

SHRI GURU RAM RAI UNIVERSITY

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



SYLLABUS FOR

Bachelor of Optometry

With CO, and PO Mapping

School of Paramedical Sciences

(W.E.F 2025-2026)

Bachelor Optometry

OUTCOME BASED EDUCATION

Programme outcome (POs)

Students will be able to

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

SHRI GURU RAM RAI UNIVERSITY DEHRADUN (UTTARAKHAND)

**REGULATIONS OF THE UNIVERSITY FOR THE AWARD OF THE DEGREE OF
BACHELOR OF OPTOMETRY**

In exercise of the powers conferred by section of the SGRR University Act no.3 of 2017.Academic Council of the Shri Guru Ram Rai University Dehradun hereby makes the following regulations:-

SHORT TITLE AND COMMENCEMENT

- (1) These regulations shall be called “THE REGULATIONS FOR THE BACHELOR OPTOMETRY OF THE SHRI GURU RAM RAI UNIVERSITY, DEHRADUN”.
- (2) They shall come into force from the 2025-2026 academic sessions.
- (3) The regulations framed are subject to modification from time to time by the sending them to the Academic Board of the University.

**ADMISSION, SELECTION, MIGRATION AND TRAINING
ADMISSION TO THE B.Sc, OPTOMETRY COURSE.**

‘ELIGIBILITY CRITERIA’

No Candidate shall be allowed to be admitted to the B.Sc Optometry (BOPTO) until:-

- 1) He/She has completed the age of 17 years on or before first day of July of the year commencing the prescribed academic session of the said course;
- 2) He/She has passed qualifying examination as under:
 - a) The Indian school Certificate Examination which is equivalent to 10+2 Higher Secondary Examination after a period of 12 years study, the last two years study comprising of Physics, Chemistry, Biology or Mathematics or any other elective subject with English at a level not less than the core course for English as prescribed by the National Council for Educational Research and training after the introduction of the 10+2+3 years educational structure as recommended by the National Committee on education;
OR
 - b) The Intermediate examination in science of an Indian University/Board or other recognized examine body with Physics, Chemistry, Biology /Maths which shall include a practical test in these subjects and also English as a compulsory subject.
OR
 - c) The pre-professional or medical examination with Physics, Chemistry and Biology after passing either the higher Secondary school examination, or the pre-university or an equivalent examination. The pre-professional/pre-medical examination shall include a practical test in physics, Chemistry and Biology/and also English as a compulsory subject.
OR
 - d) The first year of the three years degree course of recognized University, with Physics, Chemistry and Biology/ including a practical test in these subject provided the examination is a ‘University Examination’ and candidate has passed 10+2 with English at all level not less than a core course;
OR
 - e) B.Sc examination of an Indian University, provided that he/she has passed the B.Sc examination with not less than two of the following subjects-Physics, Chemistry (Botany, Zoology) and further that he/she has passed the earlier qualifying examination with the following subjects Physics, Chemistry/Biology and English (10+2 level);
OR
 - f) Any other examination which in scope and standard is found to be equivalent to the intermediate science examination of an Indian University/Board, taking Physics, Chemistry and Biology including a practical test in each of these subjects and English.

10+2 with vocational training in optometry are also eligible.

MIGRATION/TRANSFER OF CANDIDATE

- a)** Migration/ Transfer of candidate from one recognized institution to another institution of this University or from another University will not generally be considered.
- b)** However, under extra ordinary circumstances, the Vice –Chancellor shall have the power to place any migration/ transfer he deems fit I the Governing Council and get its approval for grant of permission for migration/ transfer to candidates to candidates undergoing course of study in affiliated institutes of this university.

Bachelor of Optometry is divided into 8 Semester)**Study & Evaluation Scheme****Bachelor of Optometry - I Semester**

S.No.	Course Code	Course Name	Periods			Credits	Internal	External	Total
			L	T	P				
01	BSO-101	Human Anatomy & Physiology (I)	3	3	-	6	40	60	100
02	BSO-102	Ocular Anatomy, Pathology & Microbiology (I)	2	2	-	4	40	60	100
03	BSO-103	Ocular Physiology & Biochemistry (I)	2	2	-	4	40	60	100
04	BSO-104	Optics (I)	2	1	-	3	40	60	100
05	BSO-101P	Human Anatomy & Physiology (I)	-	-	2	1	40	60	100
06	BSO-102P	Ocular Anatomy, Pathology & Microbiology (I)	-	-	2	1	40	60	100
07	BSO-103P	Ocular Physiology & Biochemistry (I)	-	-	2	1	40	60	100
08	BSO-104P	Optics (I)	-	-	2	1	40	60	100
		Total	9	8	8	21	320	480	800

Bachelor of Study & Evaluation Scheme

Bachelor of Optometry - II Semester

S.No.	Course Code	Course Name	Periods			Credits	Internal	External	Total
			L	T	P				
01	BSO-201	Human Anatomy & Physiology (II)	3	3	-	6	40	60	100
02	BSO-202	Ocular Anatomy, Pathology & Microbiology (II)	2	2	-	4	40	60	100
03	BSO-203	Ocular Physiology & Biochemistry (II)	2	2	-	4	40	60	100
04	BSO-204	Optics (II)	2	1	-	3	40	60	100
05	BSO-201P	Human Anatomy & Physiology (II)	-	-	2	1	40	60	100
06	BSO-202P	Ocular Anatomy, Pathology & Microbiology (II)	-	-	2	1	40	60	100
07	BSO-203P	Ocular Physiology & Biochemistry (II)	-	-	2	1	40	60	100
08	BSO-204P	Optics (II)	-	-	2	1	40	60	100
		Total	9	8	8	21	320	480	800

Bachelor of Study & Evaluation Scheme**Bachelor of Optometry - III Semester**

S.No.	Course Code	Course Name	Periods			Credits	Internal	External	Total
			L	T	P				
01	BSO-301	Pharmacy & Pharmacology(I)	3	-	-	3	40	60	100
02	BSO-302	Refraction (I)	3	-	-	3	40	60	100
03	BSO-303	Investigative Ophthalmology (I)	3	-	-	3	40	60	100
04	BSO-304	Ophthalmic Appliances (I)	3	-	-	3	40	60	100
05	BSO-301P	Pharmacy & Pharmacology(I)	-	-	2	1	40	60	100
06	BSO-302P	Refraction (I)	-	-	2	1	40	60	100
07	BSO-303P	Investigative Ophthalmology (I)	-	-	2	1	40	60	100
08	BSO-304P	Ophthalmic Appliances (I)	-	-	2	1	40	60	100
		Total	12		8	16	320	480	800

Bachelor of Study & Evaluation Scheme**Bachelor of Optometry - IV Semester**

S.No.	Course Code	Course Name	Periods			Credits	Internal	External	Total
			L	T	P				
01	BSO-401	Pharmacy & Pharmacology(II)	3	-	-	3	40	60	100
02	BSO-402	Refraction (II)	3	-	-	3	40	60	100
03	BSO-403	Investigative Ophthalmology (II)	3	-	-	3	40	60	100
04	BSO-404	Ophthalmic Appliances (II)	3	-	-	3	40	60	100
05	BSO-401P	Pharmacy & Pharmacology(II)	-	-	2	1	40	60	100
06	BSO-402P	Refraction (II)	-	-	2	1	40	60	100
07	BSO-403P	Investigative Ophthalmology (II)	-	-	2	1	40	60	100
08	BSO-404P	Ophthalmic Appliances (II)	-	-	2	1	40	60	100
		Total	12		8	16	320	480	800

Bachelor of Study & Evaluation Scheme

Bachelor of Optometry - V Semester

S.No.	Course Code	Course Name	Periods			Credits	Internal	External	Total
			L	T	P				
01	BSO-501	Advanced Orthoptics & LVA (I)	3	-	-	3	40	60	100
02	BSO-502	Clinical Refraction & Contact lens (I)	3	-	-	3	40	60	100
03	BSO-503	Community Ophthalmology & Ocular diseases (I)	3	-	-	3	40	60	100
04	BSO-504	Ophthalmic Appliances, Eye bank & Management of OT(1)	3	-	-	3	40	60	100
05	BSO-501P	Advanced Orthoptics & LVA (I)	-	-	2	1	40	60	100
06	BSO-502P	Clinical Refraction & Contact lens (I)	-	-	2	1	40	60	100
07	BSO-503P	Community Ophthalmology & Ocular diseases (I)	-	-	2	1	40	60	100
08	BSO-504P	Ophthalmic Appliances, Eye bank & Management of OT(1)	-	-	2	1	40	60	100
		Total	12		8	16	320	480	800

Bachelor of Study & Evaluation Scheme

Bachelor of Optometry – VI Semester

S.No.	Course Code	Course Name	Periods			Credits	Internal	External	Total
			L	T	P				
01	BSO-601	Advance Orthoptics & LVA (II)	3	-	-	3	40	60	100
02	BSO-602	Clinical Refraction & Contact lens (II)	3	-	-	3	40	60	100
03	BSO-603	Community Ophthalmology & Ocular diseases (II)	3	-	-	3	40	60	100
04	BSO-604	Ophthalmic Appliances, Eye bank & Management of OT(11)	3	-	-	3	40	60	100
05	BSO-601P	Advance Orth optics & LVA (II)	-	-	2	1	40	60	100
06	BSO-602P	Clinical Refraction & Contact lens (1I)	-	-	2	1	40	60	100
07	BSO-603P	Community Ophthalmology & Ocular diseases (II)	-	-	2	1	40	60	100
08	BSO-604P	Ophthalmic Appliances, Eye bank & Management of OT(11)	-	-	2	1	40	60	100
		Total	12		8	16	320	480	800

Note:

1. The minimum pass marks will be 40% in individual subjects in theory and Practical and 50% in aggregate.
2. The Theory and Practical papers will be of equal weightage with 50% in Sessional and 50% in final University Examination.
3. The division will be determined on the basis of the aggregate of the marks of all the courses./subjects prescribed for the degree as under:
 - a) Passed with honours will be rewarded on 75% and above only in first attempt.
 - b) First Division will be marked on 60% and above.
 - c) Second Division will be marked on 50% and above but less than 60%.

INTERNSHIP

Internship is a phase of training where a student is expected to conduct actual practice of clinical optometry and acquire skills under supervision so that he/she may become capable of functioning independently.

INTERNSHIP DURATION: ONE YEAR**OTHER DETAILS**

- ☐ The students are required to do internship for one full year (i.e. 7th and 8th semester) either from Shri mahant Indresh Hospital, Department of Ophthalmology.
- ☐ The University shall issue a provisional degree of Bachelor in Optometry on passing the final examination after the completion of internship on demand University.

Theory Examination: All the papers in each year carrying 100 marks out of which 40 marks will be internal assessment and 60 marks for external assessment based on the question paper sent by the University the paper will be 3 hrs. The practical examination will be held with the Final Examination. The practical and Viva voice in each subject will carry 40% marks as internal & 60% marks as external assessment (according to examination scheme) prescribed for the semester.

EXAMINATION REGULATIONS

Essentialities for qualifying to appear in professional examinations. The performance in essential components of training to be assessed based on.

ATTENDANCE: 75% of attendance in a subject for appearing in the examination is compulsory provided he/she has 80% attendance in non-lecture teaching i.e. seminars group discussions. Practical in Hospital postings and bedside clinics of 150 bedded indoor hospital with at least 75% patient Occupancy.

INTERNAL ASSESSMENT:

- (a) It shall be based on day today assessment (see note), evaluation of student assignment, preparation for seminar. Clinical case presentation etc.
- (b) Seasonal examinations shall be conducted throughout the course. The question of number of examinations is left to the institutions;
- (c) Day to day records should be given importance during internal assessment.
- (d) Weight age for the internal assessment shall be 20% marks of the total marks fixed for internal.
- (e) Student must secure at least 50% marks of the total marks fixed for internal Assessment in Particular subject in order to eligible to appear in final university examination of the subject.

Note: Internal Assessment shall being different ways in which students participation in learning process is evaluated. Some examples are as follows-

- (i) Preparation of subject for student's seminar.
- (ii) Preparation of a clinical case for discussion.
- (iii) Clinical case study problem solving exercise.
- (iv) Participation in projects for health care in the community.
- (v) Proficiency in carrying out a practical or a skill in small research project.
- (vi) Multiple choice questions (MCQ) test after completion of a system/ teaching. Each item tested shall be objectively assessed and recorded. Some of the items can be assigned as home work/Vacation work.

UNIVERSITY EXAMINATIONS:

Theory Papers will be prepared by examiners as prescribed. Nature of question will be short answer type / objective type and marks for each part indicated separately.

Practical/ clinical will be conducted in the laboratories or hospital wards. Objective will be to assess proficiency in skills Conduct of experiment, interpretation of data and logical conclusion. Clinical cases should preferably include common diseases not esoteric syndromes or rare disorders. Emphasis should be on candidate's capability in eliciting physical signs and their interpretation.

Viva/ oral includes evaluation of management approach and handling of emergencies Candidate's skills interpretation of common investigative data also is to be evaluated.

The examinations are to be designed with a view to ascertain whether the candidate has acquired the necessary for knowledge, skills along with clear concepts of the fundamentals, which are necessary for him to carry out his professional day to day work competently. Evaluation will be carried out on an objective basis and practical Question papers should preferably be of short structure/objective type.

Clinical cases/ practical shall take into account common diseases, which the student is likely to come in contact in practice.

During evaluation (both external and internal) it shall be ascertained if the candidate has acquired the skills.-

There shall be one main examination in a semester and a supplementary to be held not less than 6 months after publication of its results.

Note: Result of all University Examinations shall be decided before the start of teaching for next session.

DURATION OF EXAMINATION & QUESTIONS

- (i) Each written paper will be attempted.
- (ii) A clinical / practical examination in any subject for student shall not be for more than a day.

GENERAL

If Candidate obtains an aggregate of 75% in all the subjects of any professional Examination, he will be declared to have passed that Examination with Honours, provided he/she passes in all subjects in the first attempt.

INTERNSHIP

General

Internship is a phase of training wherein a graduate is expected to conduct actual practice of Bachelor of optometry acquired skills under supervision so that he/she may become capable of functioning independently.

SPECIFIC OBJECTIVES

At the end of internship training the graduate shall be able to:

- (i) Provide all inclusive training optometry involving all ophthalmic specialist.
- (ii) Optometrist skill like Refraction, effective communication with patient, slit-lamp examination, applanation tonometry and other routine OPD.
- (iii) Patient evaluation and counselling on visual/ocular hygiene .
- (iv) Adequate knowledge to fit, assess, prescribe and dispense contact lenses for refractive correction.
- (v) Be able to assess low vision and provide comprehensive low vision care.
- (vi) Be able to do basic binocular vision assessment, help and co-manage binocular vision anomalies.

INTERNSHIP TIME DISTRIBUTION

Main Objective

Development of skills and competency in prescription of glasses, contact lens and ophthalmic investigations.

Total Period of Internship: 1 year

OTHER DETAILS

- (1) All parts of internship shall be at least 150-bedded hospital & minimum patient occupancy in 75%.
- (2) Every candidate will be required after passing the final B.Sc Optometry, Examination to undergo compulsory rotatory internship to the satisfaction of the college Authorities and University concerned for a period of 1 year so as to be eligible for the award of the degree of Bachelor of Optometry.
- (3) The University shall issue a provisional B.Sc Pass Certificate on passing the final examination after the internship completion on demand by the candidate.

- (4) The intern shall be entrusted with OPD & OT responsibilities under direct Supervision of Senior optometrist & ophthalmologist. They shall not be working independently.
- (5) Interns will not issue certified reports or other related documents under their signature.

ASSESSMENT OF INTERNSHIP

- (1) The interns maintain the record of work, which is to be verified and certified by the Post graduate Optometrist under whom he/she works. Apart from scrutiny of the record of work, assessment and evaluation of training shall be undertaken by an objective approach using situation test in knowledge, skills and attitude during and at the end of training. Based on the record of work and date of evaluation the Director / Principal shall issue 'Certificate of Satisfactory Completion' of training following which the University shall award the B.Sc (BOPTO) Degree and declare the candidate eligible for the same.
- (2) Satisfactory completion shall be determined on the basis of the following:
 - (a) Proficiency of knowledge required for each Investigation Techniques
 - (b) The competency in skills expected to manage each investigation Technique.
 - Competency for performance of self –performance
 - Of having assisted in procedures
 - Of having observed.
 - (c) Responsibility, Punctuality, workup investigation Techniques, involvement in procedures, follows of report.
 - (d) Capacity to work in a team (behavior with colleagues, nursing staff and relationship with Medical and Para medicals.
 - (e) Initiating, participation in discussions, research aptitude.

MEDIUM OF INSTRUCTION

English shall be the Medium of Instructions for all the subject of study and for examinations of Bachelor of Optometry course.

CONDITION OF LACK OF ATTENDANCE

As per the existing rules and regulations of SGRR University, Dehradun

SUBMISSION OF RECORD NOTE BOOKS

At the time of practical examination, each candidate shall submit to the examination the record notebooks duly certified by the Head of the College as a bonafide record of work done by the candidate.

CLASSIFICATION OF SUCCESSFUL CANDIDATE

REVALUATION OF ANSWER PAPAERS

The regulations as prescribed by the University for other Undergraduate Course shall be applicable.

WARD OF MEDALS AND PRIZES

The University shall award at its convocation medals and prizes to outstanding candidates, as and when instituted by the donors as per the schedule as per the prescribed for the award.

UNIVERSITY RANKING

First, Second and third University ranks may be awarded to candidates, who have passed all the examination in the first appearance and taking into consideration the aggregate marks obtained in all the subjects in which the candidate had been examined during the entire course of study.

Bachelor's in Optometry Ist Semester

Course code	: BSO-101
Course Name	: Human Anatomy & Physiology
Semester /Year	: I st Semester

	L	T	P	C
	3	3		6

Course Content

Unit -1:	Introduction: and terminology of Human Body, body parts and areas. Terms of location and position, body cavities and their membranes, Dorsal cavity, ventral cavity, planes and section.
Unit -2	Embryology: and development of human body, body parts and their areas.
Unit-3	Cells: Structure function and location, prokaryotic and eukaryotic cells, cell organelles, cell division, tissue, types, structure location and functions of epithelial tissue, connective tissue, muscles tissue and nerve tissue. The Integumentary system: structure and functions of the skin, subcutaneous tissue.
Unit-4	Autonomic Nervous system: The Senses sensory pathway, characteristics of sensation, cutaneous senses, muscle sense, sense of taste, sense of smell, hunger and thirst, The eye and The ear.
Unit-5	Circulatory System: heart structure and function, blood vessels and valves, mechanism of circulation, cardiac cycle, heart sounds, heart rate, pulse rate, blood pressure. Blood, its composition and function, function of RBC, WBC & platelets, Lymphatic system: lymph, its composition and function, lymphatic tissue

Course outcomes (COs):

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

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

Text Book

1. B. D Chourasia's Human Anatomy Fifth edition
2. Vikram singh's Textbook of anatomy

Refrance book-

1. Atlas of anatomy
2. Osteology

CO-PO Mapping

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

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

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

	L	T	P	C
			2	1

Unit -1:	Introduction: and terminology of Human Body, body parts and areas. Terms of location and position, body cavities and their membranes, Dorsal cavity, ventral cavity, planes and section.
Unit -2	Embryology: and development of human body, body parts and their areas.
Unit-3	Cells: Structure function and location, prokaryotic and eukaryotic cells, cell organelles, cell division, tissue, types, structure location and functions of epithelial tissue, connective tissue, muscles tissue and nerve tissue. The Integumentary system: structure and functions of the skin, subcutaneous tissue.
Unit-4	Autonomic Nervous system: The Senses sensory pathway, characteristics of sensations, cutaneous senses, muscle sense, sense of taste, sense of smell, hunger and thirst, The eye and The ear.
Unit-5	Circulatory System: heart structure and function, blood vessels and valves, mechanism of circulation, cardiac cycle, heart sounds, heart rate, pulse rate, blood pressure. Blood, its composition and function, function of RBC, WBC & platelets, Lymphatic system: lymph, its composition and function, lymphatic tissue.

Course outcomes (COs):

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

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

Text Book

1. B. D Chourasia's Human Anatomy Fifth edition
2. Vikram singh's Textbook of anatomy

Reference book-

3. Atlas of anatomy
4. Osteology

CO-PO Mapping

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

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

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

	L	T	P	C
	2	2		4

Ocular Anatomy

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

Ocular pathology and microbiology

Unit-1	Morphology and principles of cultivating bacteria.
Unit 2	Common bacterial infections of eye.
Unit 3	Common fungal infections of eye.
Unit 4	Common viral infections of eye.
Unit 5	Common parasitic infections of eye.
Unit 6	Grossing of tissue Tissue processing

	select cutting Staining Haematoxylins & special stains
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Text book-

1-Fundamentals of Microbiology Jeffrey C. Pommerville

Reference book-

1-Fundamentals of Microbiology Jeffrey C. Pommerville

2-Parson. Ramanjit Sihota

Course outcomes (COs):

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

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

CO-PO Mapping

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

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

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

	L	T	P	C
			2	1

Ocular Anatomy (Practical)

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

Ocular pathology and microbiology (Practical)

Unit-1	Morphology and principles of cultivating bacteria.
Unit 2	Common bacterial infections of eye.
Unit 3	Common fungal infections of eye.
Unit 4	Common viral infections of eye.
Unit 5	Common parasitic infections of eye.
Unit 6	Grossing of tissue Tissue processing

	select cutting Staining Haematoxylin & special stains
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Course outcomes (COs):

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

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

CO-PO Mapping

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

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

Course code	: BSO-103
Course Name	: Ocular physiology & biochemistry
Semester /Year	: I st Semester

	L	T	P	C
	2	2		4

Course Content

Unit 1	General physiology of the eye - An introduction Aqueous humour and vitreous: Intra ocular pressure
Unit 2	Maintenance of Transparency of the Cornea Maintenance of Transparency of the Lens
Unit 3	Visual stimulus Visual acuity and their principal of measurement Visual perception, An over view of binocular vision. Contrast sensitivity Visual field
Unit 4	Extra ocular muscles Saccades and pursuit Fixatory eye movement
Unit 5	Binocular vision & stereopsis. Vitamin sources for Eye.

Ocular Biochemistry

Unit 1	Ocular Biochemistry: Various aspects of the eye- Cornea, lens, aqueous, vitreous, retina and pigment rhodopsin
Unit 2	Metabolism – carbohydrates, proteins, lipids

Text book-

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

Reference Book-

Ophthalmology A K khurana

Course outcomes (COs):

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

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

CO-PO Mapping

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

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

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

	L	T	P	C
			2	1

Ocular Physiology

Unit 1	General physiology of the eye - An introduction Aqueous humour and vitreous: Intra ocular pressure
Unit 2	Maintenance of Transparency of the Cornea Maintenance of Transparency of the Lens

Unit 3	Visual stimulus Visual acuity and their principal of measurement Visual perception, An over view of binocular vision. Contrast sensitivity Visual field
Unit 4	Extra ocular muscles Saccades and pursuit Fixatory eye movement
Unit 5	Binocular vision & stereopsis. Vitamin sources for Eye.
Unit 6	General physiology of the eye - An introduction Aqueous humour and vitreous: Intra ocular pressure

Ocular Biochemistry Practical

Unit 1	Ocular Biochemistry: Various aspects of the eye- Cornea, lens, aqueous, vitreous, retina and pigment rhodopsin
Unit 2	Metabolism – carbohydrates, proteins, lipids

Course outcomes (COs):

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

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

CO-PO Mapping

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

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

Course code	: BSO-104
Course Name	: Optics
Semester /Year	: I st Semester

	L	T	P	C
	3			3

Course Content

Unit 1	Introduction: Light, Mirror, Reflection, Refraction and Absorption □ Prisms: Definition, properties, Refraction through prisms, Thickness difference, Base-apex notation, uses, nomenclature and units; Fresnel's prisms, rotary prisms.
Unit 2	Lenses: Definition, units, terminology used to describe, form of lenses, Lens shape, size and types that is spherical, cylindrical and Sphero-cylindrical Transpositions: Simple, Toric and Spherical equivalent
Unit 3	Measurement of visual acuity with different methods.
Unit 4	Intensity of polarized light Malus' Law; polarizers and analyzers; Methods of producing polarized light; Brewster's angle. Birefringence; ordinary and extraordinary rays Relationship between amplitude and intensity
Unit 5	Coherence- Interference; constructive interference, destructive interference, Diffraction;

Text books-

1. Borish's Clinical Refraction
2. Duke elder Practice of refraction

Refrance books –

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

Course outcomes (COs):

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

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

CO-PO Mapping

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

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

Course code	: BSO-104P
Course Name	: Optics Practical
Semester /Year	: I st Semester

	L	T	P	C
			2	1

Course Content

Unit 1	Introduction: Light, Mirror, Reflection, Refraction and Absorption □ Prisms: Definition, properties, Refraction through prisms, Thickness difference, Base-apex notation, uses, nomenclature and units; Fresnel's prisms, rotary prisms.
Unit 2	Lenses: Definition, units, terminology used to describe, form of lenses, Lens shape, size and types that is spherical, cylindrical and Sphero-cylindrical Transpositions: Simple, Toric and Spherical equivalent
Unit 3	Measurement of visual acuity with different methods.
Unit 4	Intensity of polarized light Malus' Law; polarizers and analyzers; Methods of producing polarized light; Brewster's angle. Birefringence; ordinary and extraordinary rays Relationship between amplitude and intensity
Unit 5	Coherence- Interference; constructive interference, destructive interference, Diffraction;

Course outcomes (COs):

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

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

CO-PO Mapping

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

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

Bachelor's of Optometry II Semester

Course code	: BSO-201
Course Name	: Human Anatomy & Physiology
Semester /Year	: II Semester

	L	T	P	C
	3	3		6

Course Content

Human anatomy

Unit -1	Anatomical Position & terminology
Unit -2	Joints & Bones

Unit -3	Muscles, basic tissue, cartilage, artery, vein and nerve.
Unit -4	Hip bone, femur, patella.

HUMAN PHYSIOLOGY

Unit -1	Orientation and Introduction of physiology
Unit -2	General Physiology
Unit -3	Cell and cell organelles, homeostasis.
Unit -4	Transport across cell membrane
Unit-5	Composition & Function of blood (RBC, WBC)
Unit-6	Outline of membrane Potential and Action potential.

Course outcomes (COs):

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

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

Text Book

- 1. B. D Chourasia's Human Anatomy Fifth edition**
- 2. Vikram singh's Textbook of anatomy**

Refrance book-

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

CO-PO Mapping

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

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

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

Course code	: BSO-201P
Course Name	: Human Anatomy & Physiology Practical
Semester /Year	: II Semester

	L	T	P	C
			2	1

Course Content

Unit -1	The Skeletal system: General Introduction , Classification Joints- Types of joints & Movements. Basic Anatomy of Important Muscles.
Unit -2	Central Nervous system: Nervous system Division , Nerve Tissue, Types of Neurons, Nerve and Nerve tracts, The nerve impulse, The spinal cord, The brain Meninges and cerebrospinal fluid and cranial nerves
Unit -3	The Endocrine and excretory system- Chemistry of hormones, Regulation of Hormones Secretion, The pituitary gland, Thyroid Gland, Parathyroid Glands, Pancreas, Adrenal Glands and other endocrine glands. Excretory system : General Introduction of broken down components of metabolism- Urine, sweat or feces.
Unit -4	Digestive system- General introduction of digestive system includes the mouth, pharynx, esophagus, stomach, small intestine, large intestine, rectum, anus, salivary glands, liver, gallbladder and pancreas.
Unit-5	Respiratory system- General introductions of organs, tissues. It includes lungs and blood vessels.
Unit -6	Vitamins and Proteins- Types and role of vitamins and proteins in human body.

Course outcomes (COs):

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

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

Text Book

1. B. D Chourasia's Human Anatomy Fifth edition
2. Vikram singh's Textbook of anatomy

Reference book-

1. Atlas of anatomy
2. Osteology

CO-PO Mapping

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

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

Course code	: BSO-202			
Course Name	: Ocular Anatomy, Pathology & Microbiology			
Semester /Year	: 2 nd Semester			
	L	T	P	C
	2	2		4

Ocular Anatomy

Unit 1	Retina gross anatomy
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	Layers of retina
Unit -2	Visual pathway Lesions of visual pathway
Unit-3	Aqueous Humour Aqueous humour outflow
Unit-4	Sympathetic System Parasympathetic system
Unit-5	Lacrimal apparatus- parts, structure Lacrimal passage
Unit 6	Higher visual centers

Ocular pathology and microbiology

Unit -1	Sterilization and disinfections used in hospital and ophthalmic practice.
Unit 2	Understanding about the characteristics of bacteria, viruses, fungi and parasites.
Unit 3	Blood cells and Blood collection techniques Infection in general
Unit 4	Bleeding time, clotting time Urine collection method Physical examination of urine Chemical examination of Urine Microscope Examination of urine

Text book-

1-Fundamentals of Microbiology Jeffrey C. Pommerville

Reference book-

1-Fundamentals of Microbiology Jeffrey C. Pommerville

2-Parson. Ramanjit Sihota

Course outcomes (COs):

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

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

CO-PO Mapping

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

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

Course code	: BSO-202P			
Course Name	: Ocular anatomy, Pathology & Microbiology			
Semester /Year	: 2 nd Semester			
	L	T	P	C
			2	1

Ocular Anatomy Practical

Unit 1	Retina gross anatomy Layers of retina
Unit -2	Visual pathway Lesions of visual pathway
Unit-3	Aqueous Humour Aqueous humour outflow
Unit-4	Sympathetic System Parasympathathetics system
Unit-5	Lacrimal apparatus- parts, structure Lacrimal passage
Unit 6	Higher visual centres

Ocular pathology and microbiology Practical

Unit -1	Sterilization and disinfections used in hospital and ophthalmic practice.
Unit 2	Understanding about the characteristics of bacteria, viruses, fungi and parasites.
Unit 3	Blood cells and Blood collection techniques Infection in general
Unit 4	Bleeding time, clotting time Urine collection method Physical examination of urine Chemical examination of Urine Microscope Examination of urine

Text book-

1-Fundamentals of Microbiology Jeffrey C. Pommerville

Reference book-

1-Fundamentals of Microbiology Jeffrey C. Pommerville

2-Parson. Ramanjit Sihota

Course outcomes (COs):

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

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

CO-PO Mapping

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

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Course code	: BSO-203			
Course Name	: Ocular Physiology & Biochemistry			
Semester /Year	: 2 nd Semester			
	L	T	P	C
	2	2		4

Course Content

Ocular Physiology

Unit 1	Extra ocular muscles Saccades and pursuit Fixatory eye movement
Unit 2	Iris & pupil Crystalline lens and accommodation, mechanism of accommodation- presbyopia Retina physiology & Rodpsin cycle, Night vision and colour vision
Unit 3	Higher Visual Centres Electrophysiological Aspects of lens and cornea

Ocular Biochemistry

Unit 1	Tears film and Ph
Unit 2	Minerals- Na, K, Ca, P, Fe, Cu and Se (requirements availability and properties) with respect to the eye

Text book-

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

Refrance Book-

Ophthalmology A K khurana

Course outcomes (COs):

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

CO1	To understanding the concepts and terminology of ocular physiology.
CO2	To understanding function of various ocular structures.
CO3	To understanding the role of minerals with respect to eyes.

CO4	To recognize the different ocular structure.
CO5	To creating the phenomenon of vision.
CO6	To remembering the extra ocular parts.

CO-PO Mapping

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

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

Course code	: BSO-203P			
Course Name	: Ocular Physiology & Biochemistry			
Semester /Year	: 2 nd Semester			
	L	T	P	C
			2	1

Course Content

Ocular Physiology

Unit 1	Iris & pupil Crystalline lens and accommodation, mechanism of accommodation.
Unit 2	Physiology of Tear film.
Unit 3	Retina physiology & Rhodopsin cycle.
Unit 4	Night vision and colour vision

Ocular Biochemistry

Unit 1	Tears film and Ph
Unit 2	Minerals- Na, K, Ca, P, Fe, Cu and Se (requirements availability and properties) with respect to the eye

Course outcomes (COs)

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

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

CO-PO Mapping

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

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

Text book-

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

Refrance Book-

Ophthalmology A K khurana

Course code	: BSO-204
Course Name	: Optics
Semester /Year	: II Semester

	L	T	P	C
	2	1		3

Course Content

Unit 1	Emmetropia & Ammetropia: Myopia, Hypermetropia, Astigmatism □ Spherical Ammetropia correction □ Aperture stop: Entrance and Exitpupil
Unit 2	Properties of an Ideal Ophthalmic Lens material. □

	Current Ophthalmic Lens materials-Crown glass, CR-39, Polycarbonate & Trivex. □ Lens Surfacing □ Defects of optical lenses. □ Lens types & design (spheric, aspheric, lenticular lenses) □ High index lens □ Revision of Aberrations and its correction
Unit 3	Reflection and refraction of light- laws of reflection and refraction. Total internal reflection. Refractive index -Its relation with wavelength, Fermat's and Huygen's Principle, Derivation of laws of reflection and refraction (Snell's law) from these principles
Unit 4	Principal and procedure of retinoscopy and their types. Objective and subjective method of refraction.
Unit 5	Accommodation & Convergence -1, Far point, near point, range, amplitude of accommodation

Text books-

1. Borish's Clinical Refraction
2. Duke elder Practice of refraction

Reference books –

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

Course outcomes (COs):

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

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

CO-PO Mapping

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

3: Highest Correlated, 2: Medium C

Course code	: BSO-204P
Course Name	: Optics
Semester /Year	: II Semester

	L	T	P	C
			2	1

Course Content

Unit 1	Emmetropia & Ammetropia: Myopia, Hypermetropia, Astigmatism □ Spherical Ammetropia correction □ Aperture stop: Entrance and Exitpupil
Unit 2	Properties of an Ideal Ophthalmic Lens material. □ Current Ophthalmic Lens materials-Crown glass, CR-39, Polycarbonate & Trivex. □ Lens Surfacing □ Defects of optical lenses. □ Lens types & design (spheric, aspheric, lenticular lenses) □ High index lens □ Revision of Aberrations and its correction
Unit 3	Reflection and refraction of light- laws of reflection and refraction. Total internal reflection. Refractive index -Its relation with wavelength, Fermat's and Huygen's Principle, Derivation of laws of reflection and refraction (Snell's law) from these principles
Unit 4	Principal and procedure of retinoscopy and their types. Objective and subjective method of refraction.
Unit 5	Accommodation & Convergence -1, Far point, near point, range, amplitude of accommodation

Course outcomes (COs):

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

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

CO-PO Mapping

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

3: Highest Correlated, 2: Medium C

Text books-

1. Borish's Clinical Refraction
2. Duke Elder Practice of refraction

Reference books –

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

Bachelor's of Optometry 3rd Semester

Course code	: BSO-301			
Course Name	: Pharmacology & Pharmacy			
Semester /Year	: III Semester			
	L	T	P	C
	3			3

Course content

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

Text book-

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

Reference book-

1. Comprehensive Ophthalmology A K khurana
2. Parson. Ramanjit Sihota

Course outcomes (Cos):

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

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

CO-PO Mapping

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

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

Course code	: BSO-301P			
Course Name	: Pharmacology & Pharmacy Practical			
Semester /Year	: 3 rd Semester			

			2	1
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Course content

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

Course outcomes (Cos):

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

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

CO-PO Mapping

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

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

Course code	: BSO-302
Course Name	: Refraction (Including prescription making and fitting of glasses)
Semester /Year	: 3 rd Semester

	L	T	P	C
	3			3

Unit 1	Subjective Refraction Principle and fogging Fixed astigmatic dial (Clock dial), Combination of fixed and rotator block test), J.C.C dial (Fan) Duo chrometest Binocular balancing- alternate occlusion, prism dissociation, dissociate Duo chrome balance, Borish dissociated fogging
Unit 2	Describe Emmetropia & Ammetropia, Classification of refractive error.
Unit 3	Refractive errors- Myopia Hypermetropia Astigmatism Aphakia/Pseudo-phakia

Text books-

1. Borish's Clinical Refraction
2. Duke elder Practice of refraction

Refrance books –

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

Course outcomes (Cos):

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

CO1	To understand the names of various optical content of eye & their measurements..
CO2	To analyzing about various refractive anomalies of the eye.
CO3	To applying all the theoretical skills on practical purpose.
CO4	To evaluating the concept of different types and design of ophthalmic lenses.

CO5	To understanding the various aspects of measuring visual acuity
CO6	To creating knowledge about various optical defects of eye.

CO-PO Mapping

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

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

Course code	: BSO-302P			
Course Name	: Refraction (Including prescription making and fitting of glasses)			
Semester /Year	: 3 rd Semester			
	L	T	P	C
			2	1

Unit 1	Subjective Refraction Principle and fogging Fixed astigmatic dial (Clock dial), Combination of fixed and rotator block test), J.C.C dial (Fan) Duo chrome test Binocular balancing- alternate occlusion, prism dissociation, dissociate Duo chrome balance.
Unit 2	Describe Emmetropia & Ammetropia, Classification of refractive error.
Unit 3	Refractive errors- Myopia Hypermetropia Astigmatism Aphakia/Pseudo-phakia

Course outcomes (Cos):

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

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

CO-PO Mapping

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

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

Text books-

1. Borish's Clinical Refraction
2. Duke elder Practice of refraction

Reference books –

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

Course code	: BSO-303
Course Name	: Investigative Ophthalmology
Semester /Year	: 3 rd Semester

	L	T	P	C
	3			3

Unit 1	Binocular Vision and Space perception. Relative subjective visual direction. Retino motor value, Grades of BSV, SMP and Correspondence, Fusion, Diplopia, Horopter, Physiological Diplopia and Suppression, Stereopsis, Panum's area, BSV. Stereopsis and monocular clues –significance, clinical applications. Theories of Binocular vision
Unit 2	Anatomy of Extra Ocular Muscles. Recti and Obliques, LPS, Innervation & Blood Supply, Physiology of Ocular movements. Center of rotation, Axes of Fick. Action of

	individual muscle. Laws of ocular motility Sherrington's law, Hering's law.
Unit 3	Unocular & Binocular movements - fixation, saccadic & pursuits. Version & Vergence. Fixation & field of fixation

Text book-

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

Reference book-

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

Course outcomes (Cos):

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

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

CO-PO Mapping

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

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

Course code	: BSO-303P
Course Name	: Investigative Ophthalmology Practical
Semester /Year	: 3 rd Semester

	L	T	P	C
			2	1

Unit 1	Binocular Vision and Space perception. Relative subjective visual direction. Retino motor value, Grades of BSV, SMP and Correspondence, Fusion, Diplopia, Horopter, Physiological Diplopia and Suppression, Stereopsis, Panum's area, BSV. Stereopsis and monocular clues –significance, clinical applications. Theories of Binocular vision
Unit 2	Anatomy of Extra Ocular Muscles. Rectus and Obliques, LPS, Innervation & Blood Supply, Physiology of Ocular movements. Center of rotation, Axes of Fick. Action of individual muscle. Laws of ocular motility Sherrington's law, Hering's law,
Unit 3	Unocular & Binocular movements - fixation, saccadic & pursuits. Version & Vergence. Fixation & field of fixation

Course outcomes (Cos):

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

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

CO-PO Mapping

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

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

Course code	: BSO-304
Course Name	: Ophthalmic Instrument & appliances
Semester /Year	: 3 rd Semester

	L	T	P	C
	3			3

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

Text book-

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

Refrence book-

1. A K khurana Ophthalmology
2. Parson. Ramanjit Sihota

Course outcomes (Cos):

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

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

CO-PO Mapping

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

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

Course code	: BSO-304P
Course Name	: Ophthalmic Instrument & appliances Practical
Semester /Year	: 3 rd Semester

	L	T	P	C
			2	1

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

Course outcomes (Cos):

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

CO1	To understanding the method of using indirect ophthalmoscope and their advantage
CO2	To evaluating the difference between contact and non contact tonometer.
CO3	To explaining the advantage of automated perimetry over manual.
CO4	To Understanding the use of lensometer.

CO5	To evaluating nerve fibre layer.
CO6	To evaluating the knowledge of slit lamp examination.

CO-PO Mapping

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

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

Text book-

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

Reference book-

1. A K khurana Ophthalmology
2. Parson. Ramanjit Sihota

Bachelor's of Optometry IV Semester

Course code	: BSO-401			
Course Name	: Pharmacology & Pharmacy			
Semester /Year	: IV Semester			
	L	T	P	C
	3			3

Course Content

Unit 1	Diagnostic & Therapeutic applications of drugs used in Ophthalmology: Diagnostic Drugs & biological agents used in ocular surgery, Anesthetics used in ophthalmic procedure
Unit 2	Anti- glaucoma drugs; Pharmacotherapy of ocular infections– Bacterial, viral, fungal
Unit 3	How to prepare following eye drops: a. Vancomycin eye drops b. Cefazidone eye drops c. Fortified tobramycin eye drops d. Fortified Cefazoline eye drops e. EDTA eye drops f. Ascorbate eye drops g. Mitomycin eye drops h. Voriconazole eye drops i. Sodium citrate eye

	drops, MK Media preparation.
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Text book-

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

Reference book-

1. Comprehensive Ophthalmology A K khurana
2. Parson. Ramanjit Sihota

Course outcomes (Cos):

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

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

CO-PO Mapping

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

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

Course code	: BSO-401P
Course Name	: Pharmacology & Pharmacy
Semester /Year	: IV Semester

	L	T	P	C
			2	1

Course Content

Unit 1	Diagnostic & Therapeutic applications of drugs used in Ophthalmology: Diagnostic Drugs & biological agents used in ocular surgery, Anesthetics used in ophthalmic procedure
Unit 2	Anti- glaucoma drugs; Pharmacotherapy of ocular infections– Bacterial, viral, fungal
Unit 3	How to prepare following eye drops: a. Vancomycin eye drops b. Cefazidime eye drops c. Fortified tobramycin eye drops d. Fortified Cefazoline eye drops e. EDTA eye drops f. Ascorbate eye drops g. Mitomycin eye drops h. Voriconazole eye drops i. Sodium citrate eye drops, MK Media preparation.

Text book-

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

Reference book-

3. Comprehensive Ophthalmology A K khurana
4. Parson. Ramanjit Sihota

Course outcomes (Cos):

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

CO1	To understanding the concept & terminologies of Pharmacology and ocular preparations.
CO2	To remembering the routes of drug administration in ophthalmology
CO3	To applying of different pharmaceutical agents in the management of Ocular diseases.
CO4	To applying diagnostic and therapeutic drugs in ophthalmology.

CO5	To creating the procedure for installing cycloplegics and mydratics to see the effect of drugs.
CO6	To remembering various ways of disinfection

CO-PO Mapping

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

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

Course code	: BSO-402			
Course Name	: Refraction (Including prescription making and fitting of glasses)			
Semester /Year	: IV Semester			
	L	T	P	C
	3			3

Course Content

Unit 1	Presbyopia Accommodation Convergence – Far point, near point, ranges. Amplitude of accommodation
Unit 2	Accommodation & Convergence – Methods of measurements NPA,NPC, AC/A ratio.
Unit 3	Optics and Principal of Retinoscopy and their Procedure. Keratoconus

Text Book

- 1.Borish's Clinical Refraction
- 2.Duke elder Practice of refraction

Refrance books –

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

2 Optics & Refraction L.P Aggarwal

Course outcomes (Cos):

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

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

CO-PO Mapping

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

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

Course code	: BSO-402P			
Course Name	: Refraction (Including prescription making and fitting of glasses)			
Semester /Year	: IV Semester			
	L	T	P	C
			2	1

Course Content

Refraction (Practical):-

Unit 1	Presbyopia Accommodation
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	Convergence – Far point, near point, ranges. Amplitude of accommodation
Unit 2	Accommodation & Convergence – Methods of measurements NPA,NPC, AC/A ratio.
Unit 3	Optics and Principal of Retinoscopy and their Procedure. Keratoconus

Text Book

- 1.Borish's Clinical Refraction
- 2.Duke elder Practice of refraction

Refrance books –

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

Course outcomes (Cos):

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

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

CO-PO Mapping

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

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

Course code	: BSO-403
Course Name	: Investigative Ophthalmology
Semester /Year	: IV Semester

	L	T	P	C
	3			3

Course Content-

Unit 1	Convergent strabismus- Accommodative convergent squint- Classification, Investigation and Management, Non accommodative Convergent squint- Classification, Investigation and Management, Divergent Strabismus-Classification, A& V phenomenon, Investigation and Management.
Unit 2	Investigations: History and symptoms, Head Posture, Diplopia , . Charting, PBCT, Nine directions, Binocular field of vision, Amblyopia and Treatment of Amblyopia Maddox rod , Maddox wing, Synaptophore
Unit 3	. Disorders of accommodation

Text book-

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

Refrence book-

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

Course outcomes (Cos):

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

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

CO-PO Mapping

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

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

Course code	: BSO-403P			
Course Name	: Investigative Ophthalmology			
Semester /Year	: IV Semester			
	L	T	P	C
			2	1

Course Content-

Unit 1	Convergent strabismus- Accommodative convergent squint- Classification, Investigation and Management, Non accommodative Convergent squint- Classification, Investigation and Management, Divergent Strabismus-Classification, A& V phenomenon, Investigation and Management.
Unit 2	Investigations: History and symptoms, Head Posture, Diplopia , . Charting, PBCT, Nine directions, Binocular field of vision, Amblyopia and Treatment of Amblyopia Maddox rod , Maddox wing, Synaptophore
Unit 3	. Disorders of accommodation

Text book-

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

Reference book-

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

Course outcomes (Cos):

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

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CO2	To understanding the anatomy of extra ocular muscles and their movement.
CO3	To evaluating the pediatric visual acuity and refraction.
CO4	To analyzing the causes and treatment of amblyopia.
CO5	To understand the uses of synaptophore and its advantages.
CO6	To analyzing the binocular single vision and their grades.

CO-PO Mapping

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

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

Course code	: BSO-404			
Course Name	: Ophthalmic Instrument & appliances			
Semester /Year	: IV Semester			
	L	T	P	C
	3			3

Course Content

Unit 1	Biometry Perimeter – Manual & automated Placido disc
Unit 2	Contrast sensitivity tests Glare acuity tests Colour vision tests
Unit 3	Syringing Gonioscopy Nerve fiber analyzer

Text book-

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

Reference book-

1. A K khurana Ophthalmology
2. Parson. Ramanjit Sihota

Course outcomes (Cos):

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

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

CO-PO Mapping

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

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

Course code	: BSO-404P			
Course Name	: Ophthalmic Instrument & appliances			
Semester /Year	: IV Semester			
	L	T	P	C
	3			3

Course Content

Unit 1	Biometry Perimeter – Manual & automated Placido disc
Unit 2	Contrast sensitivity tests Glare acuity tests Colour vision tests
Unit 3	Syringing Gonioscopy Nerve fiber analyzer

Text book-

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

Reference book-

1. A K khurana Ophthalmology
2. Parson. Ramanjit Sihota

Course outcomes (Cos):

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

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

CO-PO Mapping

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

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

Course code	: BSO-501
Course Name	: Advanced Orthoptics & LVA
Semester /Year	: V th Semester

	L	T	P	C
	3			3

Unit 1	Binocular Vision and Space perception. Relative subjective visual direction. Retino motor value, Grades of BSV, SMP and Correspondence, Fusion, Diplopia, Horopter, Physiological Diplopia and Suppression, Stereopsis, Panum's area, BSV. Stereopsis and monocular clues –significance, clinical applications. Theories of Binocular vision
Unit 2	Convergent strabismus- Accommodative convergent squint- Classification, Investigation and Management,
Unit 3	Non accommodative Convergent squint- Classification, Investigation and Management, Divergent Strabismus-Classification, A& V phenomenon, Investigation and Management and Amblyopia
Unit 4	Definitions & classification of Low vision , Global Prevalence, causes, symptoms of low vision and Psycho-social implication of low vision

Text book-

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

Refrence book-

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

Course outcomes (COs):

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

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

CO-PO Mapping

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

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

Course code	: BSO-501P
Course Name	: Advanced Orthoptics & LVA Practical
Semester /Year	: V th Semester

	L	T	P	C
			2	1

Unit 1	Binocular Vision and Space perception. Relative subjective visual direction. Retino motor value, Grades of BSV, SMP and Correspondence, Fusion, Diplopia, Horopter, Physiological Diplopia and Suppression, Stereopsis, Panum's area, BSV. Stereopsis and monocular clues –significance, clinical applications. Theories of Binocular vision
Unit 2	Convergent strabismus- Accommodative convergent squint- Classification, Investigation and Management,
Unit 3	Non accommodative Convergent squint- Classification, Investigation and Management, Divergent Strabismus-Classification, A& V phenomenon, Investigation and Management.
Unit 4	Definitions & classification of Low vision , Global Prevalence, causes, symptoms of low vision and Psycho-social implication of low vision

Course outcomes (COs):

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

CO1	To evaluating the measurement of angle of squint.
CO2	To remembering the disorders of accommodation.
CO3	To understanding the convergence anomalies and their clinical significance.

CO4	To evaluating the causes, treatment and management of amblyopia.
CO5	To creating the difference between paralytic and non paralytic squint.
CO6	To understanding the classification of strabismus.

CO-PO Mapping

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

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

Course code : BSO-502				
Course Name : Clinical Refraction & Contact lens				
Semester /Year : V th Semester				
	L	T	P	C
	3			3

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

Text book-

- 1.Theories and practice of Optics and refraction

- 2.Contact lens Primer Monika Chaudhary

Refrance book-

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

Course outcomes (COs):

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

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

CO-PO Mapping

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

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

Course code	: BSO-502P
Course Name	: Clinical Refraction & Contact lens Practical
Semester /Year	: V th Semester

	L	T	P	C
			2	1

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

Course outcomes (COs):

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

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

CO-PO Mapping

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

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

Course code	: BSO-503
Course Name	: Community Ophthalmology & Ocular Diseases
Semester /Year	: V th Semester

	L	T	P	C
	3			3

Community Ophthalmology

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

Ocular Diseases

Unit 1	Lids- Inflammatory Disorders, Eyelash Disorders & Anamolies in position of lid margins
Unit 2	Conjunctiva- Inflammation of Conjunctiva, Degenerative condition, Tumors,
Unit 3	Cornea- Congenital anomalies, Inflammations of cornea, Cornea degenerations, Ectatic conditions of cornea, Abnormalities of corneal transparency and Corneal surgery.
Unit 4	Uveal tract- Uveitis, Non-Infectious uveitis, Degenerative conditions of uveal tract and Tumours of uveal tract.
Unit 5	Lens- Catract, Displacement of lens and Congenital Anomalies of Lens.
Unit 6	Dry eye diseases, Dacryocystitis, and DCT

Text Book-

- 1.Comprehensive .Ophthalmology text book A K khurana
- 2.Parsons' Diseases of eye fifth edition- Ramanjit Sihota

Refrance Book-

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

Course outcomes (Cos):

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

CO1	To understanding the role of optometrist in public health
CO2	Analyzing the role of optometrist in school screening programme
CO3	Analyzing the concept of clinical features of the diseases for the management of ocular diseases.
CO4	To understanding the National programme for control of blindness.
CO5	Utilizing the concept of clinical features of the diseases for the differential diagnosis of the ocular diseases
CO6	To understanding the Diseases of Anterior segment and their management.

CO-PO Mapping

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

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

Course code	: BSO-503P
Course Name	: Community Ophthalmology & Ocular Diseases Practical
Semester /Year	: V th Semester

	L	T	P	C
			2	1

Community Ophthalmology

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

Ocular Diseases

Unit 1	Lids- Inflammatory Disorders, Eyelash Disorders & Anamolies in position of lid margins
Unit 2	Conjunctiva- Inflammation of Conjunctiva, Degenerative condition, Tumors,
Unit 3	Cornea- Congenital anomalies, Inflammations of cornea, Cornea degenerations, Ectatic conditions of cornea, Abnormalities of corneal transparency and Corneal surgery.
Unit 4	Uveal tract- Uveitis, Non-Infectious uveitis, Degenerative conditions of uveal tract and Tumours of uveal tract.
Unit 5	Lens- Catract, Displacement of lens and Congenital Anomalies of Lens.
Unit 6	Dry eye diseases, Dacryocystitis, and DCT

Course outcomes (Cos):

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

CO1	To understanding the role of optometrist in public health
CO2	Analyzing the role of optometrist in school screening programme
CO3	Analyzing the concept of clinical features of the diseases for the management of ocular diseases.
CO4	To understanding the National programme for control of blindness.
CO5	Utilizing the concept of clinical features of the diseases for the differential diagnosis of the ocular diseases
CO6	To understanding the Diseases of Anterior segment and their management.

CO-PO Mapping

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

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

Text Book-

- 1.Comprehensive .Ophthalmology text book A K khurana
- 2.Parsons' Diseases of eye fifth edition- Ramanjit Sihota

Refrence Book-

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

Course code	: BSO-504
Course Name	: Ophthalmic Appliances, Eye bank & Management of OT
Semester /Year	: V th Semester

	L	T	P	C
	3			3

Unit 1	Indirect Ophthalmoscope Direct Ophthalmoscope Slit Lamp Fundus Camera
Unit 2	Lensometer. Lens gauge Tonometer – Contact and Non contact Auto-refractometer Keterometer
Unit 3	Biometry Perimeter – Manual & automated Placido disc
Unit 4	Contrast sensitivity tests Glare acuity tests Colour vision tests
Unit 5	Preservation of Tissue - Procedures and Methods Preservation Media Transport and Storage of Tissue
Unit 6	Sterlization

Text Book-

- 1.Comprehensive Ophthalmology text book-A K khurana
- 2.Parsons' Diseases of eye fifth edition-Ramanjit Sihota

Refrance Book-

1. Comprehensive Ophthalmology text book -A K khurana

Course outcomes (Cos):

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

CO1	To remembering the syringing and lacrimal functions test.
CO2	To understanding the role of biomicroscopy.
CO3	To Evaluating the anterior and posterior segments in eye.
CO4	To remembering the fundus photography .
CO5	To understanding the ophthalmic drugs uses in OT
CO6	To understanding the procedure and storage of eye in EYE BANK. Safety aspects in eye department, OT instruments and sterility.

CO-PO Mapping

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

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

Course code	: BSO-504P			
Course Name	: Ophthalmic Appliances, Eye bank & Management of OT			
Semester /Year	: V th Semester			
	L	T	P	C
	-	-	2	1

Course content

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

Unit 4	Contrast sensitivity tests Glare acuity tests Colour vision tests
Unit 5	Preservation of Tissue - Procedures and Methods Preservation Media Transport and Storage of Tissue
Unit 6	Sterilization

Course outcomes (Cos):

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

CO1	To remembering the syringing and lacrimal functions test.
CO2	To understanding the role of biomicroscopy.
CO3	To Evaluating the anterior and posterior segments in eye.
CO4	To remembering the fundus photography .
CO5	To understanding the ophthalmic drugs uses in OT
CO6	To understanding the procedure and storage of eye in EYE BANK. Safety aspects in eye department, OT instruments and sterility

CO-PO Mapping

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

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

Text Book-

- 1.Comprehensive Ophthalmology text book-A K khurana
- 2.Parsons' Diseases of eye fifth edition-Ramanjit Sihota

Refrance Book-

1. Comprehensive Ophthalmology text book -A K khurana

Course code	: BSO-601
Course Name	: Advanced Orthoptics & LVA
Semester /Year	: VI th Semester

	L	T	P	C
	3			3

Unit 1	Vertical strabismus-Classification, Investigation and Management, Paralytic Strabismus--Classification, Investigation and Management, Distinction from comitant and restrictive Squint
Unit 2	Investigations: History and symptoms, Head Posture, Diplopia Charting, Hess chart, PBCT, Nine directions, Binocular field of vision, Nystagmus.
Unit 3	Disorders of accommodation Neural aspects of binocular vision Neural aspects of binocular vision.
Unit 4	Definitions & classification of Low vision Global Prevalence, causes, symptoms of low vision Psycho-social implication of low vision

Text book-

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

Reference book-

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

Course outcomes (COs):

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

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

CO-PO Mapping

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

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

Course code	: BSO-601P
Course Name	: Advanced Orthoptics & LVA
Semester /Year	: VI th Semester

	L	T	P	C
			2	1

Course Content

Unit 1	Vertical strabismus-Classification, Investigation and Management, Paralytic Strabismus--Classification, Investigation and Management, Distinction from comitant and restrictive Squint
Unit 2	Investigations: History and symptoms, Head Posture, Diplopia Charting, Hess chart, PBCT, Nine directions, Binocular field of vision, Nystagmus.
Unit 3	Disorders of accommodation Neural aspects of binocular vision Neural aspects of binocular vision.
Unit 4	Definitions & classification of Low vision Global Prevalence, causes, symptoms of low vision Psycho-social implication of low vision

Text book-

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

Refrence book-

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

Course outcomes (COs):

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

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

CO-PO Mapping

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

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

Course Code	: BSO-602			
Course Name	: Clinical Refraction & contact lens			
Semester /Year	: VI th Year			
	L	T	P	C
	3			3

Course Content

Unit 1	Insertion & removable of RGP Pre- fitting evaluation ,Fitting assessments (dynamic & static) , Properties of Types of fit (steep, optimal, flat) , Tear lens calculation , Calculation (SAM, FAP) & finalization of RGP Calculation & finalization of RGP
Unit 2	Common handling instructions ,Do's & Don't of RGP , Care & maintenance of RGP , Cleaning ,Rinsing , Disinfecting (one step & two step).

	Protein removers & MPS
Unit 3	Types of contact lens deposit Complications , Inflammation & staining related Oedema & Hypoxia related Mechanical & pressure related Management of Complication Cosmetic Contact Lenses Low Vision Aids
Unit 4	Accommodation & Convergence: Anomalies & Accommodation & Convergence relationship
Unit 5	Subjective Refraction , Principle and fogging , Fixed astigmatic dial (Clock dial), Combination of fixed and rotator block test), J.C.C dial (Fan) , Duo chrome test , Binocular balancing- alternate occlusion, prism dissociation, dissociate , Duo chrome balance.

Text book-

1.Theories and practice of Optics and refraction

2.Contact lens Primer Monika Chaudhary

Refrance book-

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

Course outcomes (COs):

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

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

CO-PO Mapping

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

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

Course Code	: BSO-602P
Course Name	: Clinical Refraction & contact lens
Semester /Year	: VI th Year

	L	T	P	C
			2	1

Course Content

Unit 1	Insertion & removable of RGP Pre- fitting evaluation ,Fitting assessments (dynamic & static) , Properties of Types of fit (steep, optimal, flat) , Tear lens calculation , Calculation (SAM, FAP) & finalization of RGP Calculation & finalization of RGP
Unit 2	Common handling instructions ,Do's & Don't of RGP , Care & maintenance of RGP , Cleaning ,Rinsing , Disinfecting (one step & two step). Protein removers & MPS
Unit 3	Types of contact lens deposit Complications , Inflammation & staining related Oedema & Hypoxia related Mechanical & pressure related Management of Complication Cosmetic Contact Lenses Low Vision Aids
Unit 4	Accommodation & Convergence: Anomalies & Accommodation & Convergence relationship
Unit 5	Subjective Refraction , Principle and fogging , Fixed astigmatic dial (Clock dial), Combination of fixed and rotator block test), J.C.C dial (Fan) , Duo chrome test , Binocular balancing- alternate occlusion, prism dissociation, dissociate , Duo chrome balance.

Text book-

1.Theories and practice of Optics and refraction

2.Contact lens Primer Monika Chaudhary

Refrance book–

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

Course outcomes (COs):

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

CO1	To understanding about soft contact lenses material and their properties
CO2	To analyzing complication and their management of contact lenses
CO3	To remembering the management of refractive error.
CO4	To evaluating the indications and contraindications of contact lenses

CO5	To analyzing the pre post operative refractive error.
CO6	To understanding the concept of convergence.

CO-PO Mapping

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

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

Course code	: BSO-603			
Course Name	: Community Ophthalmology & Ocular Diseases			
Semester /Year	: VI th Semester			
	L	T	P	C
	3			3

Community Ophthalmology-

Unit 1	Role of an optometrist in Public Health, Organization and Management of Eye Care Programs Service Delivery models, Health manpower and planning & Health Economics, Evaluation and assessment of health programs.
Unit 2	Optometrist role in school eye health programmes, Basics of Tele Optometry and its application in Public Health, Information, Education and Communication for Eye Care programs.

Ocular Diseases-

Unit 1	Vitrous- Disorders of Vitrous, Vitrectomy
Unit 2	Retina- Disorders of Retina, Vascular disorders of retina, Hypertensive retinopathy, Diabetic Retinopathy, Retinal dystrophies, Retinal Degenrations, Macula Disorders, Retinal Detachment and Tumours of Retina.
Unit 3	Orbit- Proptosis, Anomalies of Orbit, Orbital Infevctions , Orbital tumours and orbital

	blow out fractures.
Unit 4	Ocular Injuries- Mechanical Injuries, Open globe Injuries, Extraocular Lesions and Non-Mechanical Injuries.
Unit 5	Sclera-Inflammations of Sclera, Staphylococci,
Unit 6	Lesions of Visual Pathway, Pupillary Reflexes and their abnormalities and Diseases of Optic Nerve
Unit 7	Glaucoma- Congenital/ Developmental Glaucomas, Primary open angle glaucoma, Primary angle closure glaucoma and Secondary Glaucomas

Course outcomes (Cos):

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

CO1	To understanding the role of optometrist in public health
CO2	Analyzing the role of optometrist in school screening programme
CO3	Analyzing the concept of clinical features of the diseases for the management of ocular diseases.
CO4	To understanding the National programme for control of blindness.
CO5	Utilizing the concept of clinical features of the diseases for the differential diagnosis of the ocular diseases
CO6	To understanding the Diseases of Posterior segment and their management.

CO-PO Mapping

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

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

Text Book-

- 1.Comprehensive .Ophthalmology text book A K khurana
- 2.Parsons' Diseases of eye fifth edition- Ramanjit Sihota

Refrance Book-

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

Course code	: BSO-603P			
Course Name	: Community Ophthalmology & Ocular Diseases			
Semester /Year	: VI th Semester			
	L	T	P	C
			2	1

Community Ophthalmology-

Unit 1	Role of an optometrist in Public Health, Organization and Management of Eye Care Programs Service Delivery models, Health manpower and planning & Health Economics, Evaluation and assessment of health programs.
Unit 2	Optometrist role in school eye health programmes, Basics of Tele Optometry and its application in Public Health, Information, Education and Communication for Eye Care programs.

Ocular Diseases-

Unit 1	Vitrous- Disorders of Vitrous, Vitrectomy
Unit 2	Retina- Disorders of Retina, Vascular disorders of retina, Hypertensive retinopathy, Diabetic Retinopathy, Retinal dystrophies, Retinal Degenrations, Macula Disorders, Retinal Detachment and Tumours of Retina.
Unit 3	Orbit- Proptosis, Anomalies of Orbit, Orbital Infevctions , Orbital tumours and orbital blow out fractures.
Unit 4	Ocular Injuries- Mechanical Injuries, Open globe Injuries, Extraocular Lesions and Non-Mechanical Injuries.
Unit 5	Sclera-Inflammations of Sclera,Staphylomas,

Unit 6	Lesions of Visual Pathway, Pupillary Reflexes and their abnormalities and Diseases of Optic Nerve
Unit 7	Glaucoma- Congenital/ Developmental Glaucomas, Primary open angle glaucoma, Primary angle closure glaucoma and Secondary Glaucomas

Course outcomes (Cos):

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

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CO2	Analyzing the role of optometrist in school screening programme
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CO-PO Mapping

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

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

Text Book-

- 1.Comprehensive .Ophthalmology text book A K khurana
- 2.Parsons' Diseases of eye fifth edition- Ramanjit Sihota

Refrance Book-

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

Course code	: BSO-604
Course Name	: Ophthalmic Appliances, Eye bank & Management of OT
Semester /Year	: VI th Semester

	L	T	P	C
	3			3

Course Content

Unit 1	Syringing and lacrimal functions test Gonioscopy Nerve fiber analyzer
Unit 2	Gonioscopy VKG,ERG,EOG OCT
Unit 3	Flurescein angiography Specular microscopy Nerve fibre analyzer
Unit 4	Publicity- How to donate your eyes Pre operative instruction Post operative instruction

Text Book-

- 1.Comprehensive Ophthalmology text book-A K khurana
- 2.Parsons' Diseases of eye fifth edition-Ramanjit Sihota

Refrance Book-

1. Comprehensive Ophthalmology text book -A K khurana

Course outcomes (Cos):

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

CO1	To remembering the syringing and lacrimal functions test.
CO2	To understanding the role of biomicroscopy.
CO3	To Evaluating the anterior and posterior segments in eye.
CO4	To remembering the fundus photography .
CO5	To understanding the ophthalmic drugs uses in OT
CO6	To understanding the procedure and storage of eye in EYE BANK. Safety aspects in eye department, OT instruments and sterility.

CO-PO Mapping

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

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

Course code	: BSO-604P
Course Name	: Ophthalmic Appliances, Eye bank & Management of OT
Semester /Year	: VI th Semester

	L	T	P	C
			2	1

Course Content

Unit 1	Syringing and lacrimal functions test Gonioscopy Nerve fiber analyzer
Unit 2	Gonioscopy

	VKG,ERG,EOG OCT
Unit 3	Flurescein angiography Specular microscopy Nerve fibre analyzer
Unit 4	Publicity- How to donate your eyes Pre operative instruction Post operative instruction

Text Book-

- 1.Comprehensive Ophthalmology text book-A K khurana
- 2.Parsons' Diseases of eye fifth edition-Ramanjit Sihota

Refrance Book-

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Course outcomes (Cos):

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

CO1	To remembering the syringing and lacrimal functions test.
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Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	1	1	-	2	-	-	-	-	-
CO2	2	1	-	-	-	-	-	2	-	-	-	-
CO3	-	-	-	-	-	-	-	2	1	-	-	1
CO4	-	-	-	-	-	-	-	2	1	-	-	1
CO5	1	-	-	-	-	-	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	1

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

Objectives Of The Course Main Purpose :

1. To achieve general understanding of the Human Biology (Anatomy, Physiology, and Biochemistry).
2. To achieve good understanding of the basic medical sciences as related to ophthalmology.
3. To be able to follow WHO criteria of a Multi Purpose Worker.

Basic Medical Sciences

1. To achieve general understanding of the Human Biology (Anatomy, Physiology, and Biochemistry).
2. To achieve good understanding of the basic medical sciences as related to Ophthalmology (Anatomy, Physiology, Optics, Pharmacology and Microbiology).

Clinical

The objective of the clinical work are to enable a student to work under the supervision of an Ophthalmologist so as to render assistance, develop skills and to perform other optometric jobs.

1. Be able to develop skills to carryout Ophthalmic Investigations.
2. Be able to do refraction work including prescription of glasses, contact lenses, low vision aids.
3. Be able to assess disorder of Ocular motility and uniocular and binocular visual functions and knowledge of principles of non-surgical therapy and indications of surgery.
4. To impart knowledge with regard to common eye diseases with a view to acquaint them in their recognition.
5. To impart training to develop skill in manufacturing of spectacle lenses and contact lenses.
6. To impart knowledge regarding organizations of eye banks and preservation of ocular tissues.
7. To impart knowledge regarding importance and the methodology of conducting surveys for early detection of visual defects, prevalence of ocular diseases and organization of community services like eye camps, schools, clinics and community eye care programme.
8. To impart knowledge regarding the programme of blindness, its causes and principles of rehabilitation of the blind.
9. To get a wide range of exposure and be able to assist in various procedures in Ophthalmology.
10. To learn and develop expertise in the functioning of operation theatre.

Expectations from a trained optometrist

1. Be able to develop skills to carryout Ophthalmic Investigations.
2. Be able to do refraction work including prescription of glasses, contact lenses, low vision aids.
3. Be able to assess disorder of Ocular motility and uniocular and binocular visual functions and knowledge of principles of non-surgical therapy and indications of surgery.
4. To impart knowledge with regard to common eye diseases with a view to acquaint them in their recognition.
5. To impart training to develop skill in manufacturing of spectacle lenses and contact lenses.
6. To impart knowledge regarding organizations of eye banks and preservation of ocular tissues.
7. To impart knowledge regarding importance and importance and the methodology of conducting surveys for early detection of visual defects, prevalence of ocular diseases and organization of community services like eye camps, schools, clinics and community eye care programme.
8. To impart knowledge regarding the programme of blindness, its causes and principles of rehabilitation of the blind.
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