patients – prognostic & psychological factors; psychosocial impact of low vision. 4. Types of low vision aids – optical aids, non-optical aids & electronic devices, Optics of low vision aids.	8	CO1
2	LOW VISION ASSESSMENT	1. Clinical evaluation – assessment of visual acuity, visual field, selection of low vision aids, instruction & training 2. Pediatric Low Vision care, Low vision aids – dispensing & prescribing aspects 3. Visual rehabilitation & counselling 4. Legal aspects of Low vision in India, Case Analysis.	8	CO2
3	SPECIAL PROCEDURES I	1. Visual Acuity Testing & Theory, Color Vision Testing & Theory 2. Electro Retinography, E.R.G., Electro Oculography, E.O.G. 3. Fluorescein Angiography F.A., Ultrasonography U.S.G. 4. Visual Evoked Response / Potential V.E.R. or V.E.P. 5. Tonometer, Tonometry & Tonography, Visual Field Charting & Perimetry	8	CO3
4	SPECIAL PROCEDURE II	1. Adaptation & Adaptometry, Berman’s Locator, Cryo Technique, Diathermy 2. Photo-coagulation, Methods of examination (Focal illumination) 3. Slit lamp and attachments, Gonioscopy 4. Ocular Photography (Ant.Seg.), Contact & Trans-illumination	8	CO4
5	CLINICAL PROCEDURES	1. pH Testing & Schirmer’s Test 2. Fluorescein Staining & Techniques, Syringing & Lacrimal Function Test 3. Ophthalmoscopy, Retinoscopy 4. Auto-Refractometry, Keratometry 5. Ophthalmic Lens Measuring Instruments	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. J.B Eskridge, J F. Amos, J D. Bartlett: Clinical Procedures in Optometry, Lippincott Williams and Wilkins, 1991.

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	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
	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.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
BO212	LOW VISION AID & OPTOMETRY INVESTIGATION	√	√	√	√		√	√	3,4



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"> • Basic principle of pharmacokinetics & Pharmacodynamics. • Commonly used ocular drugs, mechanism, indications, contraindications, drug dosage and adverse effects. 						

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"> • Drugs for ocular hypertension • Drugs that enhance aqueous outflow • Inhibitors of aqueous secretion 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																
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	-	-	-	-	-	-
CO4	-	-	-	-	-	2	2	-	-	-	-	2	-	-	-	-	-
CO5	-	-	-	-	-	2	1	1	-	-	1	2	-	-	-	1	1

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

Attributes & SDGs

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



Integral University, Lucknow

Effective from Session: 2019-20							
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.						

Course Outcomes	
CO1	Understanding about the process of history taking and its clinical importance
CO2	Understanding about various clinical examination test available
CO3	Analyzing the importance of pupillary examination in the field of optometry
CO4	Applying all the theoretical knowledge on practical field
CO5	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	VISUAL ACUITY	1. Visual acuity estimation 2. Extra ocular motility	4	CO1
2	CLINICAL PROCEDURES I	3. Cover test, Alternating cover test 4. Pupils Examination 5. External examination of the eye, Lid Eversion	4	CO2
3	CLINICAL PROCEDURE II	6. Color Vision 7. Stereopsis 8. Photo stress test	4	CO3
4	CLINICAL PROCEDURES III	9. Slit lamp bio microscopy	4	CO4
5	CLINICAL PROCEDURES IV	10. Ophthalmoscopy 11. Tonometry	4	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.	B. Elliott: Clinical Procedures in Primary Eye Care, 3rd edition, Butterworth–Heinemann, 2007

e-Learning Source:	
1.	https://www.youtube.com/watch?v=anpivljrat0
2.	https://www.youtube.com/watch?v=WRlbtXk4Zto
3.	https://www.youtube.com/watch?v=anpivljrat0

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
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

Attributes & SDGs

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

