Study & Evaluation Scheme

Of

Bachelor of Optometry

[Applicable w.e.f. Academic Session - 2019-20 till revised]

[As per CBCS guidelines given by UGC]

TEERTHANKER MAHAVEER UNIVERSITY

N.H.-24, Delhi Road, Moradabad, Uttar Pradesh-244001 Website: www.tmu.ac.in

TEERTHANKER MAHAVEER UNIVERSITY
(Established under Govt. of U.P. Act No. 30, 2008)
Delhi Road, Bagarpur, Moradabad (U.P.)

Study & Evaluation Scheme	
SUMMARY	
Institute Name	*Teerthanker Mahaveer University, College of Paramedical Sciences, Delhi Road, Moradabad*
Programme	*Bachelor of Optometry*
Duration	*Four Year Full time (8 semesters)*
Medium	*English*
Minimum Required Attendance	*75%*
Credits	
Maximum Credits	*205*

PROGRAMME OUTCOMES: (POs)

On completion of the programme, the students will be

PO1.	Developing the ability to diagnose and manage various vision abnormalities including refractive errors as well as various eye diseases. **(Attitude)**
PO2.	Developing the ability to practice various sub-specialties of Eye care industry like Contact lens, spectacle dispensing, Orthoptics, Low Vision management, etc. **(Technology savvy/usage)**
PO2.	Developing the ability towards medical ethical as well as critical thinking **(Critical thinking)**
PO3.	Understanding environmental consciousness and societal & Community Eye care concerns in achieving the goal of vision for all. **(Social interaction &effective citizenship)**
PO4.	Developing the ability to communicate effectively both with the patients as well as within the organization for effective team work **(Communication)**
PO5.	Recognizing and understanding the need to engage in life-long learning to upgrade oneself with Eye care innovations **(Lifelong learning)**
PO6.	Developing and applying computer skills in Eye care system and taking entrepreneurial decisions. **(Entrepreneurship)**
PO7.	Applying systematized problem-solving techniques to identify and correct procedural errors to verify the accuracy of ophthalmic diagnosis obtained **(Problem analysis and solving)**
PO8.	Understanding environmental consciousness and societal concerns in achieving sustainable development **(Environment and Sustainability)**

Assessment:

	Internal	External	Total
Theory	40	60	100
Practical	50	50	100

Internal Evaluation (Theory papers):

Class Test-I	Class Test-II	Class Test-III	Attendance	Assignment /work book assignments &viva	Total
Best Two out of Three CTs					
10	10	10	10	10	40

Evaluation Practical's/Dissertations/ProjectReports:

Internal	External	Total
50	50	100

Duration of Examinations:

Internal	External
1.5 Hrs	03Hrs

To qualify the course a student is required to secure a minimum of 45% marks in aggregate including the semester examination and teacher's continuous evaluation. (i.e., both internal and external). A candidate who secures less than 45% of marks in a course shall be deemed to have failed in that course. The student should have minimum CPI50 in aggregate to clear the programme.

- **The student must have qualified all the semesters exam along with supplementary for the commencement of internship.**

Internal Practical Evaluation (50 marks)

The Internal evaluation would also be done by the Internal Examiner based on the experiment performed during the internal examination

During Semester				On the day of Examination	
Experiment	**File Work**	**Viva Voce**	**Attendance**	**Experiment**	**Viva Voce**
5 Marks	10 Marks	10 Marks	10 Marks	5 Marks	10 Marks

External Practical Evaluation (50 marks)

The external evaluation would also be done by the External Examiner based on the experiment performed during the external examination.

Experiment	File Work	Viva Voce	Total Experiment
30 Marks	10Marks	10 Marks	50 Marks

Internal Theory Assessment: 40

Best 2 out of Three CTs	Attendance	Assignments	Total
20Marks	10 marks	10 Marks	40 marks

▪ English Evaluation Scheme

INTERNAL			EXTERNAL		TOTAL
40 Marks			60Marks		
20Marks	10 Marks	10 Marks	40 Marks	20 Marks	
(Best two out of three CTs)	(Oral Assignment)	Attendance	External Written Examination	External Viva	100

*Parameters of External Viva for First Semester

Content	Body Language	Confidence	Question Responsiveness	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	20 Marks

*Parameters of External Viva for Second,Third&Fourth Semester

Content	Body Language	Communication Skills	Confidence	TOTAL
05 Marks	05 Marks	05 Marks	05 Marks	20 Marks

- ***Note:*** ***External Viva will be conducted by 2-member committee comprising***
  - *One Internal Examiner (Course Teacher)*
  - *One External Examiner nominated by University Examination cell.*

Each member will evaluate on a scale of 20 marks and the average of two would be the 20 marks obtained by the students.

Structure of Question paper (Theory externalexamination)

Question paper shall have two sections and examiner shall set questions specific to respective section. Section wise details shall be as mentioned under;

Section-1:	It shall consist of short answer type questions **(answer should not exceed 50 words**). This section will essentially assess COs related to Remembering & Understanding. This section will contain five questions and every question shall have an "or" option. (Questions should be from each unit and the "or" option question should also be from the same unit) each question shall have equal weight age of 2 Marks and total weightage of this section shall be 10 Marks**.**
Section-2:	It shall consist of long answer type questions. This section will also contain five questions and every question should assess a specific CO and should have an "or" option (Questions should be from the entire syllabus and the "or" option question should assess the same CO). Each question shall have equal weightage of 10 Marks and total weightage of this section shall be 50 Marks.
	IMPORTANT NOTES
Note- 1:	*There must be at least one question from the entire syllabus to assess the specific element of the Higher Level of Learning (Thinking). Every question in this section must essentially assess at least one of the following aspects of learning: Applying, Analyzing, Evaluating and Creating/ Designing/ Developing.*
Note- 2:	*The question must be designed in such a way that it assesses the concerned CO in entirety. It means a question could have multiple parts depending upon the requirement of the Specific Course Outcome.*
Note- 3:	*Strictly avoid repetition of questions. Also Assure that there is at least one question assessing every CO. The copies of COs of this course & syllabus is attached for your reference*

Admission to the Next Semester: As per the university norms

Programme Structure: Bachelor of Optometry

A. Introduction:

The Ministry of Health and Family Welfare, accepted in its entirety the definition of an allied and healthcare professional based on the afore-mentioned report, though the same has evolved after multiple consultations and the recommended definition is now as follows-

'Allied and healthcare professionals (AHPs) include individuals involved with the delivery of health or healthcare related services, with qualification and competence in therapeutic, diagnostic, curative, preventive and/or rehabilitative interventions. They work in multidisciplinary health teams in varied healthcare settings including doctors (physicians and specialist), nurses and public health officials to promote, protect, treat and/or manage a person('s) physical, mental, social, emotional, environmental health and holistic well-being.'

Since the past few years, many professional groups have been interacting and seeking guidance on all those who would qualify under the purview of "allied and healthcare professionals". In the healthcare system, statutory bodies exist for clinicians, nurses, pharmacists and dental practitioners; but a regulatory structure for around 50 professions is absent in India. Currently, the Government is considering these professions (as listed Annex-1) under the ambit of the allied and healthcare system. However, this number is subject to changes and modifications over time, particularly considering how quickly new technologies and new clinical avenues are expanding globally, creating newer cadres of such professionals.

Scope and Need for Allied and Healthcare Professionals in the Indian Healthcare System

The quality of medical care has improved tremendously in the last few decades due to the advances in technology, thus creating fresh challenges in the field of healthcare. It is now widely recognized that health service delivery is a team effort involving both clinicians and non-clinicians, and is not the sole duty of physicians and nurses.1Professionals that can competently handle sophisticated machinery and advanced protocols are now in high demand. In fact, diagnosis is now so dependent on technology, that allied and healthcare professionals (AHPs) are vital to successful treatment delivery.

Effective delivery of healthcare services depends largely on the nature of education, training and appropriate orientation towards community health of all categories of health personnel, and their capacity to function as an integrated team. For instance, in the UK, more than 84,000 AHPs, with a range of skills and expertise, play key roles within the National Health Service, working autonomously, in multi-professional teams in various settings. All of them are first-contact practitioners and work across a wide range of locations and sectors within acute, primary and community care. Australia's health system is managed not just by their doctors and nurses, but also by the 90,000 university-trained, autonomous AHPs vital to the system.

As the Indian government aims for Universal Health Coverage, the lack of skilled human resource may prove to be the biggest impediment in its path to achieve targeted goals. The

benefits of having AHPs in the healthcare system are still unexplored in India. Although an enormous amount of evidence suggests that the benefits of AHPs range from improving access to healthcare services to significant reduction in the cost of care, though the Indian healthcare system still revolves around the doctor-centric approach. The privatization of healthcare has also led to an ever-increasing out-of-pocket expenditure by the population. However, many examples assert the need of skilled allied and healthcare professionals in the system, such as in the case of stroke survivors, it is the support of AHPs that significantly enhance their rehabilitation and long-term treatment ensures return to normal life. AHPs also play a significant role to care for patients who struggle mentally and emotionally in the current challenging environment and require mental health support; and help them return to well-being. Children with communication difficulties, the elderly, cancer patients, patients with long term conditions such as diabetes people with vision problems and amputees; the list of people and potential patients who benefit from AHPs is indefinite.

Thus, the breadth and scope of the allied and healthcare practice varies from one end to another, including areas of work listed below:

- Across the age span of human development from neonate to old age;
- With patients having complex and challenging problems resulting from systemic illnesses such as, in the case of diabetes, cardiac abnormalities/conditions and elderly care to name a few;
- Towards health promotion and disease prevention, as well as assessment, management and evaluation of interventions and protocols for treatment;
- In a broad range of settings from a patient's home to community, primary care centers,to tertiary care settings; and
- With an understanding of the healthcare issues associated with diverse socio-economies and cultural norms within the society.

Bachelor of Optometry: Four Years (8 -Semester) CBCS Programme			
Basic Structure: Distribution of Courses			
S.No.	**Type of Course**	**Credit Hours**	**Total Credits**
1	**Discipline Specific Course (DSC)**	**6 Courses of 2 Credit (Total Credit Hrs. 6x2) = 12**	**73**
		15 Courses of 3 Credit (Total Credit Hrs. 15x3) = 45	
		4 Courses of 4 Credit (Total Credit Hrs. 4x4) = 16	
2	**Skill-Enhancement Course (SEC)**	**19 Courses of 1 Credit (Total Credit Hrs. 19x1) = 19**	**78**
		2 Courses of 2 Credit (Total Credit Hrs. 2x2) = 4	
		5 Courses of 3 Credit (Total Credit Hrs. 5x3) = 15	
		2 Courses of 10 Credit (Total Credit Hrs. 2x10) = 20	
		1 Courses of 20 Credit (Total Credit Hrs. 1x20) = 20	
3	**Core Course (CC)**	**5 Courses of 2 Credit (Total Credit Hrs. 5x2) = 10**	**24**
		2 Courses of 3 Credit (Total Credit Hrs. 2x3)= 6	
		2 Courses of 4 Credit (Total Credit Hrs. 2x4)= 8	
4	**Ability-Enhancement Course (AEC)**	**1 Course of 2 Credit (Total Credit Hrs. 1x2) = 2**	**18**
		4 Courses of 3 Credit (Total Credit Hrs. 4x3) = 12	
		1 Courses of 4 Credit (Total Credit Hrs. 1x4) = 4	
5	**Discipline Specific Elective course (DSEC)**	**1 course of 3 Credit (Total Credit Hrs 1x3) =3**	**3**
6	**Open Elective Course (OEC)**	**1 Courses of 3 Credit each (Total Credit Hrs. 1X3) = 3**	**3**
7	**Compulsory Specified Course (CSC)**	**1 Course of 4 Credit (Total Credit Hrs.1X4) =4**	**4**
8	**MOOC**	**1 course of 2 credit each (Total Credit Hrs. 1X2) = 2**	**2**
9	**Value Added Course (VAC)**	**2 Courses of 0 Credit each (Total Credit Hrs. 2X0)= 0**	**0**
TOTAL CREDITS			**205**

Contact hours include work related to Lecture, Tutorial and Practical (LTP), where our institution will have flexibility to decide course wise requirements.

B. Choice Based Credit System(CBCS)

❖ CHOICE BASED CREDIT SYSTEM(CBCS)

Choice Based Credit System (CBCS) is a versatile and flexible option for each student to achieve his target number of credits as specified by the UGC and adopted by our University.
The following is the course module designed for the Bachelor of Optometry programme:

- ✓ ***Discipline Specific Course (DSC):***Discipline Specific courses of Bachelor of Optometry programme will provide a holistic approach to clinical or practical education, giving students an overview of the field, a basis to build and specialize upon. These courses are the strong foundation to establish Optometry knowledge and provide broad multi-disciplined knowledge can be studied further in depth during the electivephase.
  The Discipline Specific courses will provide more practical-based knowledge, case-based lessons and collaborative learning models. It will train the students to analyze, decide, and lead-rather than merely know-while creating a common student experience that can foster deep understanding, develop decision-making ability and contribute to the hospital and community at large.
  A wide range of Discipline Specific courses provides groundwork in the Ocular Anatomy & Physiology, Spectacle lenses dispensing, Ocular Diseases, Contact lenses, Binocular Vision, etc.
  The integrated foundation is important for students because it will not only allow them to build upon existing skills, but to explore other options like efficiently running an eye clinic, an optical outlet, can work as a specialist lens trainer, or get into manufacturing of various ophthalmic products like Ophthalmic drugs, ophthalmic lenses, spectacle frames, Contact Lenses,etc.
  Department offers Discipline Specific courses from semester-I to Semester VI with varying credits depending upon the importance of the course in the field of Optometry as already described in above table.

- ✓ ***Core Course (CC):***Core courses of Bachelor of Optometry programme are compulsory courses that are required to be studied by the students as a core requirement which acts as supporting course for better understanding of the Discipline Specific Course. Department have Core Courses spread from I semester to VI Semester like General Anatomy & Physiology, Medical Psychology, Ethics,etc.

- ✓ ***Ability Enhancement Course (AEC):*** As per the guidelines of Choice Based Credit System (CBCS) for all Universities, including the private Universities, the Ability Enhancement Course (AEC) is a course designed to develop the ability of students in communication (especially English) and other related courses where they might find it difficult to communicate at a higher level in their prospective job at a later stage due to lack of practice and exposure. Students are motivated to learn the theories, fundamentals and tools of communication which can help them develop and sustain in the corporate environment and culture. Department offers AECs from I semester to IV Semester. Each AEC will be of different credits.

- ✓ ***Skill Enhancement Course (SEC):*** This course is designed to provide value-based and/or skill-based knowledge. Department offers SECs from I Semester to VIII Semester. Each SEC will carry different credits.

- ✓ ***Open Elective Course (OEC):***Open Elective is an interdisciplinary additional subject that is compulsory in the fifth semester of a programme. It carries total of 2credits

✓ ***Compulsory Specified Course (CSC):*** This is a compulsory course that does not have any choice and will be of 4 credits. Each student of Bachelor of Optometry programme has to compulsorily pass the CSC course.

✓ ***Value Added Course (VAC):*** A value added course is a non-credit course which is basically meant to enhance general ability of students in areas like soft skills, quantitative aptitude and reasoning ability - required for the overall development of a student and at the same time crucial for industry/corporate demands and requirements. The student possessing these skills will definitely develop acumen to perform well during the recruitment process of any premier organization and will have the desired confidence to face the interview. Moreover, these skills are also essential in day-to-day life of the corporate world. The aim is to nurture every student for making effective communication, developing aptitude and a general reasoning ability for a better performance, as desired in corporate world. There shall be one course each in Semester III & Semester IV and will carry no credit, however, it will be compulsory for every student to pass these courses with minimum 45% marks to be eligible for the certificate. These marks will not be included in the calculation of CGPI. Students have to specifically be registered in the specific course of the respective semesters.

✓ ***Massive open online course (MOOC):***MOOC is an online course aimed unlimited participation and open access via web. In addition to traditional course materials, such as contact lens online evaluation, Ocular diseases, binocular vision etc. Department offers MOOC course in fifth semester which carry total two credits.

✓ ***Discipline Specific Elective Course (DSEC) :***Discipline Specific Elective Course (DSEC) is offered in semester fourth where two course will be offered, out of which only one course will be selected by students which carry 3credits

C. Programme Specific Outcomes(PSOs)

The learning and abilities or skills that a student would have developed by the end of four-year Bachelor of Optometry Programme.

PSO1.	Understanding the basic concepts & theories related to applied science, human anatomy & physiology, biochemistry, ocular anatomy & physiology
PSO2.	Understanding the concepts & theories, techniques & Procedures used in optometry**.**
PSO3.	Understanding & applying quality assurance, safety measures and maintenance of ophthalmic instruments
PSO4.	Analyzing eye environmental factors & selecting the relevant optical mode of correction **&**Evaluating different optical correction technique
PSO6.	Evaluating & determining tools, technique, methods, tests used in optometry
PSO7.	Designing & planning of new techniques, procedure for patient and clinic management.

D. Pedagogy & Unique practices adopted: "Pedagogy is the method and practice of teaching, especially for teaching an academic subject or theoretical concept". In addition to conventional time-tested lecture method, the institute will **emphasize on experiential learning.**

1. Role Play & Simulation: Role-play and simulation are forms of experiential learning. Learners take on different roles, assuming a profile of a character or personality, and interact and participate in diverse and complex learning settings. Role-play and simulation function as learning tools for teams and groups or individuals as they "play" online or face-to-face. They alter the power ratios in teaching and learning relationships between students and educators, as students learn through their explorations and the viewpoints of the character or personality they are articulating in the environment. This student-centered space can enable learner-oriented assessment, where the design of the task is created for active student learning. Therefore, role-play& simulation exercises such as virtual share trading, marketing simulation etc. are being promoted for the practical-based experiential learning of our students.

2. Video Based Learning (VBL) & Learning through Movies (LTM): These days technology has taken a front seat and classrooms are well equipped with equipment and gadgets. Video-based learning has become an indispensable part of learning. Similarly, students can learn various concepts through movies. In fact, many teachers give examples from movies during their discourses. Making students learn few important theoretical concepts through VBL & LTM is a good idea and method. The learning becomes really interesting and easy as videos add life to concepts and make the learning engaging and effective. Therefore, our institute is promoting VBL & LTM, wherever possible.

3. Special Guest Lectures (SGL)&Extra Moral Lectures (EML): Some topics/concepts need extra attention and efforts as they either may be high in difficulty level or requires experts from specific industry/domain to make things/concepts clear for a better understanding from the perspective of the industry. Hence, to cater to the present needs of industry we organize such lectures, as part of lecture-series and invite prominent personalities from academia and industry from time to time to deliver their vital inputs and insights.

4. Special assistance programme for slow learners: Special classes are arranged for slow learners. They are assisted patiently and consistently. Motivation is one of the most essential requirements to help them continue learning. Proper acknowledgement and praise help the overall development of such student.

5. Orientation programme: Two-week programme is arranged to introduce students to college services which will support their educational and personal goals. To facilitate initial academic advisement, course selection and registration, creating an atmosphere that minimizes anxiety, promotes positive attitude and stimulates excitement for learning. It also helps knowledge of scope, information regarding academic and student service resources and programme. It provides a welcoming atmosphere for students to meet faculty, staff and continuing students, as well as other new students.

6. Mentoring scheme: Every student is provided with a faculty mentor to help him/her in their personal & academic issues. The mentor maintains a register along with the mentor mentee booklet provided to all students. In that book all the details of student are filled and every month 2 times they meet with their mentor. Mentor filled the details of meeting in every student's register and tries to solve the issue and after solving the issue it updated in the register.

7. Industry Focused programme: Establishing collaborations with various industry partners to deliver the programme on sharing basis. The specific courses/contents are to be delivered by industry experts to provide practice-based insight to the students.

8. Career &Personal Counseling We have training and placement cell for career and personal counseling of the students. The training & placement cell make necessary arrangement for the interview of the students for internship as well as final placement of the students.

9. Extra-curricular Activities: organizing& participation in extracurricular activities will be mandatory to help students develop confidence & face audience boldly. It brings out their leadership qualities along with planning & organizing skills. Students undertake various cultural, sports and other competitive activities within and outside then campus. This helps them build their whole some personality.

10. Participation in Workshops, Seminars & writing & Presenting Papers We are encouraging our students to participate in these types of activities. Most of our students are participating in these types of activities.

11. Formation of Student Clubs, Membership &Organizing& Participating events We have student club and our students are taking part in many events like youth festival and other activities those are performed in our Universities as well as in other Universities.

12. Capability Enhancement &Development Schemes: We are running some schemes like soft skill development, remedial coaching, yoga and meditation and personal counseling to enhance the capability and holistic development of the students.

13. Library Visit & Utilization of E-Learning Resources: The students are encouraged to visit the college library and university central library and utilize the resources like books, journals, e-journals, etc. to enhance and upgrade their knowledge. For this we have provision of Library schedule in our time table so student can use that time to ready different books and use E learn in library. We have well developed and organized library in our college as well as central library in the university campus.

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 8thsemester) either from TMMRC & RC, Department of Ophthalmology or from any other recognized eye institute/hospital after getting a NOC from the College of Paramedical Sciences.

- The University shall issue a provisional degree of Bachelor in Optometry on passing the final examination after the completion of internship on demand by

the candidate.

- ❖ The internee shall be entrusted with optometry responsibilities under direct supervision of Senior Optometrist. They shall not be working independently.

- ❖ Internee will not issue certified copy of investigation reports or other related documents under their signature.

Internal Evaluation:

BCO-S-751

Internal marks will be given on the basis of following criteria:

PROGRESS REPORT	VIVA	PRESENTATION
20	10	20

External Evaluation:

External marks will also be given by external examiner on the basis of following criteria:

LOG BOOK	VIVA	PRESENTATION
20	10	20

Internal Evaluation:

Internal marks will be given on the basis of following criteria:

1. **BCO-S-851:**

PROGRESS REPORT	VIVA	SKILLED BASED TEST
25	10	15

2. **BCO-S-852:**

PROGRESS REPORT	PRESENTATION	VIVA
20	20	10

External Evaluation:

External marks will also be given by external examiner on the basis of following criteria:

1. **BCO-S-851:**

VIVA	PRESENTATION	LOG BOOK
20	20	10

2. BCO-S-852:

THESIS	PRESENTATION	VIVA
20	20	10

Internship Log Book

The Log Book submitted by the candidate will be duly verified & a viva voce shall be conducted on the same at the time of Practical Examination of final year.

Study &Evaluation Scheme

Bachelor of Optometry - I Semester

S.NO.	CATEGORY	COURSE CODE	COURSE NAME	PERIODS			CREDITS	EVALUATION SCHEME		
				L	T	P		INTERNAL	EXTERNAL	TOTAL
1	CC-1	BCO-S-101	General Anatomy	4	-	-	4	40	60	100
2	CC-2	BCO-S-102	General Physiology	4	-	-	4	40	60	100
3	CC-3	BCO-S-103	General Bio-Chemistry	3	-	-	3	40	60	100
4	DSC-1	BCO-S-104	Geometrical Optics I	4	-	-	4	40	60	100
5	CC-4	BCO-S-105	Nutrition	3	-	-	3	40	60	100
6	AEC-1	TMUGE 101	English Communication -I	2	-	2	3	40	60	100
7	SEC-1	BCO-S-151	General Anatomy-Practical	-	-	2	1	50	50	100
8	SEC-2	BCO-S-152	General Physiology-Practical	-	-	2	1	50	50	100
9	SEC-3	BCO-S-153	General Bio-Chemistry-Practical	-	-	2	1	50	50	100
10	SEC-4	BCO-S-154	Geometrical Optics-I Practical	-	-	2	1	50	50	100
Total				20		10	25	440	560	1000

Study &Evaluation Scheme

Bachelor of Optometry - II Semester

S.NO.	CATEGORY	COURSE CODE	COURSE NAME	PERIODS			CREDITS	EVALUATION SCHEME		
				L	T	P		INTERNAL	EXTERNAL	TOTAL
1	DSC-2	BCO-S-201	Ocular Anatomy	3	-	-	3	40	60	100
2	DSC -3	BCO-S-202	Ocular Physiology	3	-	-	3	40	60	100
3	DSC -4	BCO-S-203	Ocular Bio-Chemistry	3	-	-	3	40	60	100
4	DSC -5	BCO-S-204	Physical Optics	3	-	-	3	40	60	100
5	DSC -6	BCO-S-205	Geometrical Optics II	3	-	-	3	40	60	100
6	SEC-5	BCO-S-206	Computer Fundamentals, Internet &Ms-Office	3	-	-	3	40	60	100
7	AEC-2	TMUGE 201	English Communication -II	2	-	2	3	40	60	100
8	SEC -6	BCO-S-251	Ocular Anatomy - Practical	-	-	2	1	50	50	100
9	SEC -7	BCO-S-252	Ocular Physiology - Practical	-	-	2	1	50	50	100
10	SEC -8	BCO-S-253	Ocular Bio-Chemistry - Practical	-	-	2	1	50	50	100
11	SEC -9	BCO-S-254	Geometrical Optics II Practical	-	-	2	1	50	50	100
12	SEC -10	BCO-S-255	Computer Fundamentals, Internet &Ms-Office Practical	-	-	2	1	50	50	100
13	SEC-11	BCO-S-256	Hospital Posting	-	-	4	2	50	50	100
Total				20		16	28	580	720	1300

Study &Evaluation Scheme

Bachelor of Optometry - III Semester

S.NO.	CATEGORY	COURSE CODE	COURSE NAME	PERIODS			CREDITS	EVALUATION SCHEME		
				L	T	P		INTERNAL	EXTERNAL	TOTAL
1	DSC-7	BCO-S-301	Ocular Microbiology	2	-	-	2	40	60	100
2	DSC -8	BCO-S-302	Visual Optics- I	2	-	-	2	40	60	100
3	DSC -9	BCO-S-303	Optometric Optics – I	2	-	-	2	40	60	100
4	DSC-10	BCO-S-304	Optometric Instruments	3	-	-	3	40	60	100
5	DSC-11	BCO-S-305	Ocular Diseases – I	3	-	-	3	40	60	100
6	DSC-12	BCO-S-306	Clinical Examination of Visual System	2	-	-	2	40	60	100
7	CC-5	BCO-S- 307	Indian Medicine and Telemedicine	2	-	-	2	40	60	100
8	AEC-3	BCO-S-308	Environmental Sciences	4	-	-	4	40	60	100
9	AEC-4	TMUGE 301	English Communication -III	2	-	2	3	40	60	100
10	SEC-12	BCO-S-351	Optometric Optics –I Practical	-	-	2	1	50	50	100
11	SEC -13	BCO-S-352	Optometric Instruments Practical	-	-	2	1	50	50	100
12	SEC -14	BCO-S-353	Ocular Disease-I Practica	-	-	2	1	50	50	100
13	SEC-15	BCO-S-354	Hospital Posting	-	-	6	3	50	50	100
Total				22	-	14	29	560	740	1300

1.	VAC-1	TMUGS-301	Managing Self	2	1	-	0	50	50	100

Note: Value added course is an audit course. It is compulsory to pass this course with 45%. However, it will not be added to the overall result.

Study &Evaluation Scheme

Bachelor of Optometry - IV Semester

S.NO.	CATEGORY	COURSE CODE	COURSE NAME	PERIODS			CREDITS	EVALUATION SCHEME		
				L	T	P		INTERNAL	EXTERNAL	TOTAL
1	DSC-13	BCO-S-401	Optometric Optics –II & Dispensing Optics	4	-	-	4	40	60	100
2	DSC-14	BCO-S-402	Visual Optics II	4	-	-	4	40	60	100
3	DSC-15	BCO-S-403	Ocular Disease – II	3	-	-	3	40	60	100
4	CC-6	BCO-S-404	Pathology	2	-	-	2	40	60	100
5	DSC-16	BCO-S- 405	Basic and Ocular Pharmacology	3	-	-	3	40	60	100
6	AEC-5	BCO-S-406	Introduction to Quality And Patient Safety	2	-	-	2	40	60	100
7	CC-7	BCO-S-407	Medical Psychology	2	-	-	2	40	60	100
8	DSEC-1	BCO-S-408	Discipline Specific Elective Course: Eye Banking	3	-	-	3	40	60	100
		BCO-S-409	Discipline Specific Elective Course: Dry Eye							
9	AEC-6	TMUGE 401	English Communication - IV	2	-	2	3	40	60	100
10	SEC-16	BCO-S-451	Optometric Optics –II & Dispensing Practical	-	-	2	1	50	50	100
11	SEC-17	BCO-S-452	Hospital Posting	-	-	6	3	50	50	100
12	SEC-18	BCO-S-453	Eye Banking-Practical	-	-	2	1	50	50	100
		BCO-S-454	Dry Eye -Practical							
Total				25		12	31	510	690	1200

1.	VAC-II	TMUGS-401	Managing Work and Others	2	1	-	0	50	50	100

Note: Value added course is an audit course. It is compulsory to pass this course with 45%. However, it will not be added to the overall result.

Study &Evaluation Scheme

Bachelor of Optometry - V Semester

S.NO.	CATEGORY	COURSE CODE	COURSE NAME	PERIODS			CREDITS	EVALUATION SCHEME		
				L	T	P		INTERNAL	EXTERNAL	TOTAL
1	DSC-17	BCO-S-501	Contact Lens – I	4	-	-	4	40	60	100
2	DSC-18	BCO-S-502	Low Vision Care	3	-	-	3	40	60	100
3	DSC-19	BCO-S- 503	Geriatric Optometry & Pediatric Optometry	3	-	-	3	40	60	100
4	DSC -20	BCO-S- 504	Binocular Vision – I	3	-	-	3	40	60	100
5	DSC -21	BCO-S- 505	Systemic Disease & the Eye	3	-	-	3	40	60	100
6	CSC-1	BCO-S-506	Research Methodology & Biostatistics	4	-	-	4	40	60	100
7	SEC-19	BCO-S- 551	Contact Lens – I Practical	-	-	2	1	50	50	100
8	SEC -20	BCO-S- 552	Low Vision Care Practical	-	-	2	1	50	50	100
9	SEC -21	BCO-S-553	Geriatric Optometry & Pediatric Optometry Practical	-	-	2	1	50	50	100
10	SEC-22	BCO-S-554	Hospital Posting	-	-	6	3	50	50	100
11		MOOC		-	-	-	2	-	-	100
12		Open Elective					3	As per University Guide line		
Total				22		12	31	480	620	1200

Study &Evaluation Scheme

Bachelor of Optometry - VI Semester

S.NO.	CATEGORY	COURSE CODE	COURSE NAME	PERIODS			CREDITS	EVALUATION SCHEME		
				L	T	P		INTERNAL	EXTERNAL	TOTAL
1	DSC-22	BCO-S- 601	Contact Lens – II	3	-	-	3	40	60	100
2	DSC-23	BCO-S- 602	Binocular Vision – II	3	-	-	3	40	60	100
3	DSC-24	BCO-S- 603	Public Health And Community Optometry	2	-	-	2	40	60	100
4	CC-8	BCO-S- 604	Practice Management	2	-	-	2	40	60	100
5	DSC -25	BCO-S- 605	Occupational Optometry	2	-	-	2	40	60	100
6	CC-9	BCO-S- 606	Medical Law And Ethics	2	-	-	2	40	60	100
7	SEC-23	BCO-S- 651	Contact Lens – II Practical	-	-	2	1	50	50	100
8	SEC-24	BCO-S- 652	Binocular Vision – II Practical	-	-	2	1	50	50	100
9	SEC-25	BCO-S- 653	Hospital Posting	-	-	6	3	50	50	100
10	SEC-26	BCO-S- 654	Research Project 1	-	-	4	2	50	50	100
Total				14		14	21	440	560	1000

Study &Evaluation Scheme

Bachelor of Optometry - VII Semester (Internship)

S.NO.	CATEGORY	COURSE CODE	COURSE NAME	PERIODS			CREDITS	EVALUATION SCHEME		
				L	T	P		INTERNAL	EXTERNAL	TOTAL
1	**SEC-27**	BCO-S-751	Internship-I	**-**	**-**	**-**	**20**	**50**	**50**	**100**

Study & Evaluation Scheme

Bachelor of Optometry - VIII Semester (Internship)

S.NO.	CATEGORY	COURSE CODE	COURSE NAME	PERIODS			CREDITS	EVALUATION SCHEME		
				L	T	P		INTERNAL	EXTERNAL	TOTAL
1	SEC-28	BCO-S-851	Internship-II	-	-	-	10	50	50	100
2	SEC-29	BCO-S-852	Research Project &Viva	-	-	-	10	50	50	100

Course Code: BCO-S-101	**Core Course -1** **Bachelor of Optometry** **Semester-I** **GENERAL ANATOMY**	**L-4** **T-0** **P-2** **C-5**
Course Outcomes:	**On completion of the course, the students will be:**	
CO1.	Understanding the concept & terminology of Human Anatomy	
CO2.	Enlisting and memorizing the structure, function & location of cells, tissues and major human organs system/part	
CO3.	Recognizing the different organ and organ system	
CO4.	Understanding relationship between different organ of the body with organ system	
CO5.	Developing a holistic approach to human health and medical research.	
Course Content:		
Unit-1:	Organization and general plan of the body: Levels of Organization, Metabolism and Homeostasis, Terminology and General Plan of the Body, Body Parts and Areas, Terms of Location and Position, Body Cavities and Their Membranes, Dorsal cavity, Ventral cavity, Planes and Sections	**6 Hours**
Unit-2:	**Cells:** Structure, function and location, Prokaryotic and eukaryotic cells, Cell organelles, Cell Division, Tissue, Types, Structure, Location and Function of Epithelial Tissue, Connective Tissue, Muscle Tissue, Nerve Tissue, Membranes, Glandular tissue, The Integumentary System: Structure and function of The Skin, Subcutaneous Tissue	**8 Hours**
Unit-3:	**The Skeletal System:** General Introduction, Classification, Structure and function of Skeleton. Joints-Types of joints & Movements. Basic Anatomy of Important Muscles	**6 Hours**
Unit-4:	**The Nervous System** -Nervous System Divisions, Nerve Tissue, Types of Neurons, Nerves and Nerve Tracts, The Nerve Impulse, The Spinal Cord, The Brain, Meninges and Cerebrospinal Fluid, Cranial Nerves, The Autonomic Nervous System and its function The Senses Sensory Pathway, Characteristics of Sensations, Cutaneous Senses, Muscle Sense, Sense of Taste, Sense of Smell, Hunger and Thirst, The Eye, The Ear	**8 Hours**

Unit-5:	**The Endocrine System -**Chemistry of Hormones, Regulation of Hormone Secretion, The Pituitary Gland, Thyroid Gland, Parathyroid Glands, Pancreas, Adrenal Glands, Ovaries, Testes, Other endocrine glands Embryology: Spermatogenesis, Oogenesis, Gametogenesis, Ovulation and fertilization.	**6 Hours**
Text Books:	1. B.D. Chaurasia: Handbook of General Anatomy, 2nd Ed., CBS Publishers and Distributors, New Delhi - 110 032.	
Reference Books:	1. Peter L. Williams and Roger Warwick: - Gray's Anatomy-Descriptive and Applied, 36th Ed., 1980, Churchill Livingstone. 2. T.S. Ranganathan: Text book of Human Anatomy, 1982,S. Chand & Co., New Delhi 110055. 3. Inderbir Singh: Human Embryology, 3rd Ed.,Macmillan India,1981. 4. R. Kanagasuntharam, P. Sivananda-Singham&A. Krishnamurti: 5. Anatomy-Regional, Functional, & Clinical, P.G.Publisher, Singapore 1987.	
E- Learning site	https://www.science.gov/topicpages/e/e-learning+human+anatomy	

Course Code: BCO-S-102	**Core Course -2** **Bachelor of Optometry** **Semester-I** **GENERAL PHYSIOLOGY**	**L-4** **T-0** **P-0** **C-4**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding concepts & terminology of human physiology	
CO2.	Enlisting and memorizing the function & structure of cells, tissues and major human organs systems/parts	
CO3.	Understanding function of various organ systems and employing its knowledge to identify diseases related to them.	
CO4.	Identifying and explaining the interrelation between different organ systems.	
CO5.	Differentiating various organs & organs system	
Course Content:		
Unit-1:	**Cell physiology:** Organization of the Body, Body Composition, Measurement of Body Fluid Volumes, Plasma Volume, Total Blood Volume, & Red Cell Volume, Diffusion, Osmosis, Tonicity	**6 hrs**
Unit-2:	**Gastrointestinal physiology:** Organs of GIT and their structure & function, secretion, digestion, absorption and assimilation, gastrointestinal hormones, physiology of digestion of carbohydrates, proteins & lipids, Structure & function of liver, spleen, gall bladder **Respiratory system:** parts of respiratory system, mechanism of respiration, pulmonary function, pulmonary circulation, lungs volume, and gas transport between lungs andtissues.	**8hrs**
Unit-3:	**Cardiovascular and lymphatic system:** heart structure and function, blood vessels and valves, mechanism of circulation, cardiac cycle, heart sounds, heart rate, pulse rate, blood pressure. Blood, its composition and function, function of RBC, WBC & platelets, Lymphatic system: lymph, its composition and function, lymphatictissue **Organs of Excretory System:** kidneys, nephron, Mechanism of Excretion Urine formation (glomerular filtration and tubular reabsorption) Electrolytes: their balances and imbalances. Acid-base balance. Acidosis and Alkalosis	**8hrs**
	Musculo-skeletal system: Muscles structure, types of muscles, mechanism of contraction, major muscles of the body, classification of bones, structure of bones, hormones involved in bone growth, types of	

Unit-4:	joints, Arthritis, Gout, Osteoporosis Nervous system and special senses: organization of the nervous system, Structure & Properties of Neuron, Cell bodies, Axons, Dendrites, Nerve Impulse, Type of Nerves, Central Nervous System including Brain & Spinal Cord. Peripheral Nervous System & autonomic nervous system. Structure and function of eye, ear, tongue and nose. **Endocrine System:** Structure, function, regulation & secretion of the following glands, hypothalamus, pituitary, pineal, thyroid, parathyroid, adrenal, thymus, pancreas, testes and ovary. Basic concepts about hypo and hyper secretion of hormones and their diseases	**6 hrs**
Unit-5:	Structure and function of male and female reproductive organ, function of testicular and ovarian hormones. Gametogenesis (oogenesis and spermatogenesis), menstrual cycle, implantation, pregnancy, menopause and various contraceptive measures Body fluids and their significance: Important terms, types of body fluid, total body water, general principles for fluid balance, cardinal principle, Homeostasis through fluid maintenance, Electrolytes & ions, Function of electrolytes.	**6 hrs**
Text Books:	1. Sujit K. Chaudhuri, Concise Medical Physiology, 6th edition, New Central Book Agency, Kolkata, 2008	
Reference Books:	1. AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi,2006 2. A C Guyton: Text book of Medical Physiology, 8th edition, saunders company,Japan, 3. G J Tortora, B Derrickson: Principles of anatomy &physiology,11th edition, Harper & Row Publishers, New York 4. John Wiley & Sons Inc, New Jersey, 2007	
E- Learning site	https://oli.cmu.edu/courses/anatomy-physiology-i-ii-v2-academic/	

Course Code: BCO-S-103	**Core Course -3** **Bachelor of Optometry** **Semester-I** **GENERAL BIOCHEMISTRY**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding the concepts and theories of Biochemistry related to optometry	
CO2.	Understanding the chemistry of carbohydrates, proteins, lipids and amino acids.	
CO3.	Analyzing the mechanism of enzyme action and identify the classes and factors affecting action	
CO4.	Understanding the biochemical testing and analyzing the test result.	
Course Content:		
Unit-1:	**Carbohydrate**: Introduction, classification, structure, Isomers, epimerase, anomers and Biological importance.	**6 hrs**
Unit-2:	**Amino Acids & Proteins**: General Introduction, classification, peptides, polypeptides, properties, structure and biological functions.	**6 hrs**
Unit-3:	**Enzymes**: Definition, classification, catalysis, factors affecting activities and inhibition.	**6 hrs**
Unit-4:	**Fatty Acids-** Definition, types, and Biological importance. Biological Membrane. **Lipids-**General Introduction, classification, Function, Cholesterol, Triglycerides,phospholipids.	**6 hrs**
Unit-5:	**Vitamins-**Fat soluble & water Soluble, with general Emphasis on on A, B2, C, E and inositol (requirements, assimilation and properties)	**6 hrs**
Text Books:	1.S. Ramakrishnan: Essentials of biochemistry and ocular biochemistry, Annamalai University Publications, Chidambaram, India, 1992	
Reference Books:	1.S. Ramakrishnan, K G Prasannan and R Rajan: Text book of Medical Biochemistry, Orient Longman, Madras, 1990 2.D.R. Whikehart: Biochemistry of the Eye, 2ndedition, Butterworth Heinemann, Pennsylvania, 2003	
E- Learning site	https://oli.cmu.edu/courses/biochemistry-i-ii-v2-academic/	

Course Code: BCO-S-104	**Discipline Specific Course -1** **Bachelor of Optometry** **Semester-I** **GEOMETRICAL OPTICS-I**	**L-4** **T-0** **P-0** **C-4**
Course Outcomes	**On completion of the course, the students will be :**	
CO1.	Understanding concepts and theories of light, its nature & properties	
CO2.	Understanding concepts and properties of mirror & lenses.	
CO3.	Identifying various of lens& mirror during practical	
CO4.	Applying formula calculation related to vergence	
Course Content:		
Unit-1:	**Nature of light-** light as electromagnetic oscillation; speed of light in vacuum and other media, Wave front spherical, elliptical and plane. **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	**8 hrs**
Unit-2:	Plane mirror and spherical mirror- convex and concave mirror Reflection by a spherical mirror, paraxial approximation; sign convention Imaging by concave mirror and convex mirror Reflectivity, transmissivity; Snell's Law, Refraction at a plane surface Glass slab	**6 hrs**
Unit-3:	**Definition** of crown and flint glasses; materials of high refractive index **Prism-** Angle of prism; deviation produced by a prism; refractive index of the prism, definition of Prism diopter and application of prism. **Dispersion -** Angular dispersion; dispersive power	**6 hrs**
Unit-4:	**Vergence of light** – convergence and divergence Vergence at a distance formula; effectivity of a refracting surface Image formation by a lens by application of vergence at a distance formula, definitions of front and back vertex powers; equivalent power; first and second principal planes/points; primary and secondary focal planes/points; primary and Secondary focallengths **Newton's formula** linear magnification; angular magnification	**8 hrs**

Unit-5:	**Imaging by a thin convex lens and thin concave lens**; Image properties (real/virtual; erect/inverted magnified/minified) for various object positions System of two thin lenses; review of front and back vertex powers and equivalent Power, review of six cardinal points. System of more than two thin lenses; calculation of equivalent power using magnification formula	**6 hrs**
Text Books:	1.Tunnacliffe A. H, Hirst J. G, Optics, The association of British Dispensing Opticians, London, U.K., 1990.	
Reference Books:	1. Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA,1991. 2. Schwartz S. H. Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, New York, USA,2002.	
E- Learning site	https://www.spiedigitallibrary.org/conference-proceedings-of-spie/10452/104521S/Online-course-Geometrical-Optics-for-undergraduate-students/10.1117/12.2266491.full	

Course Code: **BCO-S-105**	**Core Course -4** **Bachelor of Optometry** **Semester-I** **NUTRITION**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding the concept of nutrition & its importance to eye	
CO2.	Understanding nutritional components& their requirements	
CO3.	Understanding the concept of mal nutrition & its impact on human health	
CO4.	Classifying & Analyzing appropriate nutrients requirement for human body disorder	
Course Content:		
Unit-1:	**Introduction:** History of Nutrition as a science food groups, RDA Balanced diet, diet planning, assessment of nutritional,Status. **Energy:** Units of energy and value of food, Measurements Energy expenditure, Total energy/calorie requirement for different agegroups and diseases. Limitations of the daily food guide, Safetyvalue	**6 hrs**
Unit-2:	**Proteins:** Sources and functions, Essential and non- essential amino-acids Incomplete and complete proteins, Supplementary foods. PEM and the eye, Nitrogen balance, Changes in proteinrequirement **Fat:** Sources and function, Essential fat, Excess and deficiency,Lipids and the eye. Hyperlipidemia, heart diseases,atherosclerosis.	**6 hrs**
Unit-3:	**Minerals:** General functions and sources, Macro and micro minerals associated with the eye. **Deficiencies and excess:** Ophthalmic complications (e.g. iron, calcium, iodine etc.)	**6 hrs**
Unit-4:	**Vitamin:** General functions, and food sources, Vitamin deficiencies and associated eye disorders with particular emphasis to Vitamin A, Promoting sound habits in pregnancy, lactation and infancy. Nutrient with antioxidant. **Properties:** Digestion of Proteins, carbohydrates & lipids	**6 hrs**
Unit-5:	Essential amino acids. Miscellaneous Measles and associated eye disorders, low birth weight	**6 hrs**
Text Books:	1.Frank Eperjesi& Stephen Beatty: Nutrition and the Eye a Practical	

	Approach, Elsevier Butterworth- Heinemann, USA, 2006	
E- Learning site	**1.** https://alison.com/courses/nutrition **2.** https://www.coursera.org/browse/health/nutrition	

Course Code: **TMUGE 101**	**Ability Enhancement Compulsory Course (AECC-1)** **Bachelor of Optometry** **Semester-I** **English Communication-I**	**L-2** **T-0** **P-2** **C-3**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	**Remembering and understanding** of the basic of English grammar and vocabulary.	
CO2.	**Understanding** of the basic Communication process.	
CO3.	**Applying** correct vocabulary and tenses in sentences construction.	
CO4.	**Analyzing** communication needs and developing communication strategies using both verbal & non-verbal method.	
CO5.	**Drafting** applications in correct format for common issues.	
CO6.	**Developing** self-confidence.	
Course Content:		
Unit-1:	**Introductory Sessions** • Self-Introduction • Building Self Confidence: Identifying strengths and weakness, reasons of Fear of Failure, strategies to overcome Fear ofFailure • Importance of English Language in present scenario (*Practice: Self-introductionsession)*	**06 Hours**
Unit-2:	**Basics of Grammar** • Parts ofSpeech • Tense • Subject and Predicate • Vocabulary: Synonym andAntonym *(Practice: Conversation Practice)*	**12 hours**
Unit-3:	**Basics of Communication** • Communication :Process, Types, 7Cs of Communication, Importance& Barrier • Language as a tool ofcommunication • Non-verbal communication: BodyLanguage • Etiquette &Manners • Basic ProblemSounds	**10 hours**
Unit-4:	**Application writing** • Format &Style of ApplicationWriting • Practice of Application writing on commonissues. • *(Practice :Pronuciation drill and building positive bodylanguage*	**08 hours**
Unit-5:	**Value based text reading:** Short Story (Non- detailed study) • Gift of Magi – O.Henry	**04 hours**
Text Books:	*Singh R.P., An Anthology of Short stories*	**12 hours**
Reference Books:	1.*Kumar, Sanjay. &Pushp Lata. "Communication Skills" New Delhi: Oxford University Press.* 2.*Harris, Thomas. A. "I am ok, You are ok" New York: Harper and Row.* *Goleman, Daniel. "Emotional Intelligence" Bantam BooK*	**10 hours**

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: **BCO-S-151**	**Skill Enhancement Course-1** **Bachelor of Optometry** **Semester-I** **General Anatomy- Practical**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes		
1.	Demonstration of Major organs through models and permanent slides.	
2.	Demonstration of parts of circulatory system from models.	
3.	Demonstration of parts of respiratory system from models.	
4.	Demonstration of digestive system from models.	
5.	Demonstration of excretory system from models.	
6.	Demonstration of nervous system from models.	
7.	Structure of eye and ear	
8.	Demonstration of structural differences between skeletal, smooth and cardiac muscles.	
9.	Demonstration of various bones	
10.	Demonstration of various joints	
11.	Demonstration of various parts of male & female reproductive system from model	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: **BCO-S-152**	**Skill Enhancement Course-2** **Bachelor of Optometry** **Semester-I** **General Physiology- Practical**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes		
1.	To measure pulse rate	
2.	To measure blood pressure	
3.	Demonstration of ECG	
4.	To perform Hemoglobin by CMG method	
5.	To perform Total RBC count.	
6.	To perform total leucocyte count	
7.	To perform differential leucocyte count.	
8.	To perform PCV	
9.	To calculate Red cell indices	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: **BCO-S-153**	**Skill Enhancement Course -3** **Bachelor of Optometry** **Semester-I** **General Biochemistry - Practical**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes		
1.	Reactions of monosaccharides, disaccharides and starch: Glucose: Fructose Galactose: Maltose, lactose Sucrose: Starch	
2.	Analysis of unknown Sugars Estimations: Photometry: Bio fluid of choice – blood, plasma, serum Standard graphs: Glucose Proteins: Urea Creatinine: Bilirubin	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: BCO-S-154	**Skill Enhancement Course -4** **Bachelor of Optometry** **Semester-I** **Geometrical Optics - Practical**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes		
1.	Thick Prism – determination of prism angle and dispersive power; calculation of the refractive index	
2.	Thin Prism – measurement of deviation; calculation of the prism diopter	
3	Image formation by spherical mirrors	
4	Convex lens - power determination using lens gauge, power determination using distant object method; power determination using the Vergence formula	
5	Concave lens – in combination with a convex lens – power determination	

Course Code: BCO-S-201	**Discipline Specific Course (DSC)-2** **Bachelor ofOptometry** **Semester-II** **OCULAR ANATOMY**	**L-3** **T-0** **P-2** **C-4**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding the concepts & terminology of Ocular Anatomy	
CO2.	Enlisting and memorizing the structure, function & location of different parts of eye	
CO3.	Recognizing the different Ocular structures	
CO4.	Understanding relationship between different Ocular structures	
CO5.	Developing a holistic approach to Ocular health and medical research.	
Course Content:		
Unit-1:	• Central nervous system: A briefIntroduction • ANS • Embryology ofeye • Development ofeye • Visualmilestone	**6 hrs**
Unit-2:	• Orbit andadnexa • Eye ball & coats of eyeball	**6 hrs**
Unit-3:	• Eyelid • Conjunctiva • Cornea • Sclera	**6 hrs**
Unit-4:	• Anteriorchamber • Uvea • Crystallinelens	**6 hrs**
Unit-5:	• Vitreous • Choroid • Retina	**6 hrs**
Text Books:	1. L A Remington: Clinical Anatomy of the Visual System, Second edition, Elsevier Butterworth Heinemann, Missouri, USA, 2005.	
Reference Books:	1. AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006	

E-Learning site	https://cybersight.org/online-learning/ https://www.ophthalmologytraining.com/	

Course Code: **BCO-S-202**	**Discipline Specific Course (DSC)-3** **Bachelor of Optometry** **Semester-II** **OCULAR PHYSIOLOGY**	**L-3** **T-0** **P-2** **C-3**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding concepts & terminology of Ocular physiology	
CO2.	Enlisting and memorizing the functions & structure of Eyes	
CO3.	Understanding function of various ocular structures and applying this knowledge to identify diseases related to them.	
CO4.	Identifying and explaining the interrelationships between different Ocular structures	
CO5.	Differentiating various Ocular structures.	
Course Content:		
Unit-1:	• Protective mechanisms in the eye: Eye lids and lacrimation, description of theglobe • Extrinsic eye muscles, their actions and control of theirmovements • Cornea • Aqueous humor and vitreous: Intra ocularpressure	**6 hrs**
Unit-2:	• Iris &Pupil • Crystalline lens and accommodation, Mechanismof accommodation – presbyopia • Retinal : physiology & Rodpsin cycle	**6 hrs**
Unit-3:	• Visual stimulus, • Visual acuity, Vernier acuity and principle ofmeasurement • Visual perception , An over view of Binocularvision • Visual pathway, Pupillarypathway • Contrastsensitivity	**6 hrs**
Unit-4:	• Introduction toelectrophysiology • Scotopic & Photopicvision • Color vision & itstheories • Retinal sensitivity &visibility	**6 hrs**
Unit-5:	• Extra Ocularmuscles • Saccades &Pursuit • Fixatory eye movement	**6 hrs**
Text Books:	1. AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006	

Reference Books:	1. .RD Ravindran: Physiology of the eye, Arvind eye hospitals, Pondicherry, 2001 2. PL Kaufman, A Alm: Adler's Physiology of the eye clinical application, 10th edition, Mosby, 2002	
E-Learning site	https://cybersight.org/online-learning/ https://www.ophthalmologytraining.com/	

Course Code: BCO-S-203	Discipline Specific Course (DSC)-4 Bachelor of Optometry Semester-II OCULAR BIOCHEMISTRY	L-3 T-0 P-2 C-3
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding the concepts and theories of Biochemistry	
CO2.	Understanding the chemistry of carbohydrates, proteins, lipids andamino acids related to eye	
CO3.	Understanding the basic metabolism of biomolecules and their energetic related to eye	
CO4.	Understanding the role of Minerals with respect to eyes	
CO5.	Understanding the process of biochemical testing and analyzing the test result.	
Course Content:		
Unit-1:	• Ocular Biochemistry: Various aspects of the eye, viz., cornea, lens aqueous, vitreous, retina and pigment rhodopsin. (Theimportant chemicals in each and their roles.)	**6 hrs**
Unit-2:	• Metabolism- carbohydrates, proteins,lipids. • Glycolysis, TCA Cycle, HMP Shunt, Glycogen metabolism, Sorbitol pathway, Lipid Metabolism, triglyceride and Cholesterolmetabolism. Urea- Cycle. Catabolism of AminoAcids	**6 hrs**
Unit-3:	• Hormones metabolic regulation with examples sayinsulin. • Clinical Biochemistry: Blood sugar, urea, creatinine andbilirubin significance of theirestimation.	**6 hrs**
Unit-4:	• Technique: Colloidal state, sol. Gel. Emulsion, electrophoresis. pH buffers mode of action, molar and percentage solutions, photometer, colorimeter and spectrometry. Radio isotopes: application inmedicine and basicresearch.	**6 hrs**
Unit-5:	• Minerals--Na, K, Ca, P, Fe, Cu and Se. (requirements, availability and properties) with respect to theEye.	**6 hrs**
Text Books:	1. S. Ramakrishnan: Essentials of biochemistry and ocular biochemistry, Annamalai University Publications, Chidambaram, India, 1992	

Reference Books:	**1.** .S. Ramakrishnan, K G Prasannan and R Rajan: Text book of Medical Biochemistry, Orient Longman, Madras, 1990 2. D R Whikehart: Biochemistry of the Eye, 2nd edition, Butterworth Heinemann, Pennsylvania, 2003	
E-Learning site	https://www.elsevier.com/books/biochemistry-of-the-eye/whikehart/978-0-7506-7152-1	

Course Code: BCO-S-204	**Discipline Specific Course (DSC)-5** **Bachelor of Optometry** **Semester-II** **PHYSICAL OPTICS**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding concepts and theories of light, its nature & properties	
CO2.	Understanding concepts & theories of interference, polarization & diffraction	
CO3.	Understanding concepts & operations of various optical instruments	
CO4.	Understanding concepts of Laser & Radiometry	
Course Content:		
Unit-1:	**Nature of light**-light as electromagnetic oscillation –wave equation; ideas of sinusoidal oscillations –simple harmonic oscillation; transverse nature of oscillation; concepts of frequency, wavelength, amplitude and phase. Sources of light; Electromagnetic Spectrum. Polarized light; linearly polarized light; and circularly polarized light	**6 hrs**
Unit-2:	Intensity of polarized light Malus'Law; polarizers and analyzers; Methods of producing polarized light; Brewster's angle. Birefringence; ordinary and extraordinary raysRelationship between amplitude and intensity	**6 hrs**
Unit-3:	Coherence- Interference; constructive interference, destructive interference; fringes; fringe width.Double slits, multiple slits, gratings. Diffraction; diffraction by a circular aperture; Airy's disc	**6 hrs**
Unit-4:	Resolution of an instrument, Telescope, for example), Raleigh's criterion, Scattering; Raleigh's scattering; Tyndall effect, Fluorescence and Phosphorescence	**6 hrs**
Unit-5:	Basics of Lasers, Coherence; population inversion; spontaneous emission; Einstein's theory of lasers. Radiometry; solid angle; radiometric units; photopic and scotopic luminous efficiency and efficacy curves; photometric units Inverse square law of photometry; Lambert's law. Other units of light measurement; retinal illumination; Trolands	**6 hrs**

Text Books:	Subrahmanyan N, BrijLal, A text book of Optics, S. Chand Co Ltd, New Delhi, India, 2003	
Reference Books:	. 1. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998. 2. Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA, 2002.	
E-Learning site	http://www.rapidlearningcenter.com/physics/college-physics/21-Physical-Optics.html	

Course Code: **BCO-S-205**	**Discipline Specific Course (DSC)-6** **Bachelor of Optometry** **Semester-II** **GEOMETRICAL OPTICS II**	**L-3** **T-2** **P-0** **C-3**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding the concepts of schematic & Reduced Eye and Visual Acuity	
CO2.	Understanding the concept of refractive error and its management options	
CO3.	Understanding the concept of image formation by different types of lenses	
CO4.	Understanding the concept of Accommodation & Presbyopia and different options of presbyopia	
CO5.	Understanding the concepts of Eye with and without crystalline lens	
Course Content:		
Unit-1:	• Vergence and Vergencetechniques • schematic and reducedeyes • VisualAcuity	**6 hrs**
Unit-2:	• Emmetropia & Ammetropia: Myopia, Hypermetropia, Astigmatism • Spherical Ammetropia correction • Aperture stop: Entrance and Exitpupil	**6 hrs**
Unit-3:	• Vertex distance and effective power, • Dioptric power of the spectacle, to calculate the Dioptricpower, • angular magnification of spectacles inAphakia • Aperture stops- entrance and exitpupils • Retinalimage	**6 hrs**
Unit-4:	• Accommodation, Accommodation formulae & itscalculations • Depth of field & depth offocus • Presbyopia & its opticalmanagement	**6 hrs**
Unit-5:	• Aphakia, its optics & opticalmanagement • Pseudophakia & its opticalmanagement	**6 hrs**
Text Books:	1. Tunnacliffe A. H, Hirst J. G, Optics, The association of British Dispensing Opticians, London, U.K., 1990. 2. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.	

Reference Books:	. **1.** Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA, 1991. 2. Schwartz S. H. Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, New York, USA, 2002.	
E- Learning site	https://www.spiedigitallibrary.org/conference-proceedings-of-spie/10452/104521S/Online-course-Geometrical-Optics-for-undergraduate-students/10.1117/12.2266491.full	

Course Code: BCO-S-206	**Skill Enhancement Course (SEC) -1** **Bachelor of Optometry** **Semester-II** **COMPUTER FUNDAMENTALS, INTERNET, & MS-OFFICE**	**L-3** **T-2** **P-0** **C-3**
Course Outcomes	**On completion of the course, the students will be :**	
CO1.	Understanding the fundamentals and history of computer	
CO2.	Understanding the concept of Computer's Memory Management and processing	
CO3.	Understanding and applying the basic functions on document sheet, Spread sheet and presentation slide	
CO4.	Understanding the concept of Internet, Web and Websites	
CO5.	Understanding and applying the Web surfing, E mail and recognize e mail netiquette	
Course Content:		
Unit-1:	**Introduction and Definition of Computer:** Computer Generation, Characteristics of Computer, Advantages and Limitations of a computer, Classification of computers, Functional components of a computer system (Input, CPU, Storage and Output Unit), Types of memory (Primary and Secondary) Memory Hierarchy. Hardware: a) Input Devices- Keyboard, Mouse, Scanner, Bar Code Reader b) Output Devices – Visual Display Unit (VDU), Printers, Plotters etc. Software: Introduction, types of software with examples, Introduction to languages, Compiler, Interpreter and Assembler. NumberSystem: Decimal, Octal, Binary and Hexadecimal Conversions, BCD, ASCII and EBCDICCodes.	**6 hrs**
Unit-2:	**MS – DOS:** Getting Started on DOS with Booting the System, Internal Commands: CHDIR(CD),CLS, COPY, DATE, DEL(ERASE), DIR, CHARACTER, EXIT,MKDIR(MD), REM, RENAME(REN), RMDIR(RD), TIME, TYPE, VER, VOL, External Commands: ATTRIB, CHKDSK, COMMAND, DOSKEY, EDIT, FORMAT,HELP, LABEL, MORE, REPLACE, RESTORE, SORT, TREE, UNDELETE,UNFORMAT,XCOPY. **Introduction of Internet:** History of internet, Web Browsers, Searching and Surfing, Creating an E-Mail account, sending and receiving E-Mails.	**6 hrs**
Unit-3:	**MS Word:** Starting MS WORD, Creating and formatting a document, Changing fonts and point size, Table Creation and operations, Autocorrect, Auto text, spell Check, Word Art, Inserting objects, Page setup, Page Preview, Printing a document, Mail Merge.	**6 hrs**
	MS Excel: Starting Excel, Work sheet, cell inserting Data into Rows/ Columns, Alignment, Text wrapping , Sorting data, Auto Sum, Use of	**6 hrs**

Unit-4:	functions, Cell Referencing form, Generating graphs, Worksheet data and charts with WORD, Creating Hyperlink to a WORD document, Page set up, Print Preview, Printing Worksheets. MS Power Point: Starting MS–Power Point,, Creating a presentation using auto content Wizard, Blank Presentation, creating, saving and printing a presentation, Adding a slide to presentation, Navigating through a presentation, slide sorter, slide show, editing slides, Using Clipart, Word art gallery, Adding Transition and Animation effects, setting timings for slide show, preparing note pages, preparing audience handouts, printing presentation documents. MS – Access: creating table and database.	
Unit-5:	**MS-POWERPOINT:** Starting MS–Power Point,, Creating a presentation using auto content Wizard, Blank Presentation, creating, saving and printing a presentation, Adding a slide to presentation, Navigating through a presentation, slide sorter, slide show, editing slides, Using Clipart, Word art gallery, Adding Transition and Animation effects, setting timings for slide show, preparing note pages, preparing audience handouts, printing presentation documents.	**6 hrs**
Text Books:	1. Sinha P.K., Computer Fundamentals, BPB Publishing.	
Reference Books:	. 1. Peter Norton_s, Introductions to Computers, Tata McGrawHill. 2. Price Michael, Office in Easy Steps,TMHPublication. ***Latest editions of all the suggested books are recommended.**	

Course Code: TMUGE -201	**Ability Enhancement Compulsory Course (AEC) -2** **Bachelor of Optometry** **Semester-II** **ENGLISH COMMUNICATION – II**	**L-2** **T-2** **P-0** **C-3**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	**Remembering & understanding** the basics of English Grammar and Vocabulary	
CO2.	**Understanding** the basics of Listening, Speaking & Writing Skills	
CO3.	**Understanding** principles of letter drafting and various types of formats.	
CO4.	**Applying** correct vocabulary and grammar in sentence construction while writing and delivering presentations	
CO5.	**Analyzing** different types of listening, role of Audience & Locale in presentation	
CO6.	**Creating** Official Letters, E-Mail & Paragraphs in correct format.	
Course Content:		
Unit-1:	**Functional Grammar** • Prefix, suffix and One-word substitution • Modals • Concord	
Unit-2:	**Listening Skills** • Difference between listening & hearing, Process and Types of Listening • Importance and Barriers to listening	
Unit-3:	**Writing Skills** • Official letter and email writing • Essentials of a paragraph, • Developing a paragraph: Structure and methods • Paragraph writing(100-120words)	
Unit-4:	**Strategies & Structure of Oral Presentation** • ***Purpose, Organizing content, Audience & Locale, Audio-visual aids, Bodylanguage*** • Voice dynamics: Five P's - Pace, Power, Pronunciation,Pause, and Pitch. • ***Modes of speech delivery and 5 W's ofpresentation***	
Unit-5:	**Value based text reading:** Short Essay (Non-detailed study) • How should one Read a book? –VirginiaWoolf	
Text Books:	Singh R.P., An Anthology of English Essay, O.U.P. New Delhi.	

Reference Books:	1. .Nesfield J.C. "*English Grammar Composition &Usage*" Macmillan Publishers 2. Sood Madan "*The Business letters"* Goodwill PublishingHouse, NewDelhi 3. Kumar Sanjay &Pushplata "*Communication Skills*"Oxford University Press, New Delhi.	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: BCO-S-251	**Skill Enhancement Course (SEC) -5** **Bachelor of Optometry** **Semester-II** **Ocular Anatomy - Practical**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes		
1.	Practical dissection of bull's eye	
2.	**Orbit:** Practical demonstration of orbital structure	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: BCO-S-252	**Skill Enhancement Course (SEC) -6** **Bachelor of Optometry** **Semester-II** **Ocular Physiology - Practical**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes		
1.	Lid Eversion technique	
2.	Lacrimal tests	
3	Ocular motality	
4	Break up time - TBUT	
5	Pupillary reflexes	
6	Applanation tonometry	
7	Schiotz tonometry.	
8	Measurement of accommodation and convergence	
9	Visual acuity measurement.	
10	Direct ophthalmoscopy	
11	Indirect ophthalmoscopy	
12	Retinoscopy	
13	Light and dark adaptation.	
14	Binocular vision(Stereopsis)	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: BCO-S-253	**Skill Enhancement Course (SEC) -7** **Bachelor of Optometry** **Semester-II** **Ocular Biochemistry - Practical**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes		
1.	Quantitative analysis	
2	Abnormal constituents in urine, sugar proteins, ketones, blood and bile salts.	
3	Techniques of detection of abnormal constituents of urine:	
4	Electrophoresis a. Chromatography, Preparation of normal, molar and percentage solutions. b. Preparation of buffers, pHdetermination	
5	Electrophoresis c. Chromatography, Preparation of normal, molar and percentage solutions. d. Preparation of buffers, pHdetermination	
6	Demonstration e. Estimation of blood cholesterol Estimation ofalkaline phosphatase. f. Salivary amylase (effect of ph, etc) Milkanalysis	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: **BCO-S-254**	**Skill Enhancement Course (SEC) -8** **Bachelor of Optometry** **Semester-II** **Geometrical Optics-II - Practical**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes		
1.	Construction of a table top telescope – all three types of telescopes.	
2	Construction of a tabletop microscope	
3	Imaging by a cylindrical lens – relationship between cylinder axis and image orientation	
4	Imaging by two cylinders in contact – determination of the position of CLC; verification of CLC using a spherical lens with power equal to the spherical equivalent; orientations and position of the line images and their relation to the cylinders' powers and orientations	
5	Imaging by two cylinders in contact – determination of the position of CLC; verification of CLC using a spherical lens with power equal to the spherical equivalent; orientations and position of the line images and their relation to the cylinders' powers and orientations	
6	Imaging by a spherocylindrical lens – sphere and cylinder in contact – determination of the position of CLC; verification of CLC using a spherical lens with power equal to the spherical equivalent; orientations and position of the line images and their relation to the cylinder's power and orientation	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: BCO-S-255	**Skill Enhancement Course (SEC) -9** **Bachelor of Optometry** **Semester-II** **Computer Fundamentals, Internet & Ms-Office - Practical**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes		
1.	Using basic DOS commands.	
2	Using external DOS commands	
3	Creating a email account	
4	Using web browser for searching and surfing.	
5	Creating and formatting a document in MS office	
6	Using autocorrect, auto text and spell check operation in MS office.	
7	Create tables in MS Word.	
8	Inserting different kinds of object in MS word.	
9	Use main merge options in MS office.	
10	Create a Excel work sheet with following options rows and columns alignment.	
11	Using excel formulas.	
12	Create a graph with available data in MS excel.	
13	Create a PPT presentation using auto content wizard.	
14	Use Clip art animation effects and word art galleries in presentations.	
15	Using transition and setting timings for slide show.	
16	Use MS access to create data base and tables.	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: **BCO-S-256**	**Skill Enhancement Course (SEC) -10** **Bachelor of Optometry** **Semester-II** **Hospital Posting**	**L-0** **T-0** **P-4** **C-2**
Course Outcomes		
1.	Students will gain additional skills in clinical procedures, interaction with patients and professional personnel.	

Course Code: BCO-S-301	**Discipline Specific Course (DSC) -7** **Bachelor of Optometry** **Semester-III** **Ocular Microbiology**	**L-2** **T-0** **P-0** **C-2**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding about the characteristics of bacteria, viruses, fungi and parasites.	
CO2.	Understanding of the principles of sterilization and disinfection in hospital and ophthalmic practice.	
CO3.	Understanding of the pathogenesis of the diseases caused by the organisms in the human body with particular reference to the eye infections.	
CO4.	Understanding of basic principles of diagnostic ocular Microbiology.	
CO5.	Understanding about the characteristics of bacteria, viruses, fungi and parasites.	
Course Content:		
Unit-1:	Morphology and principles of cultivating bacteria	**4 hrs**
Unit-2:	Sterilization and disinfections used in laboratory and hospital practice	**4 hrs**
Unit-3:	Common bacterial infections of the eye.	**5 hrs**
Unit-4:	Common fungal infections of the eye	**5 hrs**
Unit-5:	Common viral infections of the eye. Common parasitic infections of the eye.	**6 hrs**
Text Books:	1.Burton g.r.w: Microbiology for the Health Sciences, third edition, J.P. Lippincott Co., St. Louis, 1988.	
Reference Books:	1. KJ Ryan, CG Ray: Sherris Medical Microbiology- An Introduction to infectious Diseases, fourth edition, McGRAW HILL Publisher, New Delhi, 1994 MACKIE & McCartney Practical MedicalMicrobiology 2. Sydney m. Finegold & ellenjo baron: Diagnostic Microbiology (DM)5)	
E-Learning site	**https://www.narayananethralaya.org/ocular-microbiology/**	

Course Code: BCO-S-302	**Discipline Specific Course (DSC) -8** **Bachelor of Optometry** **Semester-III** **Visual Optics- I**	**L-2** **T-0** **P-0** **C-2**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding about the various optical constants of the eye & their measurements	
CO2.	Understanding the various aspects of vision and measuring visual acuity	
CO3.	Having a knowledge about various optical defects of the eye	
CO4.	Analyzing about various refractive anomalies of the eye	
CO5.	Applying all the theoretical skills on practical purpose	
Course Content:		
Unit-1:	• Review of Geometrical Optics: Vergence andpower • object space and image space • Signconvention • Spherical refractingsurface • Sphericalmirror • Cardinalpoints • Magnification • Light and visualfunction • Clinical Relevance of: Fluorescence, Interference,Diffraction, Polarization. Spherical and chromatic aberration, application of chromatic aberration	**4 hrs**
Unit-2:	• Optics of OcularStructure • Cornea andaqueous • Crystalline lens,Vitreous • Schematic and reducedeye	**4 hrs**
Unit-3:	• Measurements of Optical Constants of theEye • Corneal curvature andthickness • Keratometry • Curvature of the lens and ophthalmophakometry Axis and angle of the eye	**5 hrs**
	• Basic Aspects ofVision • VisualAcuity • Light and DarkAdaptation	**5 hrs**

Unit-4:	• Spatial and TemporalResolution • Science of Measuring visual performance and applicationto ClinicalOptometry	
Unit-5:	• Refractive anomalies and theircauses • Etiology of refractiveanomalies • Population distributions ofanomalies. • Optical componentmeasurements • Growth of the eye in relation to refractiveerrors	**6 hrs**
Text Books:	1. AG Bennett & RB Rabbets: Clinical Visual optics, 3rd edition, Butterworth Heinemann,	
Reference Books:	1. . M P Keating: Geometric, Physical and Visual optics,2nd edition, Butterworth-Heinemann, USA,2002 2. HL Rubin: Optics for clinicians, 2nd edition, Triadpublishing company. Florida,1974. 3. H Obstfeld: Optic in Vision- Foundations of visual optics & associated computations, 2nd edition, Butterworth, UK,1982. 4. WJ Benjamin: Borish's clinical refraction,2ndedition, Butterworth Heinemann, Missouri, USA,2006	
E- Learning site	https://cybersight.org/online-learning/ https://www.aao.org/education-course	

Course Code: **BCO-S-303**	**Discipline Specific Course (DSC) -9** **Bachelor of Optometry** **Semester-III** **Optometric Optics – I**	**L-2** **T-0** **P-0** **C-2**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding the concept of different phenomenon of light & basic of ophthalmic prism.	
CO2.	Understanding the concept& terminology use to describe the ophthalmic lenses	
CO3.	Understanding the concept of different types & design of ophthalmic lenses	
CO4.	Understanding the concept of Prismatic effect	
CO5.	Applying the Prentice's Rule	
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, rotaryprisms; • **SignConventions**	**4 hrs**
Unit-2:	• **The characteristics of lens material properties** (Refractive index, specific gravity, UV cut off, impact resistance – include drop ball test, abbe value, Centerthickness) • **Lenses: Definition**, units, terminology used to describe, form of lenses**,** Lens shape, size and types i.e.spherical, cylindrical and Sphero-cylindrical • **Transpositions: Simple**, Toric and Spherical equivalent	**4 hrs**
Unit-3:	• **Power specification:** (surface power, front & back vertex power,effectivepower,equivalentpower)Genevalensmeasure;	**5 hrs**
Unit-4:	• **Spherometer** & Sag formula, Edge thicknesscalculations • **Prismatic effect:** centration, decentration and Prentice rule, Prismatic effect of Plano-cylinder and Sphero-cylinderlenses	**5 hrs**
Unit-5:	**Aberration of Ophthalmic Lenses:**(monochromatic& chromatic) & its correction	**6 hrs**
Text Books:	1. AG Bennett & RB Rabbets: Clinical Visual optics, 3rd edition, Butterworth Heinemann	

Reference Books:	1. . M P Keating: Geometric, Physical and Visual optics,2nd edition, Butterworth-Heinemann, USA,2002 2. HL Rubin: Optics for clinicians, 2nd edition, Triadpublishing company. Florida,1974. 3. H Obstfeld: Optic in Vision- Foundations of visual optics & associated computations, 2nd edition, Butterworth, UK,1982. 4. WJ Benjamin: Borish's clinical refraction,2ndedition, Butterworth Heinemann, Missouri, USA,2006	
E- Learning site	https://cybersight.org/online-learning/https://www.aao.org/education-course https://abdocollege.org.uk/news/become-a-dispensing-optician-2/	

Course Code: **BCO-S-304**	**Discipline Specific Course (DSC) -10** **Bachelor of Optometry** **Semester-III** **Optometric Instruments**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding and application of the refractive instrument	
CO2.	Understanding & design, application and use of refractive instrument use in refraction room	
CO3.	Understanding the optics and applying the basic functions of Ophthalmoscope	
CO4.	Understanding the optics and applying the basic functions and importance of examination of anterior segment	
CO5.	Understanding and applying the various tools to measure ocular condition	
Course Content:		
Unit-1:	• Refractiveinstruments • Test chartsstandards. • Choice of testchart • Trial caselenses • Refractor (phoropter) headunit • Trial framedesign • Near vision difficulties with units and trialframe • Retinoscope – typesavailable • Adjustment of Retinoscopes- special features Objective optometers	**6 Hours**
Unit-2:	• Autorefractometer. • Projectioncharts • Illumination of the consultingroom. • Brightness acuitytest • Visionanalyzer • Pupilometer • Aberrometer	**6 Hours**
Unit-3:	• Ophthalmoscopes and relateddevices • Design of ophthalmoscopes – illumination, Filtersfor ophthalmoscopy • Indirectophthalmoscope	**6 Hours**
Unit-4:	• Lensometer, Lens gauges orclock • Slitlamp • Tonometers • Keratometer and cornealtopography	**6 Hours**
	• Refractometer • Orthoptic Instruments (Synaptophore Only)	

Unit-5:	• Color Vision TestingDevices • Fields of Vision And ScreeningDevices • A Scans(Details)	**6 Hours**
Text Books:	**1.** David Henson: Optometric Instrumentations, Butterworth-Heinnemann, UK,1991	
Reference Books:	1. . P R Yoder: Mounting Optics in Optical Instruments, SPIE Society of Photo- Optical Instrumentation,2002 2. G Smith, D A. Atchison: The Eye and Visual Optical Instruments, Cambridge University Press,1997	
E- Learning site	https://www.college-optometrists.org/the-college/museum/online-exhibitions/virtual-ophthalmic-instrument-gallery.html	

Course Code: BCO-S-305	**Discipline Specific Course (DSC) -11** **Bachelor of Optometry** **Semester-III** **Ocular Disease – I**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding the concept of different Ocular diseases of anterior segment of Eye	
CO2.	Applying the concept of anatomy & Physiology of Eye while understanding the Pathology of different ocular diseases	
CO3.	Utilizing the concept of clinical features of the diseases for the differential diagnosis of the anterior segment diseases	
CO4.	Analyzing the concept of clinical features of the diseases for the management of anterior segment diseases	
CO5.	Understanding the concept of different Ocular diseases of anterior segment of Eye	
Course Content:		
Unit-1:	• Lids-AppliedAnatomy • Congenital anomalies (Ptosis, Coloboma, Epicanthus, Distichiasis, Cryptophthalmos) • Inflammatory disorders (Blepharitis, External Hordeolum, Chalazion, Internal hordeolum, Molluscum Contagiosum) • Anomalies in the position of the lashes and Lid Margin(Trichiasis, Ectropion, Entropion) • Ptosis & PtosisEvaluation	**6 Hours**
Unit-2:	• Lacrimal System: AppliedAnatomy • Tearfilm • The Dry Eye (Sjogren's Syndrome) & various test to investigate of DryEye • Dacryocystitis & Dacryoadenitis	**6 Hours**
Unit-3:	• Conjunctiva: Appliedanatomy • Inflammations of conjunctiva (Infective conjunctivitis:bacterial, chlamydial, viral, Allergicconjunctivitis) • Degenerative conditions (Pinguecula, Pterygium,Concretions)	**6 Hours**

	• Symptomatic conditions (Hyperaemia, Chemosis, Ecchymosis, Xerosis, Discoloration) • Cysts and Tumors	
Unit-4:	• Cornea-Applied Anatomy andPhysiology • Congenital Anomalies (Megalo cornea, Microcornea, Cornea plana, Congenital cloudy cornea) • Inflammations of the cornea (Topographical classifications: Ulcerative keratitis and Nonulcerative • Etiological classifications: Infective, Allergic, Trophic,Traumatic, Idiopathic) • Degenerations (Arcus senilis, Band shaped keratopathy, • Dystrophies (Granular dystrophy, Lattice dystrophy,Macular dystrophy, cornea guttata, Fuch's epithelial endothelial dystrophy) • Keratoconus, PMD, TMD	**6 Hours**
Unit-5:	• Applied Anatomy: Uveal Tract andSclera • Classification of uveitis: Etiology, Pathology, clinical featuresand management. • Episcleritis and scleritis • Clinical examination of Uveitis andScleritis • Crystalline lens- Cataract & surgical management,Dislocation, subluxation and surgicalmanagement.	**6 Hours**
Text Books:	**1.** A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international(p) Ltd. Publishers, New Delhi, 2007	
Reference Books:	1. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth - Heinemann, 2007	
E- Learning site	https://cybersight.org/online-learning/http://www.uniteforsight.org/eye-health-course/	

Course Code: BCO-S-306	**Discipline Specific Course (DSC) -12** **Bachelor of Optometry** **Semester-III** **Clinical examination of visual system**	L-2 T-0 P-0 C-2
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding about the process of history taking and its clinical importance	
CO2.	Understanding about various clinical examination test available	
CO3.	Analyzing the importance of pupillary examination in the field of optometry	
CO4.	Applying all the theoretical knowledge on practical field	
CO5.	Understanding about the process of history taking and its clinical importance	
Course Content:		
Unit-1:	• Historytaking • Visual acuityestimation • Extraocular motility, Cover teat, Alternating covertest • Hirschberg test, Modified Krimsky	**4 hrs**
Unit-2:	• PupilsExamination • MaddoxRod • VanHerrick • External examination of the eye, LidEversion	**4 hrs**
Unit-3:	• Schirmer's, TBUT, tear meniscus level, NITBUT(keratometer), • ColorVision • Stereopsis • Confrontationtest	**5 hrs**
Unit-4:	• Photo stress test • Slit lamp biomicroscopy • Ophthalmoscopy • Tonometry	**5 hrs**
Unit-5:	• ROPLAS • Amsler test • Contrast sensitivity functiontest • Saccades and pursuittest	**6 hrs**
Text Books:	T Grosvenor: Primary Care Optometry, 5th edition, Butterworth–	

	Heinneman,USA,	
Reference Books:	1. . A K Khurana: Comprehensive Ophthalmology, 4thedition, New age international(p) Ltd. Publishers, New Delhi,2007 2. D B. Elliott: Clinical Procedures in Primary Eye Care,3rd edition, Butterworth-Heinemann,2007 3. Jack J. Kanski Clinical Ophthalmology: ASystematic Approach,6th edition, Butterworth-Heinemann,2007	
E- Learning site	https://www.college-optometrists.org/the-college/museum/online-exhibitions/virtual-ophthalmic-instrument-gallery.html	

Course Code: **BCO-S-307**	**Core Course (CC) -5** **Bachelor of Optometry** **Semester-III** **Indian Medicine and Telemedicine**	**L-2** **T-0** **P-0** **C-2**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding the concept of Indian traditional medicine.	
CO2.	Understanding the concept of Telemedicine.	
CO3.	Applying concept of PHS.	
CO4.	Understanding the concept of demography and vital-statistics	
CO5.	Understanding the concept of census, and its impact.	
Course Content:		
Unit-1:	• Introduction to healthcare deliverysystem • Healthcare delivery system in India at primary, secondary and tertiarycare • Community • participation in health care deliverysystem • Health system in developed countries • Private Sector • National HealthMission • National HealthPolicy • Issues in Health Care Delivery System inIndia	**4 hrs**
Unit-2:	• National Health Programme-Background objectives,action plan, targets, operations, achievements and constraints in various National HeathProgramme.	**4 hrs**
Unit-3:	• Introduction to AYUSH system ofmedicine • Introduction toAyurveda. • Yoga andNaturopathy • Unani • Siddha • Homeopathy • Need for integration of various system ofmedicine	**5 hrs**
Unit-4:	• Health scenario of India- past, present andfuture • Demography & Vital Statistics-Demography – its concept, Vital events of life & its impact on demography, Significance and recording of vitalstatistics • Census & its impact on healthpolicy	**5 hrs**
	• Epidemiology o Principles of Epidemiology Natural History ofdisease	

Unit-5:	Methods of Epidemiological studies o Epidemiology of communicable & non-communicable diseases, disease transmission, host defenseimmunizing agents, cold chain, immunization, disease monitoring andsurveillance	**6 hrs**
Text Books:	Margie Lovett Scott, Faith Prather. Global health systems comparing strategies for delivering health services. Joney & Bartlett learning, 2014 (page 167 -178)	
E-learning site	https://www.mohfw.gov.in/pdf/Telemedicine.pdf	

Course Code: BCO-S-308	ABILITY ENHANCEMENT COMPULSORY COURSE (AECC)-3 **Bachelor of Optometry** **Semester-III** **Environmental Sciences**	L-4 T-0 P-0 C-4
Course Outcomes	**On completion of the course, the students will be :**	
CO1.	Understanding basic concepts in the context of ecological and environmental sciences.	
CO2.	Interpreting the ideas about energy resources in today's scenario and discussing about alternate energy sources.	
CO3.	Classifying and describe biodiversity and also summarize biogeographically distribution ofIndia.	
CO4.	Describing concepts and methods to apply in environmental communication and publicawareness.	
CO5.	Interpreting the ethical and cultural conduct in environmental activities.	
Course Content:		
Unit-1:	Definition and Scope of environmental studies, multidisciplinary nature of environmental studies, Concept of sustainability & sustainable development. **Ecology and Environment**: Concept of an Ecosystem-its structure and functions, Energy Flow in an Ecosystem, Food Chain, Food Web, Ecological Pyramid& Ecological succession, Study of following ecosystems: Forest Ecosystem, Grass land Ecosystem & Aquatic Ecosystem & Desert Ecosystem.	**6 Hours**
Unit-2:	**Natural Resources:** Renewable & Non-Renewable resources; Land resources and land use change; Land degradation, Soil erosion & desertification. **Deforestation**: Causes & impacts due to mining, Dam building on forest biodiversity & tribal population. **Energy Resources**: Renewable & Non-Renewable resources, Energy scenario & use of alternate energy sources, Case studies. **Biodiversity:** Hot Spots of Biodiversity in India and World, Conservation, Importance and Factors Responsible for Loss of Biodiversity, Bio-geographical Classification of India	**8 Hours**
Unit-3:	**Environmental Pollutions:** Types, Causes, Effects & control; Air, Water, soil& noise pollution, Nuclear hazards &human health risks, Solid waste Management; Control measures of urban & industrial	**6 Hours**

	wastes, pollution case studies	
Unit-4:	**Environmental policies & practices: Climate change & Global** Warming (Green house Effect),Ozone Layer -Its Depletion and Control Measures, Photochemical Smog, Acid Rain Environmental laws: Environment protection Act; air prevention & control of pollution act, Water Prevention & Control of Pollution Act, Wild Life Protection Act, Forest Conservation Acts, International Acts; Montreal & Kyoto Protocols & Convention on biological diversity, Nature reserves, tribal population & Rights & human wild life conflicts in Indian context	**6 Hours**
Unit-5:	**Human Communities & Environment:** Human population growth; impacts on environment, human health & welfare, Resettlement & rehabilitation of projects affected person: A case study, Disaster Management; Earthquake, Floods & Droughts, Cyclones & Landslides, Environmental Movements; Chipko, Silent Valley, Vishnoi's of Rajasthan, Environmental Ethics; Role of Indian & other regions & culture in environmental conservation, Environmental communication & public awareness; Case studies.	**8 Hours**
Text Books:	**1.** "Fundamentals of Ecology",Odem, E. P., W. B. Sannders Co.	
Reference Books:	1. .BiodiversityandConservation",Bryant, P. J., HypertextBook 2. "Textbook of Environment Studies", Tewari, Khulbe&Tewari,I. Publication	
E-Learning site	https://www.coursera.org/browse/physical-science-and-engineering/environmental-science-and-sustainability	

Course Code: **TMUGE 301**	**Ability Enhancement Compulsory Course (AECC-4)** **Bachelor of Optometry** **SEMESTER-III** **English Communication-III**	**L-2** **T-0** **P-2** **C-3**
Course Outcomes:	**On completion of the course, the students will be:**	
CO1.	Remembering and understanding the English grammar and vocabulary	
CO2.	Understanding the art of public speaking and strategies of reading comprehension.	
CO3.	Applying correct vocabulary and sentence construction during public speaking or professional writing.	
CO4.	Analyzing different types of sentences like simple, compound and complex.	
CO5.	Creating skills for Drafting notice, agenda and minutes of the meeting.	
Course Content:		
Unit-1:	**English Grammar & Vocabulary** • Correction of Common Errors (with recap of English Grammarwith its usage in practicalcontext.) • Synthesis: Simple, complex and compound sentence Commonly used Idioms & phrases (Progressive learning whole semester)	**06 Hours**
Unit-2:	**Speaking Skills** • Art of publicspeaking • Commonconversation • Extempore • Power Point Presentation (Pptx) Skills**:** Nuances of presentingPPTs	**08 Hours**
Unit-3:	**Comprehension Skills** • Strategies of Reading comprehension: FourS's • How to solve a Comprehension (Short unseen passage: 150-200 words)	**03 Hours**
Unit-4:	**Professional Writing** • Preparing Notice, Agenda& Minutes of theMeeting	**04 Hours**
Unit-5:	**Value based text reading:** Short story. • The Barber's Trade Union – Mulk RajAnand	**03 Hours**
Text Books:	**1.** *Singh R.P., An Anthology of Short stories, O.U.P. New Delhi.*	
Reference Books:	***1.*** *Allen, W. "Living English Structure" Pearson Education, NewDelhi.* ***2.*** *Joseph, Dr C.J. & Myall E.G. "A Comprehensive Grammar of CurrentEnglish" Inter University Press, Delhi* ***3.*** *Kumar Sanjay &Pushplata "Communication Skills" Oxford University Press,New Delhi.*	

Course Code: **TMUGS-301**	**Value Added Audit Course (VAAC)-I** **Bachelor of Optometry** **Semester-III** **Managing Self**	**L-2** **T-1** **P-0** **C-0**
Course Outcomes:	**On completion of the course, the students will be:**	
CO1.	Utilizing effective verbal and non-verbal communication techniques in formal and informal settings	
CO2.	Understanding and analysing self and devising a strategy for self-growth and development.	
CO3.	Adapting a positive mindset conducive for growth through optimism and constructive thinking.	
CO4.	Utilizing time in the most effective manner and avoiding procrastination.	
CO5.	Making appropriate and responsible decisions through various techniques like SWOT, Simulation and Decision Tree.	
CO6.	Formulating strategies of avoiding time wasters and preparing to-do list to manage priorities and achieve SMART goals.	
Course Content:		
Unit-1:	**Personal Development:** Personal growth and improvement in personality Perception Positive attitude Values and Morals High self-motivation and confidence Grooming	**10 Hours**
Unit-2:	**Professional Development:** Goal setting and action planning Effective and assertive communication Decision making Time management Presentation Skills Happiness, risk taking and facing unknown	**8 Hours**
Unit-3:	**CareerDevelopment:** Resume Building OccupationalResearch Group discussion (GD) and Personal Interviews	**12 Hours**
Reference Books:	1. Robbins, Stephen P., Judge, Timothy A., Vohra, Neharika, Organizational Behaviour (2018), 18th ed., PearsonEducation 2. Tracy, Brian, Time Management (2018), ManjulPublishing House 3. Hill, Napolean, Think and grow rich (2014), AmazingReads 4. Scott, S.J., SMART goals made simple (2014), Createspace IndependentPub 5. https://www.indeed.com/career-advice/interviewing/job-	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: **BCO-S-351**	**Skill Enhancement Course-11** **Bachelor of Optometry** **Semester-III** **OPTOMETRIC OPTICS-I PRACTICAL**	**L-0** **T-0** **P-2** **C-1**
Course Content:		
1	Measurement of lens power, lens centration using conventional techniques	
2	Transposition of various types of lenses	
3	Knowledge to identify different forms of lenses a. (equi- convex, planoconvex, periscopic, etc.)	
4	Knowledge to select the tool power for grinding process.	
5	Measurement of surface powers using lens measure.	
6	Method of laying off the lens for glazing process.	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: **BCO-S-352**	**Skill Enhancement Course-12** **Bachelor of Optometry** **Semester-III** **OPTOMETRIC INSTRUMENTS PRACTICAL**	**L-0** **T-0** **P-2** **C-1**
Course Content:		
1.	Hands-on practice of the all major ophthalmic Instrument	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: **BCO-S-353**	**Skill Enhancement Course-13** **Bachelor of Optometry** **Semester-III** **OCULAR DISEASE –I PRACTICAL**	**L-0** **T-0** **P-2** **C-1**
Course Content:		
1	Visual Acuity chart/drum	
2	Retinoscopy	
3	Trail Box, Jackson Cross cylinder	
4	Direct ophthalmoscope	
5	Slit lamp Biomicroscope	
6	Tonometer: [Schiotz's, Applanation, Non-Contact, Tonopen Tonometer,]	
7	Keratometer	
8	Lensometer	
9	A – Scan Ultrasound	
10	Color Vision [ishihara,]	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: **BCO-S-354**	**Skill Enhancement Course (SEC)-14** **Bachelor ofOptometry** **Semester-III** **HOSPITAL POSTING**	**L-0** **T-0** **P-6** **C-3**
Course Content:	Students will gain additional skills in clinical procedures, interaction with patients and professional personnel.	

Course Code: BCO-S-401	**Discipline Specific Course (DSC)-13** **Bachelor of Optometry** **Semester-IV** **OPTOMETRIC OPTICS II & DISPENSING OPTICS**	**L-4** **T-0** **P-0** **C-4**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding to select the tool power for grinding process	
CO2.	Understanding about different types of materials used to make lenses and its characteristics	
CO3.	Understanding about Spectacle frames, various Lens designs,	
CO4.	Analyzing various dispensing spectacle lens and frames based on the glass prescription	
CO5.	Evaluating various facial measurements - Interpupillary distance measurement and measuring heights (single vision, multifocal, progressives)	
Course Content:		
Unit-1:	• 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	**8hrs**
Unit-2:	• Definition of Spectacle frames • Parts of spectacle frames • Frames types-Full frames, Supra-frames and Rimless, • Frame materials (Metal & Plastic) • Frame selection • Frame Measurement-Datum System and Boxing System • Facial Measurements-IPD (PD Ruler & Pupillometer), VD, Facial Wrap, Pantoscopic Tilt • Frame Adjustment. • Spectacle Delivery - on eye verification	**6 hrs**

Unit-3:	• Classification of optical radiation • Radiant and Eye • Types of reflection • Reflection from lens surface • Lens Coating- Types of Coating and their importance. • Theory of Anti-Reflection Coating. • Glares & its types • Absorptive lens (tinted lens &filters , photo chromic lenses, polarized lenses • Ideal sunglasses	**6 hrs**
Unit-4:	• Introduction: bifocals, indications • Types of bifocals • Calculations related to bifocal (image jump) • Introduction: PALs • Designs & optics of PALs • Progressive lens Markings • Trouble shooting of PALs	**8 hrs**
Unit-5:	• Special types of spectacles • Paediatric Dispensing (uniqueness of paediatric Dispensing, frame, lens & measurement) • Safety & sport eyewear • Aniseikonia &Aniseikonic lenses • Specialty sunglasses	**6 hrs**
Text Books:	1. C W Brooks, IM Borish: System for Ophthalmic Dispensing, 3rdedition, Butterworth - Heinemann, 2007	
ReferenceBooks:	1. Michael P Keating: Geometric, Phisical & Visual Optics, 2nd edition, Butterworth – Heinemann, 2002	
E- Learning site	https://cybersight.org/online-learning/https://www.aao.org/education-course https://abdocollege.org.uk/news/become-a-dispensing-optician-2/	

Course Code: BCO-S-402	**Discipline Specific Course (DSC)-14** **Bachelor of Optometry** **Semester-IV** **VISUAL OPTICS II**	**L-4** **T-0** **P-0** **C-4**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding about accommodation, its anomalies and their practical significance	
CO2.	Understanding about convergence, its anomalies and their clinical significance	
CO3.	Have a knowledge about retinoscopy and its procedure	
CO4.	Analyzing the importance of subjective and objective refraction	
CO5.	Applying the theoretical knowledge on clinical practice	
Course Content:		
Unit-1:	• Visual Acuity & its component • Optics of ocular structure (Different Refractive media) • Schematic and reduced eye	**8 hrs**
Unit-2:	• Measurements of Optical Constants of the Eye • Corneal & lens thickness • Axis & Angles of eye • Emmetropization • Refractive error (Myopia, Hypermetropia, Astigmatism) : types, Clinical features & its management	**6 hrs**
Unit-3:	• Visual functions & its types • Clinical relevance of interference, Diffraction, Polarization • Accommodation & Convergence: Anomalies • Accommodation & Convergence relationship	**6 hrs**
Unit-4:	• SubjectiveRefraction • Principle andfogging • Fixed astigmatic dial (Clock dial), Combination of fixed and rotator block test), J.C.C dial (Fan) • Duo chrometest • Binocular balancing- alternate occlusion, prism dissociation, dissociate • Duo chrome balance, Borish dissociated fogging	**8 hrs**
Unit-5:	• Effective Power &Magnification • Ocular refraction vs. Spectaclerefraction • Spectacle magnification vs. Relative spectaclemagnification • Axial vs. Refractive Ametropia, Knapp'slaw	**8hrs**

	• Ocular accommodation vs. Spectacleaccommodation • Retinal image blur-Depth of focus and depth offield	
Text Books:	1. George K. Hans, Kenneth Cuiffreda: Models of the visual system, Kluwer Academic, NY, 2002	
Reference Books:	. 1. Theodore Grosvenor: Primary Care Optometry, 5thedition, Butterworth –Heinemann,2007 2. Duke –Elder's practice ofRefraction 3. AI Lens: Optics, Retinoscopy, and Refractometry:2nd edition, SLACK Incorporated (p) Ltd, 2006 4. Leonard Werner, Leonard J. Press: Clinical Pearlsin Refractive Care, Butterworth – Heinemann,2002 5. David B. Elliot: Clinical Procedures in Primary Eye care, 3rd edition, Butterworth – Heinemann,2007 6. WJ Benjamin: Borish's clinical refraction,2ndedition, Butterworth Heinemann,Missouri, USA, 2006	
E- Learning site	https://cybersight.org/online-learning/https://www.aao.org/education-course https://abdocollege.org.uk/news/become-a-dispensing-optician-2/	

Course Code: **BCO-S-403**	**Discipline Specific Course(DSC)-15** **Bachelor ofOptometry** **Semester-IV** **OCULAR DISEASE II**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding the concept of different Ocular diseases of posterior segment of Eye	
CO2.	Applying the concept of anatomy & Physiology of Eye while understanding the Pathology of different ocular diseases	
CO3.	Utilizing the concept of clinical features of the diseases for the differential diagnosis of the ocular diseases	
CO4.	Analyzing the concept of clinical features of the diseases for the management of ocular diseases	
Course Content:		
Unit-1:	• Vitreous opacities its Pathogenesis, Clinical & Management. • Vitreous degeneration its Pathogenesis, Clinical & Management. • Vitreous inflammation its Pathogenesis, Clinical & Management. • Vitreous hemorrhage its Pathogenesis, Clinical & Management. • Vitreous detachment, its Pathogenesis, Clinical & Management.	**6 hrs**
Unit-2:	• Disorder of choroid its Pathogenesis, Clinical & Management. • **Vascular disorder of retina:** CRVO, BRVO,CRAO, BRAO,Diabetic Retinopathy, Hypertensive Retinopathy & their Pathogenesis, Clinical & Management.	**6hrs**
Unit-3:	• ROP, CSCR, Valsva Retinopathy • **Retinal detachment**: Type, Pathogenesis and its management • **Ocular Injuries:** Closed & Open Injuries, Mechanical & Non-Mechanical Injuries – its management.	**6hrs**
Unit-4:	• Lesions of the visual pathway • Pupillary Reflex & Abnormalities • Optic neuritis, ischemic and non-ischemic optic neuropathy, Papilledema, optic atrophy- Pathogenesis and their management • Cortical blindness Malingering	**6hrs**
Unit-5:	• Glaucoma: Definition, Pathogenesis, Classification (congenital, Primary open, close, Normal tension, Secondary glaucoma) and their pharmacological & surgerical management.	**6hrs**

Text Books:	**1.** A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international(p) Ltd. Publishers, New Delhi, 2007	
Reference Books:	1. . Stephen J. Miller: Parsons Diseases of the Eye, 18thedition, Churchill Livingstone, 1990 2. Jack J. Kanski Clinical Ophthalmology: ASystematic Approach, 6th edition, Butterworth-Heinemann,2007	
E- Learning site	https://cybersight.org/online-learning/https://www.aao.org/education-course	

Course Code: **BCO-S-404**	**CORE COURSE (CC)-6** **Bachelor of Optometry** **Semester-IV** **PATHOLOGY**	**L-2** **T-0** **P-0** **C-2**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding the basic concepts of infection, Inflammation and repair	
CO2.	Understanding the clinical features of various diseases like Tuberculosis, Leprosy, Syphilis	
CO3.	Understanding the clinical features of Anemia, Leukemia, Bleeding disorders	
CO4.	Understanding the clinical features Circulatory disturbances like Thrombosis, Infarction, Embolism	
CO5.	Analyzing the urine report, blood smear	
Course Content:		
Unit-1:	• Inflammation and repair • Infection in general	**4hrs**
Unit-2:	• Specific infections • Tuberculosis • Leprosy • Syphilis • Fungalinfection • Viral chlamydial infection	**6hrs**
Unit-3:	• Neoplasia • Hematology • Anemia • Leukemia • Bleeding disorders	**4 hrs**
Unit-4:	• Circulatory disturbances • Thrombosis • Infarction • Embolism • Clinicalpathology • Interpretation of urinereport • Interpretation of blood smears.	**6hrs**
Unit-5:	• Immunesystem • Shock,Anaphylaxis. • Allergy	**4hrs**
Text Books:	**1.** K S Ratnagar: Pathology of the eye & orbit, Jaypee brothers Medical Publishers,1997	

Reference Books:	1. Corton Kumar and robins: Pathological Basis ofthe Disease, 7th Edition, Elsevier, New Delhi,2004. 2. S R Lakhani Susan AD & Caroline JF: Basic Pathology: An introduction to the mechanism of disease,1993	
E-learning site	https://www.emjreviews.com/innovations/article/e-learning-in-pathology-education-a-narrative-review-and-personal-perspective/	

Course Code: BCO-S-405	**Discipline Specific Course (DSC)-16** **Bachelor of Optometry** **Semester-IV** **BASIC AND OCULAR PHARMACOLOGY**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding the basics of drugs and its different sources as well as pharmaco-dynamics and pharmaco-kinetics.	
CO2.	Understanding the concept & terminologies of Pharmacology and Ocular preparations.	
CO3.	Understandingthe advantages and disadvantages ofgeneral routes of drug administration and routes of drug administration in Ophthalmology.	
CO4.	Applying of different pharmaceutical agents in the management of Ocular disease as well as managing Ocular Toxicity.	
CO5.	Analyzing and applying diagnostic and therapeutic drugs in Ophthalmology.	
Course Content:		
Unit-1:	• **General Pharmacology:** Introduction & sources of drugs, Routes of drug administration, Pharmacokinetics (emphasis on ocular pharmacokinetics), Pharmacodynamics & factor modifying drug	**6 hrs**
Unit-2:	• **Systemic pharmacology-** ANS, drugs affecting pupillary size and light reflex, intraocular tension, Accommodation. • **General & local anesthetics, Chemotherapy:** Introduction on general chemotherapy, specific chemotherapy Antiviral, antifungal, antibiotics; steroids, Anti-diabetics; Blood Coagulants	**6hrs**
Unit-3:	• **Ocular Pharmacology:** Ocular preparations, Ocular pharmacokinetics, methods of drug administration andspecial drug delivery system, Ocular toxicology.	**6hrs**
Unit-4:	• **Diagnostic & Therapeutic applications of drugs used in Ophthalmology:** Diagnostic Drugs & biological agents used in ocular surgery, Anesthetics used in ophthalmic procedure Anti-glaucoma drugs; Pharmacotherapy of ocular infections– Bacterial, viral, fungal	**6hrs**

Unit-5:	• Drugs used in allergic, inflammatory& degenerative conditions of the eye; Immune modulators in Ophthalmic practice,Wetting agents & tear substitutes and anti-oxidants	**6hrs**
Text Books:	1. K D Tripathi: Essentials of Medical Pharmacology. 5th edition, Jaypee, New Delhi, 2004	
Reference Books:	. 1. CORTON KUMAR AND ROBINS: Pathological Basis ofthe Disease, 7th Edition, Elsevier, New Delhi,2004. 2. S R Lakhani Susan AD & Caroline JF: Basic Pathology: An introduction to the mechanism of disease,1993	
E-Learning site	**https://study.com/academy/lesson/ocular-pharmacology-pharmacokinetics.html**	

Course Code: BCO-S-406	**ABILITY ENHANCEMENT COURSE (AEC) -5** **Bachelor of Optometry** **Semester-IV** **INTRODUCTION TO QUALITY AND PATIENT SAFETY**	L-2 T-0 P-0 C-2
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding the concept of Quality assurance of different equipment used in ophthalmic department and its management	
CO2.	Understanding the concept of basics of emergency care and life support skills	
CO3.	Applying concept of biomedical waste management and environment safety.	
CO4.	Applying concept of Infection and prevention control	
CO5.	Understanding the concept of ocular drainage and other mechanical systems.	
CO6.	Utilizing the concept of disaster preparedness and management	
Course Content:		
Unit-1:	• Quality assurance andmanagement	**4hrs**
Unit-2:	• Basics of emergency care and life supportskills	**6hrs**
Unit-3:	• Biomedical waste management and environmentsafety	**4 hrs**
Unit-4:	• Infection and preventioncontrol	**6hrs**
Unit-5:	• Antibiotic resistance	**4hrs**
Text Books:	Faculty to recommend	
Reference Books:	. Faculty to recommend	
E-Learning site	**https://www.coursera.org/learn/quality-healthcare** **https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/patientsafetyculture/hospital/userguide/hospcult.pdf**	

Course Code: BCO-S-407	**Core course (CC) -7 Bachelor of Optometry Semester-IV MEDICAL PSYCHOLOGY**	L-2 T-0 P-0 C-2
Course Outcomes	**On completion of the course, the students will be:**	
CO1.	Understanding the concept of Medical Psychology.	
CO2.	Applying concept of Medical Psychology in clinic.	
CO3.	Applying concept of learning, personality and Motivation in Clinic	
CO4.	Understanding the concept of Body Image & language.	
CO5.	Utilizing Patient-therapist relation in clinic.	
CO6.	Analyzing the mentality of patient for present illness.	
Course Content:		
Unit-1:	• Introduction toPsychology • Intelligence Learning, Memory, Personality,Motivation	**4hrs**
Unit-2:	• Body Integrity – one's bodyimage • The patient in his Milen	**6hrs**
Unit-3:	• The self-concept of the therapist, Therapist-patientrelationship – some guidelines • Illness, its impact on thepatient	**4 hrs**
Unit-4:	• Maladies of the age and their impact on the patient's ownand others concept of his body image	**6hrs**
Unit-5:	• Adapting changes inVision • Why Medical Psychology demandscommitment	**4hrs**
Text Books:	1. Patricia Barkway. Psychology for health professionals, 2nd edition, Elsevier, 2013	
E-Learning site	. https://www.docsity.com/en/subjects/clinical-psychology/	

Course Code: **BCO-S-408**	**Discipline Specific Elective Course (DSEC)-I** **Bachelor of Optometry** **Semester-IV** **EYE BANKING**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes:	**On completion of the course, the students will be:**	
CO-1	Understanding the basic concepts of Eye banking	
CO-2	Understanding different methods of eye donation	
CO-3	Understanding different methods of Enucleation of eye	
CO-4	Understanding the procedure of storage of Eye in Eye bank	
Course Content:		
Unit-1:	**Quality Assurance and Control:** EB Medical Standards, EB Standardized Procedures, Sterilization, Refrigeration and Temperature Recording, Instrument Inspection, Cleaning, and Handling, Quality Assurance Monitoring	**6 Hours**
Unit-2:	• Record Keeping andDocumentation • ProfessionalStandards • Adverse ReactionReports • Consent Informed Consent Procedures andDocumentation • Donor History, Screening, andEvaluation • Determination ofSuitability	**6 Hours**
Unit-3:	• Donation • Transplant • Legislation and RegulatoryRequirements	**6 Hours**
Unit-4:	• **Preservation ofTissue** o Procedures andMethods • PreservationMedia • **Transport and Storage ofTissue** o Packaging andLabeling	**6 Hours**
Unit-5:	• **Examination and Evaluation ofTissue** o Slit Lamp Bio microscopy o Specular Microscopy o Other	**6 Hours**
Text Books:	Essentials of Eye Banking: by A. Panda	

Reference Books:	Eye Banking : T. Bredehorn, Gernot Duncker, W. John Armitage **Postgraduate Ophthalmology, Volume 1Zia Chaudhuri, MurugesanVanathi**	

Course Code: **BCO-S-409**	**Discipline Specific Elective Course** **(DSEC)-I** **Bachelor of Optometry** **Semester-IV** **DRY EYE**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes:	**On completion of the course, the students will be:**	
CO-1	Understanding the basic concepts of Dry Eye	
CO-2	Understanding Aetiology and Pathophysiology of Dry Eye	
CO-3	Analyzing the different methods of Diagnosis Dry Eye.	
CO-4	Applying the Optometric Management for Dry Eye	
Course Content:		
Unit-1:	• Anatomy of Lacrimal system, Tear film & Cornea • Physiology of Tear film • Tear secretion and its changes with age.	**6 Hours**
Unit-2:	• Definition of Dry Eye • Classification of Dry Eye • Etiology & Pathophysiology of Dry Eye • Clinical Pictures Of Dry Eye	**6 Hours**
Unit-3:	• Inflammatory condition associated with Dry Eye • Meibomian Gland disorder and deformities. • Allergic condition and the Dry Eye • Medication (Topical & Systemic) effecting Tear secretion • Effects of systemic condition and various Syndromes [Thyroids, Arthritis, SJS, Sjogrens Syndrome, CVS (dry eye specifically)]	**6 Hours**
Unit-4:	• Diagnosis (SlitLmp Biomicroscope Examination) [Evaporation dry eye diagnosis, Osmolarity testing, TBUT, Schirmer Test (I,II), Non Invasive BUT, NI Tear Meniscus Hight, Lipid Layer Thickness, FCT] • Infrared Meibography • Tearoscope • Interpherometry • Thermography	**6 Hours**
Unit-5:	• Management (Medical Intervention, Surgical Intervention) • Optometric management of Dry Eye (Environmental modification, Punctul Plugs, Specific water gradient CLs to preserve tear, Scleral lenses concept Introduction, Treating MGD with Lipid flow and it's indication, efficacy)	**6 Hours**
Text Books:	IACLE Module II	

Course Code: **TMUGE 401**	**Ability Enhancement Compulsory Course (AECC)-6** **Bachelor of Optometry** **SEMESTER-IV** **English Communication-IV**	**L-2** **T-0** **P-2** **C-3**
Course Outcomes:	**On completion of the course, the students will be:**	
CO1.	Remembering and understanding the English grammar and vocabulary.	
CO2.	Understanding the essentials of effective listening and speaking.	
CO3.	Understanding the corporate expectations and professional ethics.	
CO4.	Applying correct vocabulary and sentence construction during professional writing or job interviews.	
CO5.	Analyzing different types of interviews.	
CO6.	Developing the skills to create resume, C.V. or cover letter.	
Course Content:		
Unit-1:	**Vocabulary & Grammar** 2. Homophones and Homonyms 3. Correction of Common Errors (with recap of English Grammar with its usage in practical context.) 4. Transformation of sentences	**12 Hours**
Unit-2:	**Essence of Effective listening & speaking** • Listening short conversation/ recording (TED talks / Speechesby eminent personalities) *Critical Reviewofthese abovementioned*,Impromptu	**05 Hours**
Unit-3:	**Professional Writing** • Proposal: Significance, Types, Structure &AIDA • Report Writing: Significance, Types, Structure& Steps towardsReport writing	**08 Hours**
Unit-4:	**Job Oriented Skills** • CoverLetter • Preparing Resume andCurriculum-Vitae • Interview: Types of Interview, Tips for preparing for Interview andMock Interview • Corporate Expectation & Professional ethics: Skills expected in corporate world	**10 Hours**

Unit-5:	**Value based text reading:** Short story • A Bookish Topic – R.K.Narayan	**05 Hours**
Text Books:	1. *Raman Meenakshi & Sharma Sangeeta, "Technical Communication-Principles& Practice" Oxford university press , New Delhi .* 2. *Mohan K. & Sharma R.C., "Business Correspondence of ReportWriting",TMH, New Delhi.* 3. *Chaudhary, Sarla "Basic Concept of Professional Communication" Dhanpat Rai Publication, NewDelhi.*	
Reference Books:	4. *Kumar Sanjay &Pushplata "Communication Skills" Oxford University Press,New Delhi.* 5. *Agrawal, Malti "Professional Communication" KrishanaPrakashan Media(P) Ltd. Meerut.*	

Course Code: **TMUGS-401**	**Value Added Course (VAC)-II** **Bachelor of Optometry** **Semester-IV** **Managing Work and Others**	**L-2** **T-1** **P-0** **C-0**
Course Outcomes:	**On completion of the course, the students will be:**	
CO1.	Communicating effectively in a variety of public and interpersonal settings.	
CO2.	Applying concepts of change management for growth and development by understanding inertia of change and mastering the Laws of Change.	
CO3.	Analysing scenarios, synthesizing alternatives and thinking critically to negotiate, resolve conflicts and develop cordial interpersonal relationships.	
CO4.	Functioning in a team and enabling other people to act while encouraging growth and creating mutual respect and trust.	
CO5.	Handling difficult situations with grace, style, and professionalism.	
Course Content:		
Unit-1:	**Intrapersonal Skills:** Creativity and Innovation Understanding self and others (Johari window) Stress Management Managing Change for competitive success Handling feedback and criticism	**08 Hours**
Unit-2:	**Interpersonal Skills:** Conflict management Development of cordial interpersonal relations at all levels Negotiation Importance of working in teams in modern organizations Manners, etiquette and net etiquette	**12 Hours**
Unit-3:	**Interview Techniques:** Job Seeking Group discussion (GD) Personal Interview	**10 Hours**
ReferenceBooks:	1. *Robbins, Stephen P., Judge, Timothy A., Vohra, Neharika,Organizational Behaviour (2018), 18th ed., PearsonEducation* 2. *Burne, Eric, Games People Play (2010), PenguinUK* 3. *Carnegie, Dale, How to win friends and influence people (2004),RHUK* 4. *Rathgeber, Holger, Kotter, John, Our Iceberg is melting (2017),Macmillan* 5. *Steinburg, Scott, Nettiquette Essentials (2013),Lulu.com* 6. *https://www.hloom.com/resumes/creative-templates/* 7. *https://www.mbauniverse.com/group-discussion/topic.php* 8. *https://www.indeed.com/career-advice/interviewing/job-interview-tips-how-to-make-a-great-impression*	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: BCO-S-451	**Skill Enhancement Course (SEC) -15** **Bachelor of Optometry-** **Semester-IV** **Optometric Optics –II & Dispensing Practical**	**L-0** **T-0** **P-2** **C-1**
Course Outcomes		
1.	Find out the meridian & optical center of ophthalmic lens,	
2	Neutralization – manual & help of Lensometer	
3	Identification of lens-spherical, cylindrical & sphero-cylindrical lenses,	
4	Lens-surfacing & edging, cutting & marking of single vision bifocal progressive	
5	Frame measurement: The boxing system, the datum system. Comparison of the two systems, Lens position, segment specification,	
6	Frame selection: Fashion, Function & standard alignment,	
7	Lens selection: Ground rule for selection, selection criteria,	
8	Facial measurements: The PD, Visual axes, & measuring inter-Pupillary distance using P.D ruler., Common difficulties in measuring P.D, measuring monocular P.D, measuring near C.D., Measuring heights: - single vision, bifocal, multifocal, progressive,	
9	Pediatric dispensing.	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: **BCO-S-452**	**Skill Enhancement Course (SEC) -16** **Bachelor of Optometry-** **Semester-IV** **HOSPITAL POSTING**	**L-0** **T-0** **P-6** **C-3**
	Students will improve their skills in clinical procedures, and then progressive interactions with patients and professional personal are monitored as students practice optometry in supervised setting. Additional area includes problem solving and complications of various managements will be inculcated. Students should have exposure to eye bank facilities and must be made aware of eye donation, collection of eyes, preservation, pre- and post-operative instructions and latest techniques for preservation of donor cornea. The students will get clinical training on the practical aspects of the following courses namely optometric optic –II & dispensing optics, visual optics – II and ocular disease -II.	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: **BCO-S-453**	**Skill Enhancement course (SEC)-18** **Bachelor of Optometry** **Semester-IV** **EYE BANKING-PRACTICAL**	**L-0** **T-0** **P-2** **C-1**

	• **Preservation ofTissue**
	  • Procedures andMethods
	  • PreservationMedia
	• **Transport and Storage ofTissue**
	• Packaging andLabeling	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: **BCO-S-454**	**Skill Enhancement course (SEC)-18** **Bachelor of Optometry** **Semester-IV** **DRY EYE-PRACTICAL**	**L-0** **T-0** **P-2** **C-1**
	- Dry eye evaluation - Invasive & Non-Invasive Test	

Course Code: BCO-S-501	**Discipline Specific Course (DSC) -17** **Bachelor of Optometry** **Semester-V** **Contact Lens-I**	**L-4** **T-0** **P-2** **C-5**
Course Outcomes:	**On completion of the course, the students will be:**	
CO1.	Understanding about contact lens history, introduction, design & relation with structure of eye	
CO2.	Understanding about RGP contact lens material & their property their parameter	
CO3.	Understanding about RGP contact lens manufacturing techniques & fitting of RGP lenses	
CO4.	Understanding and know about care maintenance and do's & don't of RGP contact lens	
CO5.	Learn about complication and their management of RGP contact Lenses	
Course Content:		
Unit-1:	• Review of Anatomy & Physiology of Tear film, cornea • Definition of Contact lens &various Classification • Optics & design of RGP Contact Lenses • Vertex distance calculation	**8 Hours**
Unit-2:	• Introduction**&**types of RGP materials • Properties of various RGP materials - Physiological, Physical, Optical • Manufacturing technique of CL • Indication & contraindication of RGP • Selection of parameters of RGP • Effect of change in parameters of RGP	**6 Hours**
Unit-3:	• 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	**6 Hours**

Unit-4:	• Common handling instructions
	• Do's & Don't of RGP
	• Care & maintenance of RGP
	  ▪ Cleaning
	  ▪ Rinsing
	  ▪ Disinfecting (one step & two step)
	  ▪ Protein removers
	• MPS
		6 Hours

Unit-5:	• Types of contact lens deposit
	• Complications
	  ▪ Inflammation & staining related
	  ▪ Oedema & Hypoxia related
	  ▪ Mechanical & pressure related
	• Management of Complications
		8 Hours

Text Books:	1.IACLE modules 1 -10 *** Latest editions of all the suggested books are recommended.**	
E- Learning site	https://iacle.org/https://www.clspectrum.com/ https://www.bausch.com/ecp/for-your-practice/training-toolshttps://www.jnjvisionpro.ca/education-centre	

Course Code: **BCO-S-502**	**Discipline Specific Course (DSC) -18** **Bachelor of Optometry** **Semester-V** **Low Vision Care**	**L-3** **T-0** **P-2** **C-4**
Course Outcomes:	**On completion of the course, the students will be:**	
CO1.	Understanding the basic definition and classification of Low Vision	
CO2.	Analyzing the various causes of Low Vision	
CO3.	Understanding how to do examination of a low vision Patient,	
CO4.	Applying various optical and non-optical devices for visual rehabilitation of a low visionPatient.	
CO5.	Understanding the legal aspects of Low Vision in India, as well as applying case studies to for visual rehabilitation of a low vision Patient.	
Course Content:		
Unit-1:	✓ Definitions & classification of Low vision ✓ Global Prevalence,causes, symptoms of low vision ✓ Psycho-social implication of low vision	**6 Hours**
Unit-2:	✓ Clinical assessment of low vision patients: Review of Medical records, Observation & interview, identification of needs, visual acuity: Near & distance, Pinhole vision, Visual fields assessment, Refraction, Contract sensitivity, Glare sensitivity, Additional test.	**6 Hours**
Unit-3:	✓ Low vision aids: Optical, Non-Optical, Electronic Devices. ✓ Telescope: Galilean & Keplerian & related calculation. ✓ Magnification & its types	**6 Hours**
Unit-4:	• **Mobility & Orientation:**Introduction, Instruction, Pre Cane Skills, Sight Guided Technique • Using cane Technique • Using other senses for Orientation	**6 Hours**
Unit-5:	• Legal aspects of Low vision in India • Case Analysis: on basis of Different diseases causing Low vision • Few latest innovations in low vision devices	**6 Hours**
Text Books:	1. Richard L. Brilliant: Essentials of LowVision Practice,Butterworth-Heinemann,1999	

Reference Books:	1. Helen Farral: optometric Management of Visual Handicap, Blackwell Scientificpublications,1991 A J Jackson, J S Wolffsohn: Low VisionManual, ButterworthHeinnemann,2007	
E-Learning Site	https://lowvision.preventblindness.org/vision-related-web-sites/	

Course Code: **BCO-S-503**	**Discipline Specific Course (DSC) -19** **Bachelor of Optometry** **Semester-V** **Geriatric & Pediatric Optometry**	**L-3** **T-0** **P-2** **C-4**
Course Outcomes:	**On completion of the course, the students will be:**	
CO1.	Understanding the concept of Ocular anatomy and Physiology.	
CO2.	Understanding the concept of systemic diseases of geriatric and pediatric patients.	
CO3.	Applying concept of optometric Evaluation procedure.	
CO4.	Understanding the concept of ocular drainage and other mechanical systems.	
CO5.	Utilizing the concept of various optical and primarily medicated intervention and therapeutic procedure.	
Course Content:		
Unit-1:	• Structural, and morphological changes of eye in elderly • systemic diseases (Hypertension, Atherosclerosis, coronary heart disease, congestive Heart failure, Cerebrovascular disease, Diabetes, COPD),	**6 Hours**
Unit-2:	• Optometric Examination of the Older Adult • Ocular diseases common in old eye, with special reference to cataract, glaucoma, macular disorders, vascular diseases of the eye	**6 Hours**
Unit-3:	• Contact lenses in elderly, • Low vision causes, management and rehabilitation in geriatrics • Spectacle dispensing in elderly – Considerations of spectacle lenses and frames	**6 Hours**
Unit-4:	• The Development of Eye and Vision • History taking Pediatric subjects • Assessment of visual acuity • Determining binocular status,	**6 Hours**

Unit-5:	• Normal appearance, pathology and structural anomalies of Orbit, Eye lids, Lacrimal system, Conjunctiva, Cornea, Sclera, Anterior chamber, Uveal tract, Pupil • Pediatric eye disorders: Cataract, Retinopathy of Prematurity, Retinoblastoma,	**6 Hours**
Text Books:	1. Paediatric Optometry –William Harvey/ Bernard Gilmartin, Butterworth – Heinemann, 2004 *** Latest editions of all the suggested books are recommended.**	
Reference Books:	1. OP Sharma: Geriatric Care –Atextbook of geriatrics and Gerontology, viva books, NewDelhi,2005 2. VS Natarajan: An update on Geriatrics,Sakthi Pathipagam,Chennai,1998 3. DE Rosenblatt, VS Natarajan: Primer on geriatric Care A clinical approachto the older patient, Printers Castle, Cochin,2002 4. Binocular Vision and Ocular Motility-VON NOORDEN G K BurianVonNoorden's, 2nd Ed., C.V. Mosby Co. St.Louis,1980 5. Assessing Children's Vision. By SusanJ Leat, Rosalyn H Shute, Carol A Westall.45 Oxford: Butterworth-Heinemann,1999. 6. Clinical pediatric optometry. LJ Press, BDMoore, Butterworth-Heinemann,1993 *** Latest editions of all the suggested books are recommended.**	
E-Learning Site	**https://www.optometrystudents.com/pearl-categories/pediatrics-2/https://www.optimumvisionaz.com/pediatric-optometry-test/http://www.sdeyes.org/docs/CPG-2.pdf** **https://www.aston.ac.uk/study/courses/geriatric-optometry-standalone-module**	

Course Code: BCO-S-504	**Discipline Specific Course (DSC) -20** **Bachelor of Optometry** **Semester-V** **Binocular Vision-I**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes:	**On completion of the course, the students will be:**	
CO1.	Understanding the concept of Ocular anatomy and Physiology.	
CO2.	Understanding the concept of systemic diseases of geriatric and pediatric patients.	
CO3.	Applying concept of optometric Evaluation procedure.	
CO4.	Understanding the concept of ocular drainage and other mechanical systems.	
CO5.	Utilizing the concept of various optical and primarily medicated intervention and therapeutic procedure.	
Course Content:		
Unit-1:	Binocular Vision and Space perception. Relative subjective visual direction. Retino motor value, Grades of BSV, SMP and Cyclopean Eye Correspondence, Fusion, Diplopia, Retinal rivalry Horopter, Physiological Diplopia and Suppression, Stereopsis, Panum's area, BSV. Stereopsis and monocular clues –significance, Egocentric location, clinical applications. Theories of Binocular vision	**6 Hours**
Unit-2:	Anatomy of Extra Ocular Muscles. Recti and Obliques, LPS, Innervation & Blood Supply, Physiology of Ocular movements. Center of rotation, Axes of Fick. Action of individual muscle. Laws of ocular motility Sherrington's law, Hering's law, Uniocular & Binocular movements - fixation, saccadic & pursuits. Version & Vergence. Fixation &field of fixation	**6 Hours**
Unit-3:	RGP Contact Lens materials, Manufacturing Rigid and Soft Contact Lenses: various methods, Pre-Fitting examination: steps, significance, recording of results, Correction of Astigmatism with RGP lens	**6 Hours**
Unit-4:	Determining binocular status, Determining sensory motor adaptability Compensatory treatment and remedial therapy for: Myopia, Pseudomyopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia, Remedial and Compensatory treatment ofStrabismus	**6 Hours**

	and Nystagmus Paediatric eye disorders: Cataract, Retinopathy of Prematurity, Retinoblastoma, Neuromuscular conditions (myotonic dystrophy, mitochondrial cytopathy), and Genetic	
Unit-5:	Anterior segment dysgenesis, Aniridia, Microphthalmos, Coloboma, Albinism, Spectacle dispensing for children, Paediatric contact lenses, Low vision assessment in children	**6 Hours**
Text Books:	1. Binocular Vision and Ocular Motility - VON NOORDEN G K Burian Von Noorden's, 2nd Ed., C.V. Mosby Co. St. Louis,1980 *** Latest editions of all the suggested books are recommended.**	
Reference Books:	*** Latest editions of all the suggested books are recommended.**	
E-Learning site	https://cybersight.org/portfolio/lecture-binocular-vision-part-iii-managing-binocular-vision-disorders/ https://www.aao.org/Assets/0c711d7f-503f-4cd9-b4ac-92d6ec31a718/636343503854270000/strabismus-binocular-vision-and-ocular-motility-vnoorden-pdf?inline=1	

Course Code: BCO-S-505	**Discipline Specific Course (DSC) -21** **Bachelor of Optometry** **Semester-V** **Systemic Disease & Eye**	**L-3** **T-0** **P-0** **C-3**
Course Outcomes:	**On completion of the course, the students will be:**	
CO1.	Understanding the basics of systemic Disease having impact on the ocularhealth.	
CO2.	Understanding the definition, classification, clinical diagnosis, complications and management of various systemicdiseases.	
CO3.	Analyzing the Ocular manifestation of some common systemic diseaseslike DM, HT, etc	
CO4.	Understanding the pathophysiology of the changes due to ocularunderlying systemicdisease.	
CO5.	Applying the knowledge to manage the ocular manifestation of various systemic diseases	
Course Content:		
Unit-1:	• **Hypertension:** Definition, classification, Epidemiology, Clinical features, clinical examination & management. Hypertensive retinopathy &other Ocular manifestation of Hypertension. • **Diabetes Mellitus:** Definition,Classification, clinical features, Diagnosis & Management. Diabetic Retinopathy &other Ocular manifestation of Diabetes Mellitus.	**6 Hours**
Unit-2:	• **Thyroid Disease:** Physiology, testing for thyroid disease, Hyperthyroidism, Hypothyroidism**,** Grave's Ophthalmopathy&itsother Ocular manifestation • **Cancer:** Incidence, Etiology,classification, tumor & its types**,** Grading & staging of cancer, cancer Therapy.Ophthalmologic considerations • **Connective Tissue Disease-** Rheumatic arthritis**,** Scleroderma**,** Sjogren's syndrome**,** Behcet's Disease**,** Eye and connective tissue disease	**6 Hours**

Unit-3:	• **HIV-AIDS-**Definition,clinical features, Diagnosis, Prevention & Management. Ocular manifestation of AIDS. • **Syphilis-** Definition,clinical features, Diagnosis & Management**.** Ocular manifestation of Syphilis.	**6 Hours**
Unit-4:	• **Tuberculosis-**Aetiology, pathology, clinical features, pulmonary tuberculosis, diagnosis & management. Ocular manifestation of Tuberculosis. • **Malaria** Aetiology, pathology, clinical features & management. Ocular manifestation of Malaria. • **Leprosy** Aetiology, pathology, clinical features &management. Ocular manifestation of Leprosy.	**6 Hours**
Unit-5:	• **Toxoplasmosis:** Aetiology, pathology, clinical features & Its Ocular Manifestation • **Vitamin A Deficiency**: Xerophthalmia& Its WHO classification	**6 Hours**
Text Books:	1. C Haslett, E R Chilvers, N A boon, N R Coledge, J A A Hunter: Davidson's Principles and Practice of Medicine, Ed. John Macleod, 19th Ed., ELBS/Churchill Livingstone. (PPM), 2002 *** Latest editions of all the suggested books are recommended.**	
E-Learning sites	https://www.aao.org/clinical-education http://www.icoph.org/med/ppt/systemic.pdf	

Course Code: BCO-S-506	**Compulsory Specified Course (CSC) -1** **Bachelor of Optometry** **Semester-V** **Research methodology & Biostatistics**	**L-4** **T-0** **P-0** **C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding the basic concept of research methodology.	
CO2.	Understanding the concept of Ethical issues in research & different types of Researchdesign.	
CO3.	Understanding the Research tools and Data collection methods	
CO4.	Understanding the Sampling methods.	
CO5.	Applying the concept to Develop a research proposal	
Course Content:		
Unit-1:	Introduction to research methods Identifying research problem	**6 Hours**
Unit-2:	Ethical issues in research Research design	**6 Hours**
Unit-3:	Types of Data Research tools and Data collection methods	**6 Hours**
Unit-4:	Sampling methods Developing a research proposal	**8 Hours**
Unit-5:	Introduction of Biostatistics- Measures of Morality, Sampling, Statistical significance, Correlation, Sample size determination. Collection of Data - presentation including classification and diagrammatic representation frequency distribution. Measures of central tendency; measures of dispersion.	**8 Hours**

	Theoretical distributions. Binomial, Normal Sampling – necessity of methods and techniques. Chi. Square test (2 x 2) Hospital Statistics Use of computerized software for statistics	
Text Books:	1.Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs, 2015 *** Latest editions of all the suggested books are recommended.**	
E-learning site	https://www.coursera.org/learn/research-methodshttp://lbpresearch.com/	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: **BCO-S-551**	**Skill Enhancement Course -19** **Bachelor of Optometry** **Semester-V** **Contact Lens I Practical**	**L-0** **T-0** **P-2** **C-1**
Course Content:		
1	Measurement of Oculardimensions	
2	Pupillary diameter and lid characteristics	
3	Blink rate and TBUT	
4	Schrimer's test, Slit lamp examination of tear layer	
5	Keratometry	
6	Placido'sdisc	
7	Soft Contact Lens fitting –Aspherical	
8	Soft Contact Lens fitting – Lathe cut lenses	
9	Soft Contact Lens over refraction	
10	Lens insertion and removal	
11	Lens handling and cleaning	
12	Examination of old soft Lens	
13	RGP Lens fitting	
14	RGP Lens Fit Assessment and fluorescein pattern	
15	Special RGP fitting (Aphakia, pseudo phakia &Keratoconus)	
16	RGP over refraction and Lens flexure	
17	Examination of old RGP Lens	
18	RGP Lens parameters,	
19	Slit lamp examination of Contact Lens wearers	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: **BCO-S-552**	**Skill Enhancement Course -20** **Bachelor of Optometry** **Semester-V** **Low Vision Care Practical**	**L-0** **T-0** **P-2** **C-1**
Course Content:		
	1.Attending in low vision care clinic and history taking.	
	1. Determining the type of telescope and its magnification(Direct comparison method& calculated method) 2. Determining the change in field of view withdifferent magnification and different eyeto lens distances with telescopes and magnifiers**.**	
	1. Inducing visual impairment and prescribingmagnification. 2. Determining reading speed with different types of lowvision aids withsame magnification. **3.** Determining reading speed with a low vision aid ofdifferent magnifications**.**	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: **BCO-S-553**	**Skill Enhancement Course -21** **Bachelor of Optometry** **Semester-V** **Geriatric & Pediatric Optometry Practical**	**L-0** **T-0** **P-2** **C-1**
Course Content:		
1	Deals with hand-on session the different geriatric and pediatric evaluation techniques	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: **BCO-S-554**	**Skill Enhancement Course (SEC) - 22** **Bachelor of Optometry** **Semester-V** **Hospital Posting**	**L-0** **T-0** **P-6** **C-3**
Course Content:		
1	The course provides students the opportunity to continue to develop confidence and increased skill in diagnosis and treatment delivery. Students will demonstrate competence in basic, intermediate and advance procedure in those areas. Students will participate in advance and specialized diagnostic and management procedure. Students will get practical experience of the knowledge acquired from geriatric and paediatric optometry courses. Hands-on experience under supervision will be provided in various outreach programme namely, school vision screening, glaucoma and diabetic retinopathy screening etc., Students also get hand-on practical sessions on the following courses namely, contact lens, low vision care, geriatric optometry and paediatric optometry.	

Course Code: **BCO-S-601**	**Discipline Specific Course (DSC) -22** **Bachelor of Optometry** **Semester-VI** **CONTACT LENS-II**	**L-3** **T-0** **P-2** **C-4**
Course Outcomes:	**On completion of the course, the students will be :**	
CO1.	Understanding about soft contact lens material & their property, selection of parameter	
CO2.	Understanding about soft contact lens fitting characteristics and evaluation of fitting	
CO3.	Understanding about toric soft contact lens, stabilization techniques and application	
CO4.	Learn about complication and their management of soft contact lenses	
CO5.	Understanding about specialty contact lenses	
Course Content:		
Unit-1:	Introduction to soft Contact lenses, Advantages of SCL, Comparison of RGP vs. SCL, Selection of Parameters, Properties of various SCL materials.	**6 Hours**
Unit-2:	Pre fitting evaluation of SCL, Fitting philosophies for SCL, Characteristics of types of fit.(steep, flat, optimal), Fit assessment in Soft Contact Lenses (steep, flat, optimal), After care & follow up (Do's and Don'ts), Market availability of SCL.	**6 Hours**
Unit-3:	Different type of stabilization technique & its characteristics, Fitting assessment of Toric SCL, MPS and its major components, Market availability of Toric lens.	**6 Hours**
Unit-4:	Complications of SCL (etiology, signs, symptoms and managements), Therapeutic CL (definition, Applications, fitting, after care), X-Chrome lens.	**6 Hours**
Unit-5:	Specialty contact lens, Pediatric Contact Lenses, Multifocal SCL, Ortho-k lens, Rose K lens, Scleral & semi-scleral.	**6 Hours**
Text Books:	1. IACLE modules 1 - 10	
Reference Books:	*** Latest editions of all the suggested books are recommended.**	
E- Learning site	https://iacle.org/https://www.clspectrum.com/ https://www.bausch.com/ecp/for-your-practice/training-toolshttps://www.jnjvisionpro.ca/education-centre	

Course Code: BCO-S-602	**Discipline Specific Course (DSC)-23** **Bachelor of Optometry** **Semester-VI** **BINOCULAR VISION-II**	**L-3** **T-0** **P-2** **C-4**
Course Outcomes:	On completion of the course, the students will be :	
CO1.	Understanding the classification of strabismus	
CO2.	Understanding the concept of recording history in strabismus patients	
CO3.	Understanding the clinical features of convergent & divergent Strabismus	
CO4.	Understanding the clinical features of vertical & paralytic Strabismus	
CO5.	Understanding the procedure of various investigation to rule out the types of strabismus	
Course Content:		
Unit-1:	Neuro-muscular anomalies- Classification and etiological factors, History – recording and significance.	6 Hours
Unit-2:	**Convergent strabismus-** Accommodative convergent squint- Classification, Investigation and Management**,** Non accommodative Convergent squint- Classification, Investigation and Management, **Divergent Strabismus-**Classification, A& V phenomenon, Investigation and Management.	6 Hours
Unit-3:	**Vertical strabismus-**Classification, Investigation and Management, **Paralytic Strabismus--**Classification, Investigation and Management, Distinction from comitant and restrictive Squint.	6 Hours
Unit-4:	**Investigations:** History and symptoms, Head Posture, Diplopia Charting, Hess chart, PBCT, Nine directions, Binocular field of vision, Amblyopia and Treatment of Amblyopia, Nystagmus.	6 Hours

Unit-5:	Non-surgical Management of Squint, Restrictive Strabismus, Features, Musculo- fascial anomalies, Duane's Retraction syndrome, Clinical features and management, Brown's Superior oblique sheath syndrome, Strabismus fixus, Congenital muscle, fibrosis, Surgical management.	6 Hours
Text Books:	1. Gunter K. VonNoorden: BURIAN- VON NOORDEN'S Binocular vision and ocular motility theory and management of strabismus, Missouri, Second edition, 1980, C. V. Mosby Company.	
Reference Books:	* Latest editions of all the suggested books are recommended.	
E-Learning site	https://cybersight.org/portfolio/lecture-binocular-vision-part-iii-managing-binocular-vision-disorders/ https://www.aao.org/Assets/0c711d7f-503f-4cd9-b4ac-92d6ec31a718/636343503854270000/strabismus-binocular-vision-and-ocular-motility-vnoorden-pdf?inline=1	

Course Code: BCO-S-603	**Discipline Specific Course (DSC)-24** **Bachelor of Optometry** **Semester-VI** **PUBLIC HEALTH AND COMMUNITY OPTOMETRY**	**L-2** **T-0** **P-0** **C-2**
Course Outcomes:	On completion of the course, the students will be :	
CO1.	Understanding about the concepts and definitions of public health	
CO2.	Understanding the role of optometrist in public health	
CO3.	Having a knowledge about various eye programme and screening procedures	
CO4.	Analyzing the role of optometrist in school screening programme	
CO5.	Analyzing the importance of tele ophthalmology in the field of optometry	
Course Content:		
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.	4 Hours
Unit-2:	Eye in primary health care, Contrasting between Clinical and community health programs, Community Eye Care Programs, Community based rehabilitation programs.	4 Hours
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.	6 Hours
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.	6 Hours
Unit-5:	Optometrists role in school eye health programmes, Basics of Tele Optometry and its application in Public Health, Information, Education and Communication for Eye Care programs.	4 Hours
Text Books:	1. GVS Murthy, S K Gupta, D Bachani: The principles and practice of community Ophthalmology, National programme for control of blindness, New Delhi, 2002	

Reference Books:	1. MC Gupta, Mahajan BK, Murthy GVS, 3rd edition. Text Book of Community Medicine, Jaypee Brothers, New Delhi, 2002. * Latest editions of all the suggested books are recommended.	
E- Learning site	https://www.aao.org/headline/alert-important-coronavirus-context	

Course Code: BCO-S-604	**Core Course (CC) -8** **Bachelor of Optometry** **Semester-VI** **PRACTICE MANAGEMENT**	**L-2** **T-0** **P-0** **C-2**
Course Outcomes:	On completion of the course, the students will be:	
CO1.	Understanding the concepts of Business Management and Practice Establishment.	
CO2.	Analyzing and Applying various aspects of Stocking, staffing and business Computerization in running an Optometry Clinic, Optical outlet or business.	
CO3.	Understanding, Analyzing and Applying various aspects of accounting principles, different sources of finance and cash flow.	
CO4.	Applying various rules of Book keeping to monitor and calculate final profit/Loss of a business establishment, and helps on taxation planning of the Establishment.	
CO5.	Understanding, Analyzing and Applying various aspects of professionalism, integrity, objectivity, personal values, team work, etc in running a business efficiently.	
Course Content:		
Unit-1:	Business Management: Practice establishment and development, Stock control and costing, Staffing and staff relations, Business computerization.	6 Hours
Unit-2:	Accounting Principles, Sources of finance, Bookkeeping and cash flow.	4 Hours
Unit-3:	Taxation and taxation planning.	4 Hours
Unit-4:	Professionalism and Values, Professional values- Integrity, Objectivity, Professional competence and due care, Confidentiality.	4 Hours
Unit-5:	Personal values- ethical or moral values, Attitude and behavior- professional behavior, treating people equally, Code of conduct, professional accountability and responsibility, misconduct, Differences between professions and importance of team efforts, Cultural issues in the healthcare environment.	6 Hours
Text Books:	1. Faculty to recommend	
Reference Books:	1. Faculty to recommend. * Latest editions of all the suggested books are recommended.	

Course Code: BCO-S-605	**Discipline Specific Course (DSC)-25** **Bachelor of Optometry** **Semester-VI** **OCCUPATIONAL OPTOMETRY**	**L-2** **T-0** **P-0** **C-2**
Course Outcomes:	On completion of the course, the students will be :	
CO1.	Understanding the general aspects of Visual health and Ocular Hygiene.	
CO2.	Understanding the role of various national and international bodies in guiding and maintaining standards of Visual Hygiene,and framing various Acts and rules.	
CO3.	Understanding the effects of various occupational hazards on the eye and applying Optometric expertise to provide protective measures and eye gears.	
CO4.	Analyzing and Applying various eye screening methods for various task/jobs and providing necessary eye protections and guidelines to avoid eye strain and fatigue	
CO5.	Analyzing the effect of Visual Display Unit and electronic gadgets on the eye and applying optometric expertise to manage the symptoms caused due to Visual display units.	
Course Content:		
Unit-1:	Introduction to Occupational health, hygiene and safety, international bodies like ILO, WHO, National bodies etc. - Acts and Rules - Factories Act, WCA, ESIAct.	6 Hours
Unit-2:	**Electromagnetic Radiation** and its effects on Eye, **Light**– functions and units, Sources, advantages and disadvantages, standards, **Color Definition**: Color theory, Color coding, Color defects, Color Vision tests	6 Hours
Unit-3:	Occupational hazards and preventive/protective methods, Task Analysis.	4 Hours
Unit-4:	**Industrial Vision Screening** – Modified clinical method and Industrial Vision test, **Vision Standards** – Railways, Roadways, Airlines.	4 Hours

Unit-5:	Visual Display Units, Contact lens and work	4 Hours
Text Books:	1. PP Santanam, R Krishnakumar, Monica R. Dr. Santanam's text book of Occupational optometry. 1st edition, Published by Elite School of optometry, unit of Medical Research Foundation, Chennai, India , 2015	
Reference Books:	1. 1. G W Good: Occupational Vision Manual available in the following website:www.aoa.org 2. N.A. Smith: Lighting for Occupational Optometry,HHSC Handbook Series, Safchem Services,1999 3. J Anshel: Visual Ergonomics Handbook, CRC Press,2005 4. G Carson, S Doshi, W Harvey: Eye Essentials: Environmental &Occupational Optometry, Butterworth-Heinemann, 2008 * Latest editions of all the suggested books are recommended.	
E- Learning site	https://www.sankaranethralaya.org/occupational_optometry.html	

Course Code: BCO-S-606	**Core Course (CC) -9** **Bachelor of Optometry** **Semester-VI** **MEDICAL LAW AND ETHICS**	L-2 T-0 P-0 C-2
Course Outcomes:	On completion of the course, the students will be:	
CO1.	Understanding the goal & scope of Medical ethics	
CO2.	Understanding the concept of Basic principles of medical ethics	
CO3.	Understanding the concept of Malpractice and negligence	
CO4.	Understanding the concept medico legal aspects of medical records	
CO5.	Understanding the standardized protocol to avoid near miss or sentinel events	
Course Content:		
Unit-1:	Medical ethics - Definition - Goal – Scope, Introduction to Code of conduct.	6 Hours
Unit-2:	Basic principles of medical ethics –Confidentiality, Malpractice and negligence - Rational and irrational drug therapy.	4 Hours
Unit-3:	Autonomy and informed consent - Right of patients, Care of the terminally ill- Euthanasia.	4 Hours
Unit-4:	Organ transplantation, Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege, communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.	6 Hours
Unit-5:	Professional Indemnity insurance policy, Development of standardized protocol to avoid near miss or sentinel events, Obtaining an informed consent.	4 Hours
Text Books:	Faculty to recommend	
Reference Books:	Faculty to recommend * Latest editions of all the suggested books are recommended.	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: BCO-S-651	**Skill Enhancement Course (SEC)-23** **Bachelor of Optometry** **Semester-VI** **CONTACT LENS II PRACTICAL**	L-0 T-0 P-2 C-1
	1. Examination of old softLens 2. RGP Lensfitting 3. RGP Lens Fit Assessment and fluoresceinpattern 4. Special RGP fitting (Aphakia, pseudo phakia & Keratoconus) 5. RGP over refraction and Lensflexure 6. Examination of old RGPLens 7. RGP Lensparameters 8. Fitting Cosmetic ContactLens 9. Slit lamp examination of Contact Lenswearers 10. Fitting Toric Contact Lens 11. Bandage ContactLens 12. SPM &Pachymetry at SN DuringClinics • Specialty Contact Lens fitting (at SN duringclinics)	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: BCO-S-652	**Skill Enhancement Course (SEC)-24** **Bachelor of Optometry** **Semester-VI** **BINOCULAR VISION II PRACTICAL**	**L-0** **T-0** **P-2** **C-1**
	1. Deals with hand-on session the basic binocular vision evaluation techniques.	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: BCO-S-653	**Skill Enhancement Course (SEC)-25** **Bachelor of Optometry** **Semester-VI** **PRACTICAL-HOSPITAL POSTING**	**L-0** **T-0** **P-6** **C-3**
	The course is the final series of five directed clinical courses. The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. Practical aspects of Binocular vision II, public health & community optometry, and occupational optometry will be covered under the studentship.	

Note: Course outcome of following practical's are covered in their respective theory courses

Course Code: BCO-S-654	**Skill Enhancement Course (SEC)-26** **Bachelor of Optometry** **Semester-VI** **RESEARCH PROJECT1**	**L-0** **T-0** **P-4** **C-2**
	Team of students will be doing a research project under the guidance of a supervisor (who could be optometrists/vision scientists/ ophthalmologist). Student will get the experience of doing a research in systematic approach – identifying the primary question, literature search, identifying the gaps in the literature, identifying the research question, writing up the research proposal, data collection, data analysis, thesis writing andpresentation Project is spread through sixth to eighth semester.	