HINDUSTAN
INSTITUTE OF TECHNOLOGY & SCIENCE
(DEEMED TO BE UNIVERSITY)
CHENNAI

Bachelor of Optometry (B. Optom)
(Duration: 4 Years)
CURRICULUM and SYLLABUS

With amendments as approved from 32nd ACM, 07-08-2021

(Applicable for the students admitted from 2021-22)

DEPARTMENT OF OPTOMETRY
SCHOOL OF ALLIED HEALTH SCIENCES
HINDUSTAN INSTITUTE OF TECHNOLOGY AND SCIENCE.

Table of Contents

1. Preamble

As per the recommendations of UGC, the Hindustan Institute of Technology and Science (HITS) - Deemed to be university under section 3 of UGC Act has introduced Choice Based Credit System (CBCS) from the academic year 2015-16. Choice Based Credit System (CBCS) is a proven, flexible mode of learning in higher education which facilitates a student to have guided freedom in selecting his/her own choices of courses in the curriculum for completing a degree program. This revision of regulations, curriculum and syllabi has been carried out further to make it more flexible and adaptive to the technology advancements and industry expectations aiming at a holistic career development. The system permits a student to:

i. Learn at their own pace through flexible registration process.
ii. Choose electives from a wide range of courses offered within and outside their departments.
iii. Undergo additional courses in their special areas of interest and earn additional credits to obtain B. Optom
iv. Adopt an interdisciplinary approach in learning.
v. Avail transfer of Credits.
vi. Gain Non – CGPA credits to enhance skill / employability by taking up additional project work, entrepreneurship, co-curricular and vocational training.
vii. Make the best use of the expertise of faculty and educational resources.
viii. Learn and earn credits through MOOC and Project Based Learning.
ix. Enhance domain Knowledge, Skill and Attitude through participation in innovative Curriculum Design, Delivery, Continuous Assessments, Industry Internships and Projects.

The Curriculum is designed based on Choice Based Credit System (CBCS) with focus on Project Based Learning and Industrial Training, enabling the students to become eligible and fully equipped for employment in industries, higher studies or entrepreneurship.

2. Definitions and Nomenclature

In these Regulations, unless the context otherwise requires:

1. “Programme” means Degree Programme like B.Optom Degree Programme.
2. “Discipline” means specialization or branch of B.Optom Degree Programme, (e.g., Visual Optics, Ocular Disease).
3. “Course” means a theory or practical subject that is normally studied in a semester, (e.g., Anatomy, Physiology, etc.).
4. “Vice – Chancellor of HITS” means the Head of the Institution.
5. “Registrar” is the Head of all Academic and General Administration of the Institution.
6. “Dean” means the authority of the institution who is responsible for all academic activities and implementation of relevant rules of these Regulations pertaining to their respective Academic programmes.
7. “Controller of Examinations” means the authority of the institution who is responsible for all activities related to the Examinations conducted by the Institution, publication of results, award of grade sheets and degrees.
8. “Head Student Affairs” is responsible for all student related activities including student discipline, extra and co – curricular activities, attendance and meetings with class representatives, Student Council and parent – teacher meet.
9. “HoD” means the Head of the Department concerned.
10. “Institution” means Hindustan Institute of Technology and Science (HITS), Chennai.
11. “TCH” means Total Contact Hours – refer to teaching – learning engagement.
12. “DEC” means Department Examination Committee.
13. “BoS” means Board of Studies.
14. “BoM” means Board of Management.
15. “ACM” means Academic Council meeting the highest authoritative body for approval for all Academic Policies.
16. “Class Teacher” is a faculty of the class who takes care of the attendance, academic performance and the general conduct of the students of that class.

17. “CIA” is Continuous Internal Assessment which is assessed for every student for every course during the semester.
18. “ESE” is End Semester Examination conducted by the Institution at the End of the Semester for all the courses of that semester.
19. “AICTE” means All India Council for Technical Education.
20. “UGC” means University Grants Commission.
21. “MHRD” means Ministry of Human Resource Development, Govt. of India.
22. “MHFW” means Ministry of Health and Family Welfare, Govt. of India.

3. HINDUSTAN INSTITUTE OF TECHNOLOGY AND SCIENCE

3.1.Motto

- To Make Every Man a Success and No Man a Failure.

3.2.Vision

- To be an International Institute of Excellence, providing a conducive environment for education with a strong emphasis on innovation, quality, research and strategic partnership blended with values and commitment to society.

3.3.Mission

- To create an ecosystem that promotes learning and world class research.
- To nurture creativity and innovation.
- To instil highest ethical standards and values.
- To pursue activities for the development of the Society.
- To develop national and international collaborations with institutes and industries of eminence.
- To enable graduates to become future leaders and innovators.

3.4.Value Statement

- Integrity, Innovation, Internationalization.

3.5.Further, the Institution always strives

- To train our graduates with the latest and the best in the rapidly changing fields of Architecture, Engineering, Technology, Management studies, Allied Health Sciences and Humanities, Laws and Liberal Arts.

- To develop graduates, with a global outlook, possessing Knowledge, Skills and Attitude and capable of taking up challenging responsibilities in the respective fields.
- To mould our graduates as citizens with moral, ethical and social values so as to fulfil their obligations to the nation and the society.
- To promote research in the field of Architecture, Engineering, Technology, Management studies, Health Science, Law, Design, Allied Health Sciences and Humanities, Liberal Arts and Allied disciplines.

3.6.Aims and Objectives of the Institution are focused on

- Providing state of the art education in Architecture, Engineering, Technology, Applied Sciences, Law, Health Sciences, Design, Liberal Arts, and Management studies.
- Keeping pace with the ever – changing technological scenario and help the graduates to emerge as competent professionals, fully aware of their commitment to the society and the nation.
- To inculcate a flair for Research, Development and Entrepreneurship.

4. SCHOOL OF OPTOMETRY

4.1. Vision:

- The School of Optometry of Hindustan Institute of Technology and Science endeavours to meet the challenges of the current and the imminent by being adaptive, novel and a trend constantly meeting the ever-growing demands of the medical community in Allied Health Sciences.
- The School also strives to be powerful instruments of change with initiative, creativity and dynamic verve for contributions to the global health.

4.2. Mission:

- To train and formulate competent, compassionate and ethical Allied Health professionals through student centred programmes that deal with robust syllabi and educate health care professionals from demographically diverse backgrounds.
- To meet the primary and special health care needs of the region and Nation at large, foster biomedical research that leads to scientific advances and the improvement of the health of the public.

4.3.Programme's Educational Objectives (PEO'S)

- **PEO 1** - Acquire the knowledge and skills for providing comprehensive patient care assistance in the Allied Health/Paramedics and Healthcare sector/industry.
- **PEO 2** - Inculcate the inter-disciplinary approach for diagnosing and management of patient's health problems.
- **PEO 3** - Improve the clinical, social and communication skills by providing hands on training in medical colleges and district hospitals.

4.4.Programme's Outcomes (PO's)

1. **Independent worker:** Prepare students to work as independent optometrist or as part of a multidisciplinary team to assess, evaluate, diagnose, plan, treat, and document it in accordance with red and yellow flags.
2. **Practice ethically:** The student will be a qualified optometry practitioner who can work safely and successfully in a variety of Optometry clinic or hospitals while following to legal, ethical, and professional standards of practise.
3. **Refractive error:** The structures and processes contributing to the development of refractive error and other optical and perceptual abnormalities of the visual system (This includes vision function with respect to deviation and enhancement such as, but not limited to, strabismus, amblyopia, oculomotor function, accommodation, and visual perception.)
4. **Minimize Blindness:** The optics of the eye and ophthalmic lens systems (including spectacles, contact lenses and low vision devices) used to correct refractive, oculomotor and other vision disorders
5. **Dispensing spectacle:** Prescribe spectacle to minimise refractive error and control avoidable blindness, vision therapy to restore oculomotor and other vision disorders
6. **Importance of exercise:** Encourage the value of physical activity and exercise, as well as removing barriers in the environment, at home, and at work, in order to guarantee full participation in one's regular and anticipated social responsibilities
7. **Pharmaceutical agents:** Mechanisms of action of the various classes of pharmaceutical agents, their interactions and their safe and effective use for the treatment of diseases and conditions affecting the visual system
8. **Vision therapy** : Vision therapy & other rehabilitative methods used for the management of common visual disorders

9. **The Psychosocial dynamics**: Doctor/patient relationship and understanding of the social, psychological and economic forces affecting diverse patient populations
10. **Community Optometry**: Community health care resources and delivery systems to improve care
11. **Practice management**: Structures and strategies as they pertain to the various practice settings
12. **Communicative skills:** To Acquire the basic knowledge of grammar and develop the knowledge of forming sentences in English & Computer skills

4.5. PROGRAMME'S SPECIFIC OUTCOMES (PSO'S)

PSO-1: Apply fundamental knowledge of basic and advanced health science courses to develop core competency in Optometry in the areas of Refraction, diagnosing eye diseases, Contact lens, Low vision care, Nutrition, Community care, dispensing optics & management of patient's needs

PSO-2: Work professionally or to take-up career in healthcare sectors in hospitals for patient care management as an optometrist or to pursue higher studies in Vision science or take up short term clinical speciality fellowships for specialisation in a particular field and other interdisciplinary programs by applying the principles of management, ethics, environment and social issues

PSO-3: Develop Entrepreneurship skills for setting up a private optical outlet

4.6. Competency Statements:

1. Consults with the client to learn about his or her health, past medical history, previous health interventions, and outcomes.
2. Gathers information on the client's requirements and be competent to conduct a condition-based patient evaluation and assessment.
3. Analyse the results of the assessment, develop a Optometry diagnosis, prognosis, and recommend a strategy for intervention.
4. Ability to physically and emotionally prepare the patient, as well as the equipment to be utilised, according to the treatment plan, and implement intervention.
5. Ability to clearly describe treatment programmes, as well as show and teach self-exercises.
6. Examine the efficacy of therapies and also establish a thorough treatment record.
7. Through effective communication and inter professional connections, initiates, develops, strengthens, and promotes rapport, trust, and ethical professional relationships, which facilitate greater client-cantered cooperation.
8. Understand the concepts of continuous quality improvement and be able to perform Quality Control (QC) checks on a daily and weekly basis.
9. Review the literature, make recommendations for research implementation, and come up with new research ideas for Optometry.
10. As a part of the professional's team, a physiotherapist must be able to understand, apply, and distribute knowledge.

Credits:

- Totally 15 weeks per semester.

- 1 hour of lecture per week equals to 1 credit.
- 2 hours of practical per week equals to 1 credit.

ACADEMIC REGULATIONS FOR Bachelors of Optometry

Under Choice Based Credit System (CBCS)

(Effective from Academic year 2020 - 21)

5. Admission

The admission policy and procedure shall be decided from time to time by the Board of Management (BOM) of the Institution, based on the guidelines issued by the UGC / Ministry of Human Resource Development (MHRD) / Ministry of Health and Family Welfare (MHFW), Government of India. The number of seats in each of the B.Optom degree programme will be decided by the Board of Management / Statutory authorities of the Government like AICTE / UGC / MHFW / MHRD etc., taking into account of market demands. Seats are also made available up to 20% of the sanctioned intake for Non – Resident Indians and foreign nationals, who satisfy the admission eligibility norms of the Institution.

5.1. Eligibility for Admission

5.1.1. The students entering Optometry program should have completed the recognized secondary school studies, as the qualification stipulated for Optometry (degree) is 10 + 2 or equivalent examination with Biology subject from a recognized university or board which would provide the foundation and prepare the students for higher education studies.

5.1.2. The candidate has to fulfil the prescribed admission requirements / norms of the Institution.

5.1.3. In all matters relating to admission to the Optometry degree programme, the decision of the Board of Management (BoM) of the Institution shall be final.

5.1.4. At any time after admission, if found that a candidate has not fulfilled one or many of the requirements stipulated by the Institution, or submitted forged certificates, the Institution has the right to revoke the admission and forfeit the fee paid. In addition, legal action may be taken against the candidate as decided by the Board of Management.

6. Student Discipline

6.1. Every student is required to observe utmost discipline and decorum both inside and outside the campus and do not indulge in any activity which may affect adversely the prestige / reputation of the Institution.

6.2. Any act of indiscipline of a student reported to the Head (Student affairs) and Head of the Department will be referred to a Discipline Committee constituted for the purpose. The Committee will enquire into the charges and decide on a suitable punishment if the charges are substantiated. The committee will also authorize the Head (Student Affairs) to recommend to the Vice-Chancellor for the

implementation of the decision. The student concerned can appeal to the Vice-Chancellor, whose decision will be final.

6.3. Ragging in any form is a criminal and non-bailable offence in our country. The current State and Central legislations provide stringent punishments including imprisonment. Once the involvement of a student(s) is established in ragging, offending fellow students / staff, harassment of any nature to the fellow students / staff etc. the student(s) will be liable to be dismissed from the Institution, as per the laid down procedures of the UGC / Govt. / Institution. Every senior student of the Institution, along with their parent, shall give an undertaking at the beginning of every academic year in this regard and the same should be submitted at the time of registration for the academic year.

7. Structure of the Optometry Degree Programme

7.1. Optometry degree programme will have the curriculum and syllabi (for 4 years) as approved by the respective Board of Studies and Academic Council of the Institution.

7.2. Credits are the weightages, assigned to the courses based on the following general pattern:

One Lecture / Tutorial period per week	: 1 credit
Up to three periods of practical classes per week	: 1 credit
Four periods of practical classes per week	: 2 credits
Total weeks per semester	: 15

7.3. The curriculum for Optometry programme is designed to have a minimum of 150 credits including 3 Non CGPA credits that are distributed across eight semesters of study and one semester of internship for the award of degree. Choice Based Credit System (CBCS) is followed to provide the students, a balanced approach to their educational endeavour. Under CBCS, the degree programme will consist of the following categories of courses:

i. Core foundation (CF): Mandatory courses comprising of Basic Medical Sciences (BMS) including Anatomy, Physiology, and Biomechanics.

ii. Compulsory Courses (CC): Mandatory courses consisting of the Professional Core (PC) courses. These courses expose the students to the foundation of Optometry topics comprising of theory and practical / field work / project.

iii. Non-Departmental Electives (NE): These open courses are offered by the Non-Engineering departments other than their parent department (Optometry).

iv. Indexed Journal / Conference Publications: If a student publishes a research paper as main author in any indexed Journal / Conference, the same will be

considered as equivalent to two credits course under Non-CGPA (NCGPA), once in the duration of the programme.

v. Non-CGPA courses: These courses offered in certain semesters are compulsory, but not used for calculation of GPA and CGPA. However, the credits will be mentioned in the grade sheet.

vi. Online / MOOC Courses under Swayam, NPTEL, Edx, Coursera will be considered as NCGPA with the prior approval of Dean / HoD.

7.4. Non – CGPA courses: The student shall select any two courses / activity listed in Table 1 during the course of study, apart from the compulsory NCGPA offered in certain semesters. The student has to make his / her own efforts for earning the credits. The grades given will be Pass / Fail (P/F). The respective class teachers have to encourage, monitor and record the relevant activities of the students, based on the rules issued from time to time by the Institution and submit the End semester report to the Head of the Department.

Table 1: Non CGPA Courses

No.	Course / Activity	Credits
1.	Start ups	2
2.	Industrial Training	2
3.	Technical conference, seminar, competitions, Professional Societies	2
4.	Management courses	2
5.	Technical Certification Course	2
6.	Sports	2
7.	NCC	2
8.	NSS	2
9.	YRC	2
10.	Art and Cultural activities	2
11.	English Proficiency Certification	2
12.	Aptitude Proficiency Certification	2
13.	Foreign Languages Level II and above	2
14.	Publication in Conferences / Seminar	2
15.	Swatch Baharat Internship Scheme	2
16.	Indexed Journal Publications	4

7.5. A student must earn compulsorily, the credits mentioned under each category shown in Table 2 and also a minimum total of 150 credits

7.6. The medium of instruction is English for all courses, examinations, seminar presentations and project reports.

Table 2: Distribution of Credits

No.	Category	Courses	Credits	Percentage (%)
1	Basic Sciences (BS)	11	26	17.33
2	Professional Core (PC)	24	83	55.33
3	Non – CGPA Courses	3	7	4.66
4	Clinical Training	4	20	13.33
5	Internship	2	12	8.02
6	Project	1	2	1.33
	Total Credits	**45**	**150**	**100**

8. Faculty Advisor

Faculty Advisors are assigned by the respective department to a certain number of students to help the students in planning their selection of courses and programme of study and for getting general advice on the academic programme, Such Faculty Advisor will continue to mentor the students assigned to him for the entire duration of the programme.

8.1.Class Committee

Every section / batch of the Optometry degree programme will have a Class Committee consisting of Faculty and students. The constitution of the Class Committee will be as follows:

a) Senior Faculty not associated with teaching a course for the particular class shall be nominated by the Head of the Department to act as the Chairman of the Class Committee as approved by the Dean.
b) Course coordinator of each of the lecture – based courses (for common courses).
c) Class teacher of the class.
d) All Faculty handling the courses for that class in the semester.
e) Workshop Superintendent (for first two semesters); as applicable.
f) Four students from the respective class nominated by Head of the Department.

g) Faculty Advisors of the respective class.

8.2.Course committee

A course committee shall be constituted by the HOD for all the common courses, with the faculty who are teaching the courses and with a Professor of the core department as the Chairman. The Course committee shall meet periodically to ensure the quality of progression of the course in the semester.

8.3.HoDs meeting with the students

a) The HoD shall convene a closed meeting prior to each class committee and course committee meeting with the following members.
   i. HoD
   ii. Senior Faculty not associated with teaching a course for the class
   iii. Class Teacher
   iv. Five student representatives nominated by the class teacher / HoD
b) The above committee shall discuss the academic and other issue, if any, and obtain independent feedback on all faculties on the Teaching Learning Processes, in order to take necessary action. The minutes of the meeting along with student representation and the corrective actions shall be forwarded to the Dean by the HoD.

8.4.Basic Responsibilities of Class Committee and Course committee

a) The points of discussion during the above HoDs meeting shall be discussed in the Class committee and Course Committee meetings.
b) To review periodically the progress of the students.
c) To discuss issues concerning curriculum and syllabi and the conduct of the classes.
d) To inform the students about the method of assessment as recommended by the Department Examination Committee ("DEC") at the beginning of the semester. Each class committee / course committee will communicate its recommendations and the minutes of the meetings to the Head of the Department, Dean and the Head (Student Affairs).
e) To conduct meetings at least thrice in a semester as per the Academic Plan issued by the Dean.
f) To review the academic performance of the students including attendance, internal assessment and other issues like discipline, maintenance etc.

9. Registration for courses in a Semester

A student will be eligible for registration of courses only if student satisfies the regulation clause 13.0 (Progression) and clause 14.0 (Maximum duration), and has cleared all dues to the Institution, Hostel and Library up to the end of the previous semester provided that student is not debarred from enrolment on disciplinary grounds or for any other reasons.

9.1. The institution follows a Choice Based Credit System. Accordingly, the students shall be given the option for selecting their NE courses, and credits. The student is given the option of selecting the number of credits to undergo in a semester, subject to the curriculum requirements of minimum and maximum credits prescribed.

9.2. Except for the first year, registration for a semester shall be done during a specified week before the start of the semester as per the Academic Schedule.

9.3. Late registration/enrolment will be permitted by the respective Dean for genuine cases, on recommendation by the Head of the respective department, with a late fee as decided from time to time.

9.4. The student shall make the choice of course in consultation with the Faculty Advisor.

9.5. Students shall have to pay additional fee as prescribed, for registering in certain elective courses under Non - Departmental Electives courses offered by certain specific Departments and for higher level Foreign Languages, as decided from time to time.

10. Attendance

The faculty handling a course must finalise the attendance, 3 calendar days before the last instructional day of the course and submit to the HoD through the class teacher.

a) A student with less than 75% attendance in TCH (Total Contact Hours) in any course, will not be permitted to appear for the end-semester examination in that particular course, irrespective of the reason for the shortfall of the attendance. The student is however permitted to avail additional Academic Leave up to 10% towards special OD for attending academic related activities like, Industrial Visits, Seminars, Conferences, Competitions etc., with the prior approval of the HoD or on genuine medical reasons. On reporting back, the student shall submit the relevant documents for proof to the HoD for approval of the additional academic leave.

b) The remaining 25% attendance is given as allowance to account for activities under NCC / NSS / Cultural / Sports / Medical exigencies etc.

c) A student with an attendance ("TCH" – Total Contact Hours) below 75% (65% for genuine medical conditions / Special On Duty leave) in any course will fall under the category "RA", which means Repeat the Course for want of attendance. Students under "RA" category will not be permitted to attend the Regular End Semester Examinations for that course and Continuous Internal Assessment (CIA) marks obtained in the respective course will be treated as null and void.

d) The list of such students under "RA" will be notified by the respective Departments at the end of the course work for each semester. The students with RA courses shall repeat the course as per the procedure vide Clause 10.3.

10.1. Additional condonation may be considered for specific and genuine cases which includes approved leave for attending select NCC / Sports Camps or for cases requiring prolonged medical treatment or critical illness involving prolonged hospitalization.

10.2. For such select NCC / Sports Camps prior permission for leave shall be obtained by the respective faculty coordinator / Director of sports from the designated authority, before deputing the students. For medical cases requiring prolonged medical treatment / critical illness, submission of complete medical history and records with prior intimation from the parent / guardian regarding the health condition, progress of treatment, etc., to Head (Student Affairs) is mandatory. The assessment of such cases will be done by the attendance sub – committee based on the merit of the case and put up their recommendation to the Vice – Chancellor / designated authority. Such additional condonation is permitted only twice for a student in the entire duration of the programme. The Vice-Chancellor based on the recommendation of the attendance sub - committee may then accord additional condonation of attendance, only if the Vice Chancellor/Designated deems it fit and deserving. But in any case, the additional condonation cannot exceed 10% of TCH.

10.3. Repeat Classes Procedure for RA

a) The students shall register for the RA courses at the beginning of every semester by paying the requisite fee and attend the repeat classes for RA course during the last period of the time table or by attending special classes with the course faculty or by attending any other special schedule as approved by the Dean / HoD and shall gain the requisite eligibility to attend the End Semester Examination (ESE). The odd semester courses will be offered in the Odd semester and the Even semester courses will be offered in the even semester. The student is permitted to register for a maximum of 5 RA courses under this option.

b) The Continuous Internal Assessment Marks obtained by the student during their regular semester for the course in which they have been categorized as RA will become null and void. The students shall attend the RA classes and take

up fresh Continuous Internal Assessments during the repeat classes and gain required attendance and CIA marks.

c) The students under "RA" category, who have secured the requisite attendance as applicable vide clause 10.0 and obtained internal assessment marks, by successfully completing the End of day courses or by attending special classes with the course faculty during the semester, are eligible to register for the End Semester Examinations for that course whenever the examination is conducted. This examination will be treated as arrear (supplementary) examination.

d) **Detention:** A student who secures RA in all the Theory / Elective / Theory with Practical component courses excluding Non – Department Elective (NE) prescribed in a semester shall repeat the semester by re-registering for the respective semester in the next academic year. However, student is permitted to appear for arrear (supplementary) examinations, if any, as per eligibility.

e) **Summer Semester:** With the specific approval of the Vice – Chancellor / Designated Authority and as per the requirements / availability of the required time slot and other resources, the Institution may conduct a special Summer Semester after the regular ESE in April / May usually, for students having RA courses in both Even and Odd semesters and conduct the summer semester examinations for the eligible students. However, it is the sole discretion of the vice chancellor to permit such summer semester schedules.

11. Assessment Procedure

Every course shall have two components for assessment namely:

a) **Continuous Internal Assessment "CIA":** This assessment will be carried out throughout the semester as per the Academic Schedule.

b) **End Semester Examination "ESE":** This assessment will be carried out at the end of the Semester as per the Academic Schedule. In the End Semester Examination ("ESE") the student should secure the prescribed minimum mark in each course in the ESE as given in the Table 3 for passing.

c) There are no separate minimum marks prescribed for CIA for any course. The weightages for the various categories of the courses for CIA and ESE is given in Table 3.

Table 3: Weightage of the CIA and ESE for various categories of the courses

No.	Category of Courses		CIA weightage	ESE Weightage	Minimum ESE marks	Passing minimum (CIA + ESE)
1.	Theory Course		50%	50%	50/100	45%
2.	Theory Course with Practical	Theory	50%	50%	50/100	45%
		Practical			25/50	
3.	Project and Viva Voce and Clinical training		50%	50%	25/50	50%

d) **Improvement of CIA Marks:** The students who fail in a course ("U" Grade) due to less CIA marks but having required attendance and other eligibility to appear for ESE is allowed to improve his / her CIA marks by undergoing the fresh internal evaluation procedure and appear for ESE whenever it is offered in the subsequent semester(s) as detailed in clause 12.d.

e) **Procedure for improvement in CIA Marks:** Students who wish to improve their CIA marks in a particular course shall register for the same with the respective HoD / Course faculty whenever the course is offered in the subsequent semester(s). The student has to remit the prescribed fee at the time of registration and undergo the internal assessment improvement procedure as prescribed by the course faculty with the approval of HoD. Student can write the ESE in the subsequent semester(s) and the revised internal assessment mark (CIA) will be considered for processing the results. This will be considered as arrear (supplementary) examinations. The improved CIA mark in the subsequent attempt(s) is limited to a maximum of 30 marks out of 50 (60%) only. The number of courses for which a student can register for internal improvement scheme at a time is restricted to a maximum of 5. The student, if so desire, will be allowed to attend repeat classes for RA as mentioned in clause 10.3 with the approval of course faculty.

f) Each faculty shall maintain separate Academic assessment record for all courses handled by him/her and the same shall be submitted to the HoD for periodical verification. The faculty shall deposit the Assessment records with the HoD at the end of each semester for safe custody.

11.1. Theory Course Assessment Weightages

The general guidelines for the assessment of Theory Courses shall be done on a continuous basis is given in Table 4.

Table 4: Weightage for Assessment

No.		Assessment	Weightage Theory, DE,	Duration
1.	CIA	First Periodical Assessment	15%	2 periods
2.		Second Periodical Assessment	15%	2 Periods
3.		Seminar / Assignments / Project	10%	--
4.		Surprise Test / Quiz etc.,	5%	--
5.		Attendance*	5%	--
6.	ESE	End Semester Examination	50%	2 to 3 hours

>= 95 to <= 100 – 5 Marks

>= 90 to < 95 – 4 Marks

>= 85 to < 90 – 3 Marks

>= 80 to < 85 – 2 Marks

>= 75 to < 80 – 1 Mark

< 75 – 0 Mark

11.2. Theory Courses with Practical Component

For theory courses with practical component, the assessment method mentioned in clause 11.1. is followed. The end semester examination includes both the theory and practical or viva voce.

11.3. Internship

A student has to compulsorily attend 1 year internship internship after completing the 6th semester. One year of Internship is divided into six courses based on six electives

namely Refraction, Investigative Ophthalmology, Ophthalmology Posting, Contact lens, Binocular Vision, Low Vision, Paediatric Optometry & Dispensing Optics each with 60 days of internship posting. The internship will have a weightage of 12 credits as prescribed in the curriculum.

11.4. Final Year Project / Dissertation

The assessment will be done on a continuous basis as given in Table 5.

Table 5: Assessment of Project work

No.	Review / Examination scheme	Weightage
1.	First Review	20%
2.	Second Review	20%
3.	Attendance	10%
4.	Project report and Viva – Voce (ESE)	50%

* Rubrics shall be prescribed by the DEC with the approval of HOD.

In 6th semester, the student is permitted to register for undertaking case study / project work under a faculty of the institution and carry out the project for maximum period of eight months. In both the cases, the internship report in the prescribed format duly certified by the faculty in-charge shall be submitted to the H0D. The evaluation will be done through presentation and viva. For the final year project and Viva – Voce end semester examination, the student shall submit a Project Report in the prescribed format issued by the Institution. The first two reviews will be conducted by a Committee constituted by the Head of the Department. The End semester assessment will be based on the project report and a viva on the project conducted by a Committee constituted by the Registrar / Controller of examination. This may include an external expert.

11.5. Non – CGPA courses

The assessment will be graded “Satisfactory / Not Satisfactory” and grades as Pass / Fail will be awarded.

11.6. Flexibility in Assessment

The respective Departments under the approval of the Department Examination Committee (DEC) may decide the mode of assessment, based on the course requirements.

12. Repeat Examinations

a) Students who fail to secure a pass ("U" grade) in their regular End semester examination in any course(s) may be provided with an opportunity to register and appear for the repeat Examinations conducted immediately after the announcement of results. The students shall submit the prescribed registration forms along with repeat examination fee as per the time line specified by COE.
b) The students who fail to secure a pass on being absent in their End Semester Examination for the regular courses due to for genuine reasons are also permitted to appear for the Repeat Examinations.
c) During the even semester, the Repeat Examinations will be conducted for even semester courses only and during the Odd semester it will be conducted for Odd semester courses only.
d) The schedule for the Repeat Examinations will be notified through the Academic Calendar which will be published at the beginning of every academic year / semester(s) which depends on availability of available time slots in a semester and other resources. This will not be treated as arrear (supplementary) examination.
e) However, it is the sole discretion of the Vice Chancellor to permit such repeat examinations.

13. Progression to Higher Semester

Student has to satisfy the following conditions as laid down in Table 6 for progression from one academic year to next.

Table 6: Minimum Eligibility for progression in B. Optom.

To enrol for semester	Minimum no. of credits to be earned for progression
3	Pass in all the BMS courses from 1st and 2nd semesters
5	73 credits from all the previous semesters
7	101 credits from all the previous semesters
9	135 credits from all the previous semesters

If a student fails to satisfy the above clause in an academic year, the student has to take a break in study until they become eligible for progression.

14. Maximum Duration of the Programme

A student may complete the programme at a slower pace than the regular pace, but in any case, in not more than 5 years for Optometry, excluding the semesters withdrawn as per clause 15. A student completing the Optometry programme during the extended period than stipulated duration will not be eligible for any Institution Ranks.

15. Temporary Withdrawal from the Programme

a) A student is permitted to take a break, up to a maximum of 2 semesters, during the entire programme to clear the backlog of arrears (supplementary).
b) A student may be permitted by the Vice Chancellor to withdraw from the entire programme for a maximum of two semesters for reasons of ill health, Start-up venture or other valid reasons as recommended by a committee consisting of Head of Department, Dean and Head (Student Affairs).

16. Declaration of results

16.1. Minimum Marks

A student shall secure the minimum marks as prescribed in Clause 11 (Table 3) in all categories of courses in all the semesters to secure a pass in that course.

16.2. Arrear (Supplementary) Examinations

If a candidate secure “U” / “RA” / “DE” / “AB” in any course as applicable, due to not satisfying the minimum passing requirement – as per clause 17.1 student shall register for Arrear (supplementary) examinations by paying the prescribed examinations fee, in the subsequent semesters whenever it is offered. During the even semester, the supplementary exams will be conducted for even semester courses and during the odd semester the supplementary exams will be conducted for odd semester courses. Student need not attend the contact classes again. The Internal Assessment marks secured by the candidate will be retained for all such attempts. However, student under RA category must attend the contact classes and earn the required CIA and attendance.

16.3. Revaluation of Answer Scripts

Student can apply for the revaluation of End semester examination answer script (Regular / Supplementary) in a theory / theory with practical course, after the declaration of the results, on payment of a prescribed fee.

16.4. Revaluation is not permitted for Practical, Design Project / Internship / Comprehension courses. However, based on genuine grievances as approved by the Examination Grievance Committee, a student may be permitted to apply for revaluation in the above courses. Revaluation is not permitted for repeat examinations and online examinations.

16.5. After 4 years, i.e., completion of one year (2 semesters) from the normal duration of the programme, the internal assessment marks obtained by the student will not be considered in calculating the passing requirement. A candidate who secures 50% in the end semester examination only will be declared to have passed the course.

16.6. Student who earns required credits for the award of degree after 4 years for Optometry programme (on expiry of extended period of 2 semesters over and above normal duration of course) will be awarded only second class (Clause 19.1) irrespective of the earned CGPA. However, the period approved under temporary withdrawal, if any, from the programme (15) will be excluded from the maximum duration as mentioned above.

16.7. Semester Abroad Programme: Students who are allowed to undergo internship or Training in Industries in India or abroad during their course work or attend any National / International Institution(s) under semester abroad programme (SAP) up to a maximum of 2 semesters will be granted credit transfer for the Course Work/project work done by them in the Industry /Foreign Institution as per the recommendations of the credit transfer committee. The leave period of the students for International internships / Semester Abroad programme etc., will be accounted for attendance.

17. Grading

17.1. A grading system as shown in Table 7 will be followed.

Table 7: Grading system

Range of Marks	Letter Grade	Grade Points	Remarks
90 - 100	S	10	Outstanding
80 - 89	A	09	Excellent
70 - 79	B	08	Very Good
60 - 69	C	07	Good
50 - 59	D	06	Average
45 - 49	E	05	Pass
<45	U	--	To Reappear for end-semester

			examination
--	AB	--	Absent for the End Semester Examination
--	RA	--	Repeat the course due to Lack of minimum attendance (below 75%) in regular course (Clause 10.0)
	DE	--	DETAINED (DE) "RA" in all theory courses except Non-Department Elective (NE) of a semester. The student is detained and has to repeat the entire semester as per the Clause 10.3 (d) - Detention

17.2. GPA and CGPA: GPA is the ratio of the sum of the product of the number of credits C_i of course "*i*" and the grade points P_i earned for that course taken over all courses "*i*" registered and successfully completed by the student to the sum of C_i for all "*i*". That is:

$$GPA = \frac{\sum_i C_i P_i}{\sum_i C_i}$$

CGPA will be calculated in a similar manner, in any semester, considering all the courses enrolled from the first semester onwards. CGPA / GPA will be rounded of first decimal point.

17.3. The Grade card will not include the computation of GPA and CGPA for courses with letter grade U, RA, AB and DE until those grades are converted to the regular grades.

17.4. A course successfully completed cannot be repeated.

18. Grade Sheet

18.1. Letter grade: Based on the performance, each student is awarded a final letter grade at the end of the semester in each course. The letter grades and corresponding grade points are given in Table 8.

18.2. Student is considered to have completed a course successfully and earned credits if student secures a letter grade other than "U", "RA" "AB" and "DE" in that course.

18.3. After results are declared, grade sheet will be issued to each student which will contain the following details:

a) Program and discipline for which the student has enrolled.

b) Semester of registration.
c) The course code, name of the course, category of course and the credits for each course registered in that semester.
d) The letter grade obtained in each course.
e) Semester Grade Point Average (GPA).
f) The total number of credits earned by the student up to the end of that semester in each of the course categories.
g) The Cumulative Grade Point Average (CGPA) of all the courses taken from the first semester.
h) Credits earned under Non CGPA courses.
i) Additional credits earned in Optometry.

19. Class / Division

19.1. Classification is based on CGPA and is as follows:

CGPA ≥ 8.0	: First Class with distinction
6.5 ≤ CGPA <8.0	: First Class
5.0 ≤ CGPA <6.5	: Second Class

19.2. Further, the award of "First class with distinction" is subject to the candidate becoming eligible for the award of the degree having passed the examination in all the courses in his / her first appearance with effect from II semester, within the minimum duration of the programme.

19.3. The award of "First Class" is further subject to the candidate becoming eligible for the award of the degree having passed the examination in all the courses within 5 years.

19.4. The period of authorized break of the programme (vide clause 15.0) will not be counted for the purpose of the above classification.

20. Transfer of credits

20.1. Within the broad framework of these regulations, the Academic Council, based on the recommendation of the Credit Transfer Committee constituted for the purpose may permit students to transfer part of the credit earned in other approved Universities of repute & status in India or abroad.

20.2. The Academic Council may also approve admission of students who have completed a portion of course work in other approved Institutions of repute under lateral entry scheme based on the recommendation of the credit transfer committee on a case to case basis.

20.3. Admission norms for working Professional: Separate admission guidelines are available for working / experienced professionals for candidates with the industrial / research experience who desire to upgrade their qualification as per recommendation of Credit Transfer Committee and the Academic Council.

21. Power to modify

Notwithstanding all that has been stated above, the Academic Council is vested with powers to modify any or all of the above regulations from time to time, if required, subject to the approval by the Board of Management.

----End of the regulations----

B.OPTOM (OPTOMETRY)									
(152 CREDIT STRUCTURE)									
SEMESTER- I									
SL. NO	Course category	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	BS	HSB1101	General Anatomy	2	0	2	3	0	4
2	BS	HSB1102	General Physiology	2	0	2	3	0	4
3	BS	HSB1103	General Biochemistry	2	0	2	3	0	4
4	PS	HSP1104	Physical Optics	2	1	0	3	0	3
5	PS	HSP1109	Physical Optics practical	0	1	2	2	0	3
6	BS	HSB1106	Nutrition	2	0	0	2	0	2
7	BS	HSB1107	Communication and soft skills	3	0	0	3	0	3
			Total	13	2	6	**19**	0	23
	L – Lecture; T – Tutorial; P – Practical; S- Self Study; C – Credit; TCH – Total Contact Hours;								

SEMESTER- II									
SL. NO	Course category	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	PC	HSG1116	Ocular Anatomy	2	0	2	3	0	4
2	PC	HSG1117	Ocular Physiology	2	0	2	3	0	4
3	PC	HSG1118	Ocular Biochemistry	2	1	0	3	0	3
4	PC	HSB1222	Pathology	3	0	0	3	0	3
5	PC	HSB1223	Geometric Optics	2	1	0	3	0	3
6	PC	HSB1121	Geometrical Optics Practical	0	1	2	2	0	3
7	BS	HSS1121	Basics of Computers	2	0	0	2	0	2
			Total	13	3	6	**19**	**0**	**22**
	L – Lecture; T – Tutorial; P – Practical; S- Self Study; C – Credit; TCH – Total Contact Hours;								

SEMESTER- III									
SL. NO	**Course category**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	PC	HSP1201	Ocular Microbiology	3	0	0	3	0	3
2	PC	HSP1202	Visual optics I	2	0	2	3	0	4
3	PC	HSP1203	Optometric Optics	2	0	0	2	0	2
4	PC	HSP1204	Optometric instrumentation	2	1	0	3	0	3
5	PC	HSP1205	Ocular Diseases –I	3	0	0	3	0	3
6	PC	HSP1206	Clinical examination of Visual system	0	0	4	2	0	4
7	PC	HSP1207	Introduction to Quality and Patient safety	2	0	0	2	0	2
8	PC	HSP1209	Clinical Optometry- Practical I	0	3	4	5	0	7
			Total	14	4	10	**23**	**0**	**28**
	L – Lecture; T – Tutorial; P – Practical; S- Self Study; C – Credit; TCH –Total Contact Hours								

SEMESTER- IV									
SL. NO	**Course category**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	PC	HSS1223	Dispensing Optics	2	0	4	4	0	6
2	PC	HSS1224	Visual Optics II	2	0	2	3	0	4
3	PC	HSG1225	Ocular Diseases –II and Glaucoma	3	0	0	3	0	3
4	PC	HSG1226	Basic and Ocular Pharmacology	2	1	0	3	0	3
5	BS	HSG1227	Indian Medicine & Telemedicine	2	0	0	2	0	2
6	BS	HSG1228	Medical Psychology	2	0	0	2	0	2
7	PC	HSS1229	Clinical optometry II	0	3	4	5	0	7
			Total	13	4	10	**22**	0	27
	L – Lecture; T – Tutorial; P – Practical; S- Self Study; C – Credit; TCH –Total Contact Hours								

SEMESTER- V									
SL. NO	**Course category**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	PC	HSP1317	Contact lens I	2	0	2	3	0	4
2	PC	HSP1318	Low Vision care	2	0	2	3	0	4
3	PC	HSP1319	Geriatric Optometry	2	1	0	3	0	3
4	PC	HSP1320	Pediatric Optometry	2	1	0	3	0	3
5	PC	HSP1321	Binocular Vision- I	2	1	0	3	0	3
6	PC	HSP1322	Systemic Diseases	3	0	0	3	0	3
7	PC	HSP1323	Research Methodology and Biostatistics	4	0	0	4	0	4
8	PC	HSP1324	Clinical Optometry III	0	3	4	5	0	7
			Total	17	6	8	**27**	0	31
	L – Lecture; T – Tutorial; P – Practical; S- Self Study; C – Credit; TCH – Total Contact Hours								

SEMESTER- VI									
SL. NO	**Course category**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	PC	HSB1331	Contact Lens –II	2	0	2	3	0	4
2	PC	HSB1332	Binocular Vision –II	2	0	2	3	0	4
3	PC	HSB1333	Public Health and Community Optometry	2	0	0	2	0	2
4	BS	HSB1334	Practice Management	2	1	0	3	0	3
5	PC	HSB1335	Occupational Optometry	2	0	0	2	0	2
6	BS	HSB1336	Medical law and Ethics	2	0	0	2	0	2
7	PC	HSB1337	Clinical Optometry IV	0	3	4	5	0	7
8	PC	HSB1338	Research Project	0	0	4	2	0	4
			Total	12	4	12	**22**	0	28
	L – Lecture; T – Tutorial; P – Practical; S- Self Study; C – Credit; TCH –Total Contact Hours								

SEMESTER- VII									
SL. NO	**Course category**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	PC	HSP1424	Internship 1	0	0	12	6	0	10
2	BS	HSP1425	Life Coping Skills: Part I	2	0	0	2	0	2
3	BS	HSP1426	Interpersonal Relationship and Communication Skills Part -I	2	0	0	2	0	2
			Total	4	0	12	**10**	0	14
	L – Lecture; T – Tutorial; P – Practical; S- Self Study; C – Credit; TCH – Total Contact Hours								

SEMESTER- VIII									
SL. NO	**Course category**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	PS	HSP1439	Internship 2	0	0	12	6	0	10
2	BS	HSB1440	Life Coping Skills: Part II	2	0	0	2	0	2
3	BS	HSB1441	Interpersonal Relationship and Communication Skills Part -I	2	0	0	2	0	2
			Total	4	0	12	**10**	0	14
	L – Lecture; T – Tutorial; P – Practical; S- Self Study; C – Credit; TCH – Total Contact Hours								

* Non CGPA

Internship is for 12 months (July – December; January – June) or 1 year. Total number of days (after deducting for national holidays & Sundays + Examination): 250 days (6 days / week; 6 hours / day) = 1500 hours or minimum of 18 weeks /semester (216 days). Students are encouraged to involve in community outreach activities as part of their clinical postings without absenting himself /herself for the other regular classes. Project report (thesis) needs to be submitted at the end of internship

TOTAL CREDITS: 152

Syllabi of Optometry Programme

COURSE TITLE	GENERAL ANATOMY			CREDITS	3
COURSE CODE	HSB1101	COURSE CATEGORY	BS	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL-3
ASSESSMENT SCHEME					
First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%
Course Description	This module helps the student to learn basic human Anatomy. The module deals with system wise human anatomy which would help the student to understand medical terminologies better which is an integral part of the course.				
Course Objective	1. To learn about the musculoskeletal structure of the body. 2. To gain knowledge about the muscle origin and insertion. 3. To understand the nerve supply to the whole musculoskeletal system. 4. To be skilled in dissecting a complete system. 5. To define neuro anatomy and cardio vascular system.				
Course Outcome	Upon completion of this course, the students will be able to 1. Explain & identify of all gross anatomical structures 2. Describe & Identify bones, joints, muscles, brain, cardio-pulmonary and nervous system as these are related to the application of Optometry 3. Formulate & describe blood vessels in detail and skin appendages, embryology and anatomical differences 4. Explain lymphatic system embryology, functions & different type of glands in detail 5. Study nervous system and its parts in detail				
Prerequisites: HSB1101 - GENERAL ANATOMY					
CO & PO MAPPING					

CO	PO 1	PO -2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	**1**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**-**
CO-2	**1**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**-**
CO-3	**1**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**-**
CO-4	**1**	**1**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**-**
CO-5	**1**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**-**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: INTRODUCTION TO HUMAN ANATOMY (7L+2P=9)	
Human anatomy: Definition and its relevance in medicine and Optometry, Planes of the body, relationship of structures, Organ System. Skeleton System, Bone, Muscle, Joints, Cartilage, Classification of Synovial joint	**CO-1** **BTL-2**
MODULE 2: TISSUES OF THE BODY	**(7L+2P=9)**
Tissues of the Body – Epithelium, connective tissue, bond and cartilage, Embryology, histology, different types of each of them, types of cells, cellular differentiation and different tissues. Muscles – Different types of muscles, their functional differentiation, their relationship with different structures, their neural supply.	**CO-2** **BTL-2**
MODULE 3: BLOOD VESSELS, RESPIRATORY SYSTEM & CARDIOVASCULAR SYSTEM	**(7L+2P=9)**
Blood Vessels – Differentiation between arteries and veins, embryology, histology of both arteries and veins, Functional differences between the two anatomical differences at different locations Skin and appendages – Embryology, anatomical differences in different areas, functional and protective variations, innervations, relationship with muscles and nerves, Respiratory system -Nasal cavity, Larynx, Trachea, Thoracic, Lungs. Cardiovascular system – Mediastinum, Pericardium, Heart, Blood vessels, Thoracic duct, Arteries	**CO-3** **BTL-3**
MODULE 4: LYMPHATIC SYSTEM, GASTROINTESTINAL & URINARY SYSTEM	**(7L+2P=9)**

Lymphatic System - Embryology, functions, relationship with blood vessels and organs. Glands - Embryology, different types of glands (exocrine and endocrine), functional differences, neural control of glands. Gastrointestinal – Tongue, Salivary gland, Pharynx, Stomach, Small intestine, large intestine, Rectum. Urinary system – Kidney, Ureter, Urinary bladder, Urethra	**CO-4** **BTL-2**
MODULE 5: NERVOUS SYSTEM, REPRODUCTIVE SYSTEM & ENDOCRINE SYSTEM	**(7L+2P=9)**
Parts of Nervous system, cell types of nervous system, Blood-brain barrier, Reflex arc, Peripheral Nerves, Spinal nerves,Nerve fibres, Autonomic Nervous system. Brain and Cranial nerves - Major parts of Brain, Protective coverings of the Brain, Cerebrospinal Fluid, Brain stem, Cerebellum, Diencephalon, Cerebrum, Cranial nerves. Reproductive system- Male & female reproductive system, Endocrine system – Pituitary, Thyroid, Parathyroid, Suprarenal glands	**CO-5** **BTL-2**
PRACTICALS: 1. Cell – L.M & EM 2. Embryology – Ectoderm, Mesoderm & Endoderm 3. Bones of the body 4. Cartilage & Joints classification 5. Muscles of the body – Classification & Action 6. Histopathology of digestive tracts	

TEXT BOOKS	
1.	Ross & Wilson, Text Book of Anatomy and Physiology in Health and Illness, Anne Waugh. 2018.
REFERENCE BOOKS	
1	Human Anatomy Vol 1 -4 8th ed (2019), B.D. Chaurasia, CBS Publishers
2	Gray's Anatomy for Students 2nd ed (2019), Veeramani and Holla, Elsevier
E BOOKS	
1.	https://books.google.co.in/books/about/General_Anatomy https://www.amazon.in/General-Anatomy
MOOC	
1	https://www.edx.org/course/anatomyx-musculoskeletal-cases

COURSE TITLE	GENERAL PHYSIOLOGY			CREDITS	3
COURSE CODE	HSB1102	COURSE CATEGORY	BS	L-T-P-S	2-0-0-0
Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL-3
ASSESSMENT SCHEME					
First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%
Course Description	General Physiology deals with the entire human physiology with emphasis on different organ systems, their physiological functions with special emphasis on blood & neurophysiology.				
Course Objective	1. To know about the cytology of various organs 2. To gain knowledge about the interrelation ship between tissues, functions, organs 3. To demonstrate an understanding of elementary human physiology and Bio-Chemistry. 4. To understand the structure and physiology of various organs in the body. 5. To assist students to obtain a better understanding of the principles of Optometry through the study of human physiology..				
Course Outcome	Upon completion of this course, the students will be able to 1. Explain the basis of cell structure and organisation 2. Describe digestive system arrangements and functions in detail 3. Describe importance of endocrine system and functions of reproductive system in detail 4. Explain the mechanism of respiration and circulation in detail 5. Explain the basics of environmental physiology, nervous system and special senses				
Prerequisites: HSB1102 - GENERAL PHYSIOLOGY					

CO & PO MAPPING															
CO	PO	PO-	PO-	PO-	PO-	PO-	PO-	PO-	PO-	PO	PO-	PO-	PSO-	PSO-	PSO-

	-1	2	3	4	5	6	7	8	9	-10	11	12	1	2	3
CO-1	**1**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**1**	**-**
CO-2	**1**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**1**	**-**
CO-3	**1**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**1**	**-**
CO-4	**1**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**1**	**-**
CO-5	**1**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**1**	**-**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: CELL STRUCTURE, BLOOD, AND NEUROMUSCULAR PHYSIOLOGY (4L+2P=6)	
Cell Structure & Organisation - Tissue organization Epithelium Connective tissue –Collagen fibres & Elastic fibres Platelets – morphology –development, functions & dysfunctions. Reticula endothelial system 1. Spleen 2. lymphatic tissue 3. Thymus 4. bone marrow 5. immune system 6. cellular 7. Humoral 8. Autoimmune. Action potential and resting membrane potential; Nerve – Structure, function, types, impulse transmission, nerve regeneration and degeneration, types of neuroglia and its functions; Muscle – Structure, classifications, properties, neuromuscular transmission, myasthenia gravis, excitation, contraction	**CO-1** **BTL-2**
MODULE 2:DIGESTION GENERAL ARRANGEMENT SALIVARY DIGESTION (4L+2P=6)	
Digestion – General arrangement Salivary digestion – function & regulations Gastric digestion –functions & regulations Pancreatic digestion –functions & regulations Intestinal digestion –functions & regulations Liver & bile – Absorption – Motility – Deglutition – Vomiting – Defecation - Functions of large intestine - Neurohumoral regulations of alimentary functions, summary. Excretion - Body fluids – distribution, measurement & exchange, Kidney – structure of nephron – mechanism of urine formation – composition of the urine and abnormal constituents – urinary bladder & micturition.	**CO-2** **BTL-2**
MODULE 3: ENDOCRINES AND REPRODUCTION (4L+2P=6)	
Introduction - Endocrine glands, hormone classification, mechanism of action, functions of hormones; Pituitary Gland - Anterior pituitary, posterior pituitary hormones, secretory cells, action on target cells, regulation of secretion of each hormone, disorders, physiology of growth and development; Pituitary - Hypothalamic Relationship; Thyroid Gland -	**CO-3** **BTL-3**

Thyroid hormone, calcitonin, secretory cells, synthesis, storage, action, regulation of secretion, and disorders; Parathyroid hormones - secretory cell, action, regulation of secretion, disorders, calcium metabolism, and its regulation; Adrenal Gland - Adrenal cortex, secretory cells, synthesis, action, regulation of secretion of Aldosterone, Cortisol, and Androgens, disorders; Adrenal Medulla - Secretory cells, action, regulation of secretion of adrenaline and noradrenaline, disorders; Pancreas - Secretory cells, action, regulation of secretion of insulin and glucagon, glucose metabolism, its regulation, disorder; Calcitrol, Thymus, Pineal gland, local hormones.	
MODULE 4: RESPIRATION AND CIRCULATION	**(4L+2P=6)**
Respiration - Mechanics of respiration –pulmonary function tests –transport of respiratory gases- neural and chemical regulation of respiration – hypoxia, cyanosis, dyspnoea– asphyxia. Circulation – General Principles - Heart: myocardium – innervation – Transmission of cardiac impulse- Events during cardiac cycle –cardiac output. Peripheral circulation: peripheral resistances –arterial blood pressure –measurements – factors regulation variations – capillary circulation – venous circulation. Special circulation: coronary cerebral –miscellaneous.	**CO-4** **BTL-2**
MODULE 5: ENVIRONMENTAL PHYSIOLOGY NERVOUS SYSTEM AND SPECIAL SENSE	**(4L+2P=6)**
Environmental Physiology - Body temperature regulation (including skin Physiology). Exposure to low and high atmospheric pressure. Nervous System - Neuron –Conduction of impulse – synapse – receptor. Sensory organization –pathways and perception. Reflexes –cerebral cortex –functions. Thalamus –Basal ganglia Cerebellum. Hypothalamus. Autonomic nervous system –motor control of movements, posture and equilibrium - conditioned reflex, eye hand co-ordination. Special Senses – (Elementary) Olfaction –Taste –Hearing	**CO-5** **BTL-2**
PRACTICALS: 1. Microscope 2. Hemocytometer 3. Hb 4. WBC Count 5. Blood group & Rh type 6. Bleeding time and Clotting time	

7. ESR	
TEXT BOOKS	
1.	Essentials of Medical Physiology 8th ed (2019), K. Sembulingam, Jaypee Publishers
2.	Ramesh Bijlani, Understanding Medical Physiology: A Textbook for Medical Students, Jaypee Brothers Medical Publishers, 2010. ISBN: 9789380704814, 9789380704814.
REFERENCE BOOKS	
1	Textbook of Medical Physiology 3rd ed (2020), Guyton and Hall, Elsevier
2	Basics of Medical Physiology 4th ed (2018), D. Venkatesh, Wolters Kluwer
E BOOKS	
1.	https://www.us.elsevierhealth.com/medicine/physiology

COURSE TITLE	**GENERAL BIOCHEMISTRY**			**CREDITS**	**3**
COURSE CODE	**HSB1103**	**COURSE CATEGORY**	**BS**	**L-T-P-S**	**3-0-0-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	General Biochemistry deals with the biochemical nature of carbohydrates, proteins, minerals, vitamins, lipids etc. A detailed study of these, emphasizing on their chemical composition and their role in metabolism is the required aim of this course.				

Course Objective	1. To learn about the different types of macronutrients that are essential for human life. 2. To know about the metabolism of various macronutrients. 3. o gain knowledge about nucleic acids, enzymes and the inborn errors of metabolism. 4. To acquire skills on liver functioning and kidney functioning tests. 5. To learn about the various metabolisms.
Course Outcome	Upon completion of this course, the students will be able to 1. Familiarise with functions of different components of food 2. Explain basal metabolic rate and factors affecting BMR, with special reference to obesity 3. Explain nutritional aspects of carbohydrates, lipids, proteins and vitamins. 4. Explain the basic and clinical aspects of enzymology and regulation of enzymatic activity 5. Recognize the feathers of biochemical aspects of muscle contraction

Prerequisites: HSB1103 – GENERAL BIOCHEMISTRY

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	1	2	3	-	-	-	-	-	-	-	-	-	3	1	-
CO-2	1	2	3	-	-	-	-	-	-	-	-	-	3	1	-
CO-3	1	2	3	-	-	-	-	-	-	-	-	-	3	1	-
CO-4	1	1	2	-	-	-	-	-	-	-	-	-	3	1	-
CO-5	1	2	3	-	-	-	-	-	-	-	-	-	3	1	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: CARBOHYDRATES, PROTEINS, FATS IN NUTRITION (7L+2P=9)

Nutrition – Introduction, Importance of nutrition, calorific values, respiratory quotient, energy requirement of a person, basal metabolic rate, factor affecting BMR, special dynamic action of food, physical activities, energy expenditure for various activities, calculation of energy requirement of a person, balanced diet, recommended dietary allowances, role of carbohydrates in diet, digestible carbohydrates and dietary fibers, role of lipids in diet, role of proteins in diet, quality of proteins, biological value, net protein utilization, nutritional aspects of proteins essential and nonessential amino acids, nitrogen balance, nutritional disorders.	**CO-1** **BTL-2**

Carbohydrate Chemistry – Definition, general classification with examples, Glycosidic bond, structures, composition, sources, properties and functions of monosaccharides, disaccharides, oligosaccharides, and polysaccharides, glycosaminoglycan, mucopolysaccharides. Lipid Chemistry – Definition, general classification, properties, and functions of fatty acids, triacylglycerol, phospholipids, cholesterol, essential fatty acids and their importance, lipoproteins definition, classification, properties, Sources and function Ketone bodies.	
MODULE 2: AMINO ACID, ENZYMES, NUCLEOTIDE, AND NUCLEIC ACID	**(7L+2P=9)**
Amino-acid Chemistry – Definition, classification, peptide bonds, peptides, biologically important peptides, protein chemistry definition, classification, functions of proteins. Enzymes - Definition, active site, cofactor, proenzyme, classification with examples, factors effecting enzyme activity, enzyme inhibition and significance, isoenzymes, diagnostic enzymology, clinical significance of enzymes. Nucleotide and Nucleic acid Chemistry - Nucleotide chemistry, nucleotide composition, functions of free nucleotides in body, nucleic acid (DNA and RNA) chemistry, difference between DNA and RNA, structure of DNA (Watson and Crick model), functions of DNA, structure and functions of tRNA, rRNA, Mrna	**CO-2** **BTL-2**
MODULE 3: CARBOHYDRATE, LIPID, AMINO ACID, AND PROTEIN METABOLISM	**(7L+2P=9)**
Carbohydrate Metabolism - Introduction, glycolysis, aerobic, anaerobic, citric acid cycle, substrate level phosphorylation, glycogen metabolism, glycogenesis, glycogenolysis, metabolic disorders glycogen, gluconeogenesis, coricycle, hormonal regulation of glucose, glycosuria, diabetes mellitus. Lipid Metabolism - Introduction to lipid metabolism, lipolysis, oxidation of fatty acids, oxidation of fatty acids, lipogenesis, denovo synthesis of fatty acids, chain elongation, desaturation, triacylglycerol synthesis, fat metabolism in adipose tissues, ketone body metabolism, ketogenesis, ketolytic, ketosis, Rothera's test, cholesterol metabolism, synthesis, degradation, cholesterol transport, hypercholesterolemia and its effects, atherosclerosis and coronary heart diseases, hypocholesterolaemia agents, common hyperlipoproteinemia, fatty liver. Amino acid and Protein Metabolism - Catabolism of amino acids, transamination, deamination, fate of ammonia, transport of ammonia, urea cycle, specialized products formed from amino acids - from glycine, arginine, methionine, phenylalanine and tyrosine.	**CO-3** **BTL-3**

MODULE 4: VITAMINS, MINERAL METABOLISM, CELL BIOLOGY, MUSCLE CONTRACTION, AND CONNECTIVE TISSUE (7L+2P=9)	
Vitamins - Definition, classification according to solubility, individual vitamins, sources, coenzyme forms, functions, RDA, digestion, absorption and transport, deficiency and toxicity. Mineral Metabolism - Definition, sources, RDA, digestion, absorption, transport, excretion, functions, disorder of Individual minerals, calcium, phosphate, iron, magnesium, fluoride, selenium, molybdenum, copper, phosphate, calcium and iron in detail. Cell Biology - Introduction, cell structure, cell membrane structure and function, various types of absorption, intracellular organelles and their functions, briefly on cytoskeleton. Muscle Contraction - Contractile elements in muscle, briefly on the process of muscle contraction, energy for muscle contraction. Biochemistry of Connective tissue - Introduction, various connective tissue proteins, collagen, elastin, structure and associated disorders, glycoproteins, proteoglycans.	**CO-4** **BTL-2**
MODULE 5: CLINICAL BIOCHEMISTRY AND DIABETES MELLITUS , HORMONE, ACID BASE, WATER, ELECTROLYTE BALANCE, AND CLINICAL BIOCHEMISTRY (7L+2P=9)	
Hyperglycaemic and hypoglycaemic hormones , Diabetes mellites, Normal serum level, Definition of acid base, pH and pKa, Buffers, Acidosis & Alkalosis Hormone Action - Definition, classification, mechanism of hormone action, receptors, signal transduction, second messengers and cell function. Acid-Base balance - Acids, bases and buffers, pH, buffer systems of the body, bicarbonate buffer system Role of lungs and kidneys in acid base balance, acid base imbalance. Water balance - Water distribution in the body, body water, water turnover, regulation of water balance, role of ADH and thirst centre. Electrolyte balance – Osmolarity, distribution of electrolytes, role of aldosterone, rennin angiotensin system and ANF. Clinical Biochemistry - Normal levels of blood and urine constituents, relevance of blood and urine levels of glucose, urea, uric acid, creatinine, calcium, phosphates, pH and bicarbonate, liver function tests, renal function tests.	**CO-5** **BTL-2**
PRACTICALS:	

1. Qualitative analysis of Biomolecule – Preparation of normal, molar & Percentage solution, Buffer & pH determination 2. Reaction of Monosaccharides – Glucose, Fructose & Galactose 3. Reaction of Disaccharides – Maltose, Lactose, Sucrose 4. Colour reaction of Amino acids 5. Colour reaction of Proteins 6. Colour reaction of lipids	

TEXT BOOKS	
1.	David L Nelson and Michael M Cox, Lehninger's Principles of Biochemistry, 6th edition, MacMillan Learning, 2012.
2.	S. Ramakrishnan, K.G. Prasanna and R. Rajan: textbook of medical biochemistry, orient Longman, madras, 2001
REFERENCE BOOKS	
1	Dr. Whikehart: biochemistry of the eye, 2nd edition, Butterworth Heinemann, Pennsylvania, 2003.
E BOOKS	
1.	https://www.eu.elsevierhealth.com/medicine-and-surgery/biochemistry

COURSE TITLE	**PHYSICAL OPTICS**			**CREDITS**	**3**
COURSE CODE	**HSB1104**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**2-1-0-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**

Course Description	This course will be taught in one semester. Physical Optics is the study of light, its properties and its interaction with matter. Specifically, the phenomena of interference, diffraction, polarization and scattering will be dealt with in detail
Course Objective	1. To equip the students with a thorough knowledge of properties of light and fundamentals of physical optics 2. To understand the intensity of polarized light & Malus 'Law
Course Outcome	Upon completion of this course, the students will be able to 1. Explain the phenomena of interference, diffraction, polarization and scattering will be deal within detail. 2. Explain the intensity of polarized light & Malus 'Law. 3. Demonstrate coherence and interference. 4. Demonstrate Tyndall effect & Explain fluorescence and Phosphorescence. 5. Familiarize with basics of lasers.

Prerequisites: PHYSICAL OPTICS

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	1	3	2	2	-	-	-	-	-	-	-	1	-	-
CO-2	-	1	3	2	2	-	-	-	-	-	-	-	1	-	-
CO-3	-	1	3	2	2	-	-	-	-	-	-	-	1	-	-
CO-4	-	1	2	1	2	-	-	-	-	-	-	-	1	-	-
CO-5	-	1	3	1	2	-	-	-	-	-	-	-	1	-	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: NATURE OF LIGHT	**(7L+2T=9)**
Introduction: Nature of light - light as electromagnetic wave, concepts of frequency, wavelength, amplitude, phase and intensity, Polarization: Intensity of polarized light - Malus' Law - Polarizers and analysers - Methods of producing polarized light - Brewster's angle. Birefringence, Equation for polarization ellipse, Quarter and Half wave plates, Nicol Prism. Production and detection linearly polarized light, elliptically and circularly polarized light. Optical activity and Polarimeter	**CO-1** **BTL-2**

MODULE 2: POLARISED LIGHT	**(7L+2T=9)**
Intensity of polarized light; Malus 'Law; polarizers and analysers; Methods of producing polarized light; Brewster's angle. Birefringence; ordinary and extraordinary rays. Relationship between amplitude and intensity.	**CO-2** **BTL-2**
MODULE 3: COHERENCE & INTERFERENCE	**(7L+2T=9)**
Coherence; interference; constructive interference, destructive interference; fringes; Fringe width. Double slits, multiple slits, gratings. Diffraction; diffraction by a circular aperture; Air's disc.	**CO-3** **BTL-3**
MODULE 4: RALEIGH CRITERION	**(7L+2T=9)**
Resolution of an instrument (telescope, for example); Raleigh's criterion. Scattering; Raleigh's scattering; Tyndall effect. Fluorescence and Phosphorescence.	**CO-4** **BTL-2**
MODULE 5: BASICS OF LASERS	**(7L+2T=9)**
Basicsoflasers–coherence;populationinversion;spontaneousemission;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; Tolland's.	**CO-5** **BTL-2**

Fluorescence and Phosphorescence	
TEXT BOOKS	
1	Subrahmanyam, Brijlal, a textbook of optics, S. Chandcoltd, New Delhi, India, 2003.
2	Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA, 2002. MH Freeman, C.C. Hall: Optics, 11th edition, Butterworth - Heinemann, 2003 Keating PM: Geometric, Physical and Visual Optics, Butterworth- Heinemann, 2002
REFERENCE BOOKS	
1	Pedrotti, PedrottiSr.F.L. L, Optics and Vision, Prentice Hall, New Jersey, USA, 2008.
E BOOKS	
1	https://www.amazon.in/Physical-Optics-Principles-Practices-Engineering-ebook/

COURSE TITLE	**PHYSICAL OPTICS PRACTICALS**			**CREDITS**	**2**
COURSE CODE	**HSP1109**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**0-1-2-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	This course will be taught in one semester. Physical Optics is the study of light, its properties and its interaction with matter. Specifically, the phenomena of interference, diffraction, polarization and scattering will be dealt with in detail				
Course Objective	1. To equip the students with a thorough knowledge of properties of light and fundamentals of physical optics 2. To familiarize with wavelength determination				

Course Outcome	Upon completion of this course, the students will be able to 1. Familiarize with wavelength determination. 2. Explain surfaces and/or lenses and their imaging properties. The effect of aperture stops on the quality of images, such as blur and aberrations, depth of field and depth of focus, will also be studied. 3. Calculate the position of the line image in a sphero-cylindrical lens. 4. Explain accommodation formulae and calculations 5. Analyse spatial distribution of optical information

Prerequisites: HSG11127 – PHYSICAL OPTICS - PRACTICAL

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	3	2	2	-	-	-	-	-	-	-	1	-	-
CO-2	-	-	3	2	2	-	-	-	-	-	-	-	1	-	-
CO-3	-	-	3	2	2	-	-	-	-	-	-	-	1	-	-
CO-4	-	-	2	1	-	-	-	-	-	-	-	-	1	-	-
CO-5	-	-	3	-	-	-	-	-	-	-	-	-	1	-	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: DETERMINATION OF WAVELENGHT	**(4P+2T=6)**
Determining the wavelength of yellow, green and blue lines in the mercury spectrum using a 'Diffraction grating, Circular Apertures - measurements of Airy's disc for apertures of various sizes.	**CO-1** **BTL-2**
MODULE 2: REFRACTIVE INDEX	**(4P+2T=6)**
Determination of refractive indices of the given 'Anisotropic crystal' (quartz/calcite) taken in the form of prism using a monochromatic radiation., Measurement of the resolving power of telescope.	**CO-2** **BTL-2**
MODULE 3: AIR WEDGE EXPERIMENT AND MALLUS LAW	**(4P+2T=6)**

Determining the thickness of the given thin wire by setting up 'Air ,wedge' experiment, Verification of Malus' Law using a polarizer - analyser combination.	**CO-3** **BTL-3**
MODULE 4: WAVELENGHT OF LASER LIGHT AND PHOTOMETER	**(4P+2T=6)**
Determination of wave length of a Laser light- using a transmission diffraction grating. Verification of inverse square law using LB Photometer.	**CO-4** **BTL-2**
MODULE 5: SPATIAL DISTRIBUTION	**(4P+2T=6)**
Determining the wavelength of the given monochromatic radiation by setting up 'Newton's rings'. Verification of given laser light is plane polarized or not using Fresnel rhomb as a quarter wave plate.	**CO-5** **BTL-2**

TEXT BOOKS	
1	Tunnacliffe A. H, Hirst J. G, Optics, The association of British Dispensing Opticians, London, U.K., 1990.
2	Pedrottil.S, pedrottisr.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. geometrical and visual optics: a clinical introduction, McGraw-Hill, New York, USA, 2002.
E BOOKS	
1	https://www.springer.com/gp/book/9789811022982

COURSE TITLE	NUTRITION			CREDITS	2
COURSE CODE	HSB1106	COURSE CATEGORY	BS	L-T-P-S	0-1-2-0
Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	This course covers the basic aspects of Nutrition for good health. It also includes nutrients and nutrient derivatives relevant to ocular health, nutrition deficiency and Ocular disease.
Course Objective	To understand the basic aspects of Nutrition for good health To understand nutrients and nutrient derivatives relevant to ocular health, nutrition deficiency and Ocular disease.
Course Outcome	Upon completion of this course, the students will be able to 1. Explain basic aspects of Nutrition for good health. It also includes nutrients and nutrient derivatives relevant to ocular health, nutrition deficiency and Ocular disease. 2. Measurements of energy and value of food, Energy expenditure. 3. To Explain the sources and functions of proteins. 4. To Explain the sources and functions of Fats and Minerals. 5. Nutrition and ocular ageing, and contraindications, adverse reactions and ocular nutritional supplements and the essential vitamins and amino acid.

Prerequisites: HSG11121 – NUTRITION

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	-	-	-	2	-	-	-	-	-	-	2	1	-
CO-2	-	-	-	-	-	2	-	-	-	-	-	-	2	1	-

CO-3	-	-	-	-	-	**2**	-	-	-	-	-	-	**2**	**1**	-
CO-4	-	-	-	-	-	**2**	-	-	-	-	-	-	**2**	**1**	-
CO-5	-	-	-	-	-	**2**	-	-	-	-	-	-	**2**	**1**	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: INTRODUCTION	**(6L=6)**
1. History of Nutrition 2. Nutrition as a science 3. Food groups, RDA 4. Balanced diet, diet planning. 5. Assessment of nutritional status	**CO-1** **BTL-2**
MODULE 2:ENERGY	**(6L=6)**
Energy: Units of energy, Measurements of energy and value of food, Energy expenditure. Total energy/calorie requirement for different age groups and diseases, Satiety value, Energy imbalance- obesity, starvation, Limitations of the daily food guide.	**CO-2** **BTL-2**
MODULE 3: PROTEINS	**(6L=6)**
1. Sources and functions 2.Essential and non- essential amino-acids. 3. Incomplete and 4.completeproteins 5.Supplementaryfoods. 6.PEM and the eye 7.Nitrogenbalance 8.Changes in protein requirement	**CO-3** **BTL-3**
MODULE 4: FATS & MINERALS	**(6L=6)**
Fats: Sources and functions , Essential fatty acids, Excess and deficiency, lipids and the eye., Hyperlipidaemia, heart diseases, atherosclerosis. Minerals: General functions and sources. Macro and micro minerals associated with the eye. Deficiencies and excess–ophthalmic complications (e.g., Iron, calcium, iodine etc.)	**CO-4** **BTL-2**
MODULE 5: VITAMINS ESSENTIALS AMINOACIDS	**(6L=6)**
Vitamins: General functions, and food sources, Vitamin deficiencies and associated eye disorders with particular reemphasis to Vitamin A, Promoting sound habits in pregnancy, lactation and infancy, Nutrient with antioxidant, Properties, Digestion of Proteins, carbohydrates &lipids Essential amino acids. Miscellaneous, Measles and associated eye	**CO-5** **BTL-2**

disorders, low birth weight.	
TEXT BOOKS	
1	Swaminathan: Handbook of Food and Nutrition, fifth edition, Bangalore printing & publishing Co.Ltd., Bangalore, 2004.
2	C Gopalan, BV Rama Shastri, SC Balasubramanian: Nutritive Value of Indian Foods, National Institute of Nutrition, ICMR, Hyderabad, 2004.
REFERENCE BOOKS	
1	Frank Eperjesi & Stephen Beatty: Nutrition and the Eye A practical Approach, Elsevier Butterworth- Heinemann, USA, 2006.
E BOOKS	
1	https://www.barnesandnoble.com/b/free-ebooks/nook-books

COURSE TITLE	**COMMUNICATION & SOFT SKILLS**			**CREDITS**	**3**
COURSE CODE	**HSB1107**	**COURSE CATEGORY**	**BS**	**L-T-P-S**	**3-0-0-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	To Acquire the basic knowledge of grammar and develop the knowledge of forming sentences in English				
Course Objective	1. To enhance the learner's communication skills by giving adequate exposure in listening, speaking, reading and writing skills 2. To help the learners recognize and operate in various styles and registers in English. 3. To help the learner get rid of his present flaws and mistakes in pronunciation and grammar.				

	4. To help the learner identify and repair the voids in his present vocabulary and pronunciation targeting those specific arrays of words which create a barrier in his thought process. 5. To impart better writing skills by sensitizing the learners to the dynamics of effective writing.
Course Outcome	Upon completion of this course, the students will be able to 1. To Acquire the basic knowledge of grammar and develop the knowledge of forming sentences in English 2. To develop the language skill of reading and vocabulary building 3. To identify the common errors of English 4. To Explain the importance of listening 5. To Explain the basics of verbal and non-verbal communication

Prerequisites: HSG11122 – ENGLISH AND COMMUNICTAION

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	-	-	-	-	-	-	2	-	-	3	1	2	2
CO-2	-	-	-	-	-	-	-	-	2	-	-	3	1	2	2
CO-3	-	-	-	-	-	-	-	-	2	-	-	3	1	2	2
CO-4	-	-	-	-	-	-	-	-	2	-	-	3	1	2	2
CO-5	-	-	-	-	-	-	-	-	2	-	-	3	1	2	2

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1:EXTENSIVE READING	**(9L=9)**
Reading short meaningful extracts from literary and non-literary texts and identifying various types of connections among statements such as reason-result, statement-illustration, cause-effect, result-reason, addition, contradiction/opposite, introduction, furthering, adding, summing up, conclusion - Tracing the texture of texts — Referencing - Anaphoric and cataphoric references — Identifying relationships between topic sentences and subordinate sentences.	**CO-1** **BTL-2**

MODULE 2: WRITING SKILLS & INTENSIVE READING (9L=9)

Writing Skills - Letter Writing, Email, Essay, Articles, Memos, one-word substitutes, note making and Comprehension. Writing and Reading - Summary writing, Creative writing, newspaper reading. Matching discourse functions with corresponding linguistic structures — one function carried out through several structures — one structure fulfilling several functions - Cohesion and cohesive markers — Coherence and grammatical linkers -Reading newspapers at breakfast table — Reading publicity materials — Railway timetable — medical prescription — textbooks — cover letters accompanying important documents - Reading and Note making — Purposes of note making -- Various formats of making notes — Short forms and abbreviations — commonly used and personal conventions	**CO-2** **BTL-2**
MODULE 3: PRACTICAL EXERCISE	**(9L=9)**
Practical Exercise - Formal speech, Phonetics, semantics and pronunciation. Elements of communication. Barriers of communication and how to overcome them. Nuances for communicating with patients and their attenders in hospitals Speaking. Importance of speaking efficiently Voice culture. Preparation of speech. Secrets of good delivery Audience psychology, handling Presentation skills. Individual feedback for each student Conference/Interview technique.	**CO-3** **BTL-3**
MODULE 4: LISTENING SKILLS	**(9L=9)**
Listening; Importance of listening Self-assessment Action plan execution. Barriers in listening. Good and persuasive listening; Reading What is efficient and fast reading. Awareness of existing reading habits; Tested techniques for improving speed. Improving concentration and comprehension through systematic study.	**CO-4** **BTL-2**
MODULE 5: ORAL COMMUNICATION & VERB	**(9L=9)**
Functions in clusters: Cluster 1. Inviting, responding with thanks accepting invitation/declining - invitation with a valid reason. 2. Apologizing, explaining reason, promising not to repeat the mistake, reassuring, taking leave - 3. Correcting someone,	**CO-5** **BTL-2**

defending the right point or stance, convincing the other etc - 4. Greeting, Appreciating something good, illustrating the point further, Complimenting - 5. Complaining, defending logically, demanding things to be set right, and producing proof or evidence, Non Verbal Communication. Basics of non-verbal communication. Rapport building skills using neuro-linguistic programming (NLP). Communication in Optometry practice.	
TEXT BOOKS	
1	Barun K. Mitra. (2016). *Personality Development and Soft Skills*, Oxford University Press, 280 Pages**.**
REFERENCE BOOKS	
1	Gwen van servellen. Communication for health care professionals: concepts, practice and evidence, jones & bartlett publications, USA, 2019.
E BOOKS	
1	https://www.amazon.in/Communication-Skills-Power-Spoken-English-ebook/

SEMESTER - II

COURSE TITLE	**OCULAR ANATOMY**			**CREDITS**	**3**
COURSE CODE	**HSG1116**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**2-1-0-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**

Course Description	This course deals with detailed anatomy of the orbit, eyeball and cranial nerves associated with ocular functions
Course Objective	This course deals with detailed anatomy of the orbit, eyeball and cranial nerves associated with ocular functions
Course Outcome	Upon completion of this course, the students will be able to 1. Demonstrate anatomy of the orbit, eyeball and cranial nerves associated with ocular functions 2. Identify the microscopic structures of various tissues in the eye and correlate the structure with the function 3. Familiarize the different refractory media in the eye 4. To know the basic structure & functions of eyelid 5. To Explain the basic principles of ocular embryology

Prerequisites: HSG11123 – OCULAR ANATOMY

CO & PO MAPPING

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	2	-	3	2	1	-	-	-	-	-	-	-	2	1	-
CO-2	2	-	3	2	1	-	-	-	-	-	-	-	2	1	-
CO-3	2	-	3	2	2	-	-	-	-	-	-	-	2	1	-
CO-4	2	-	3	-	2	-	-	-	-	-	-	-	2	1	-
CO-5	2	-	3	-	2	-	-	-	-	-	-	-	2	1	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1:Introduction to Ocular Anatomy (7L+2T=9)

1. Introduction to eyeball 2. Extra ocular muscle 3. Ocular embryology 4. Orbit 5. Lacrimal system	**CO-1** **BTL-2**

MODULE 2: Anterior Chamber (7L+2T=9)	
1. Conjunctiva, Sclera and limbus 2. Cornea 3. Anterior chamber & Aqueous humour 4. Uvea – Iris, Ciliary body & Choroid 5. Crystalline lens	**CO-2** **BTL-2**
MODULE 3: Posterior Chamber	**(7L+2T=9)**
6. Retina 7. Posterior chamber and vitreous humour	**CO-3** **BTL-3**
MODULE 4: Blood and nerve supply	**(7L+2T=9)**
8. Cranial nerves **9.** Blood supply to the eyeball	**CO-4** **BTL-2**
MODULE 5: Eye Dissection & Seminar(7L+2T=9)	
Eye Dissection and students seminar	**CO-5** **BTL-2**
Practical: 1. Eye: Practical dissection of bull's eye 2. Orbit: Practical demonstration of orbital structures.	
TEXT BOOKS	
1	Leamington: 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 BOOKS	
1	https://www.kobo.com/us/en/ebook/ocular-anatomy-and-physiology-second-edition-2

COURSE TITLE	**OCULAR PHYSIOLOGY**			**CREDITS**	**3**
COURSE CODE	**HSG1117**	**COURSE CATEGORY**	**BS**	**L-T-P-S**	**2-1-0-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	General Physiology deals with the entire human physiology with emphasis on different organ systems, their physiological functions with special emphasis on blood & neurophysiology.				
Course Objective	At the end of the course, the student should be able to: 1. Explain the normal functioning of various organ systems of the body and their interactions. 2. Elucidate the physiological aspects of normal growth and development.				
Course Outcome	Upon completion of this course, the students will be able to 1. Explain ocular physiology with the physiological functions of each part of the eye. 2. Explain the normal functioning of all the structures of the eye and their interactions. of iris and pupil. 3. Familiarize with the phenomenon of vision. 4. Explain the principles of electro diagnostic devices in ophthalmology. 5. Analyse physiological principles underlying pathogenesis, treatment & visual psychology..				

Prerequisites: HSG11124 – OCULAR PSYSIOLOGY

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	2	-	3	2	1	-	-	-	-	-	-	-	2	1	-
CO-2	2	-	3	2	1	-	-	-	-	-	-	-	2	1	-
CO-3	2	-	3	2	2	-	-	-	-	-	-	-	2	1	-
CO-4	2	-	3	-	2	-	-	-	-	-	-	-	2	1	-
CO-5	2	-	3	-	2	-	-	-	-	-	-	-	2	1	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: Eyelids & EOM	**(7L+2T=9)**
1.Protective mechanisms in the eye: Eyelids and lacrimation, description of the globe 2.Extrinsic eye muscles, their actions and control of their movements 3.Coats of the eyeball 4.Cornea 5.Aqueous humour and vitreous: Intra ocular pressure.	**CO-1** **BTL-2**
MODULE 2: Iris & Pupil	**(7L+2T=9)**
1.Iris and pupil 2.Crystalline lens and accommodation –presbyopia 3.Retina – structure and functions 4.Vision – general aspects of sensation 5.Pigments of the eye and photochemistry.	**CO-2** **BTL-2**
MODULE 3: Visual Pathway	**(7L+2T=9)**
1.The visual stimulus, refractive errors 2.Visual acuity, Vernier acuity and principle of measurement 3.Visual perception–Binocular vision, stereoscopic vision, optical illusions 4.Visual pathway, central and cerebral connections 5.Colour vision and colour defects. Theories and diagnostic tests.	**CO-3** **BTL-3**
MODULE 4: Electrophysiology	**(7L+2T=9)**

1.Introduction to electrophysiology 2. Scotopic and Photopic vision 3. Colour vision, Colorizing 4. Mechanism of accommodation 5.Retinal sensitivity and Visibility.	**CO-4** **BTL-2**
MODULE 5: Psychophysics	**(7L+2T=9)**
1.Receptive stimulation and flicker 2.Ocular,movements and saccades 3.Visual perception and adaptation 4.Introduction to visual psychology(Psychophysics).	**CO-5** **BTL-2**
PRACTICALS: 1. Lid movements 2. Tests for lacrimation tests 3. Extra ocular movements 4. Break up time 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)	

TEXT BOOKS	
1	AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006.
REFERENCE BOOKS	
1	R.D. 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 BOOKS	
1	https://www.amazon.in/Ocular-Visual-Physiology-Clinical-Application-ebook

COURSE TITLE	**OCULAR BIOCHEMISTRY**			**CREDITS**	**3**
COURSE	**HSG1118**	**COURSE**	**BS**	**L-T-P-S**	**2-1-0-0**

CODE		CATEGORY			
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	General Biochemistry deals with the biochemical nature of carbohydrates, proteins, minerals, vitamins, lipids etc. A detailed study of these, emphasizing on their chemical composition and their role in metabolism is the required aim of this course.				
Course Objective	1. To demonstrate his knowledge and understanding on structure, function and interrelationship of biomolecules and consequences of deviation from normal 2. To Integration of the various aspects of metabolism, and their regulatory pathways				
Course Outcome	Upon completion of this course, the students will be able to 1. Explain basic concepts in metabolic regulation with examples say insulin. 2. Familiarize metabolic processes taking place in different ocular structures. 3. To Explain different techniques and applications in medicine and basic research. 4. To Explain the estimation of blood sugar, urea, creatine and its significance 5. Analyze Clinical Biochemistry: Blood sugar, urea, creatinine and bilirubin significance of their estimation				
Prerequisites: HSG1118 – OCULAR BIOCHEMISTRY					

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	2	-	3	2	1	-	-	-	-	-	-	-	2	-	-
CO-2	2	-	3	2	1	-	-	-	-	-	-	-	2	-	-
CO-3	2	-	3	2	2	-	-	-	-	-	-	-	2	-	-

CO-4	**2**	**-**	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**
CO-5	**2**	**-**	**3**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: TEAR FILM COMPOSITION (7L+2T=9)	
Lipid, aqueous & mucous layer	**CO-1** **BTL-2**
MODULE 2: CORNEA & LENS	**(7L+2T=9)**
Biochemical composition of all layers, Corneal metabolism – nutrient uptake, metabolic pathways, barrier functions Lens: Biochemical composition, glucose utilization- sorbitol pathways, Glutathione and ascorbic acid transport. Cataract formation: aging changes, sugar cataract, cataract and ascorbic acid	**CO-2** **BTL-2**
MODULE 3: AQUEOUS & VITREOUS HUMOUR FORMATION (7L+2T=9)	
Composition and Formation	**CO-3** **BTL-3**
MODULE 4: RETINA	**(7L+2P=9)**
Pigment epithelium-structure-composition, photoreceptor cells, rhodopsin, lipids renewal, choroidal metabolism and function; Vitamin A- retinal function and metabolism; Retinal neurochemistry & Biochemical correlates of retinal diseases.	**CO-4** **BTL-2**

MODULE 5: CLINICAL BIOCHEMISTRY	(7L+2T=9)
Clinical Biochemistry: Blood sugar, urea, creatinine and bilirubin significance of their estimation.	**CO-5** **BTL-2**

TEXT BOOKS	
1	Jeremy M Berg, John L Tymoczko, Gregory J Gatto Jr., Lubert Stryer, Biochemistry, 8th edition, W.H. Freeman, 2015
REFERENCE BOOKS	
1	S. Ramakrishnan, K.G. Prasanna and R Rajan: Textbook of Medical Biochemistry, Orient Longman, Madras, 1990.
2	D R Whikehart: Biochemistry of the Eye, 2nd edition, Butterworth Heinemann, Pennsylvania, 2003.
E BOOKS	
1	https://books.google.co.in/books/about/Anatomy Ocular physiology Biochemistry

COURSE TITLE	PATHOLOGY			CREDITS	3
COURSE CODE	HSG1222	COURSE CATEGORY	BS	L-T-P-S	2-0-2-0
Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL-3
ASSESSMENT SCHEME					
First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%
Course Description	This course describes the basic aspects of disease processes with reference to specific entities relevant in optometry/ophthalmology				

Course Objective	The module teaches student about the disease process, inflammations & repair mechanism, Neoplasms, Infectious diseases, nutritional disorders & various blood disorders.
Course Outcome	Upon completion of this course, the students will be able to 1. Describes basic aspects of disease processes with reference to specific entities relevant in optometry/ophthalmology 2. Explain specific infections 3. Explain general disease process in Haematology 4. Should be able to interpret clinical pathology reports 5. Explain basic pathology in allergic conditions

Prerequisites: Higher Secondary Biology, General and Ocular Anatomy, General and Ocular Physiology.

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	1	-	-	-	-	-	-	1	-	-	1	-	-
CO-2	-	-	2	-	-	-	-	-	-	1	-	-	1	-	-
CO-3	-	-	2	-	-	-	-	-	-	1	-	-	1	-	-
CO-4	-	-	1	-	-	-	-	-	-	1	-	-	1	-	-
CO-5	-	-	2	-	-	-	-	-	-	1	-	-	1	-	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: INTRODUCTION TO PATHOLOGY
(7L+2P=9)

Cell injuries – Etiology and Pathogenesis with a brief recall of important aspects of normal cell structure. Reversible cell injury: Types, Sequential changes, Cellular swellings, vacuolation, Hyaline changes, Mucoid changes. Irreversible cell injury: Types of Necrosis & Gangrene, Autolysis. Pathologic calcification: Dystrophic and Metastatic. Intracellular Accumulations - Fatty changes, Protein accumulations, Glycogen accumulations, Pigments - Melanin / Hemosiderin. Extra cellular accumulations: Amyloidosis - Classification, Pathogenesis, Pathology including special stains	**CO-1** **BTL-2**

MODULE 2: INFLAMMATION AND REPAIR
(7L+2P=9)

Acute inflammation, features, causes, vascular and cellular events, Inflammatory cells and Mediators, Chronic inflammation: Causes, Types, Classification nonspecific and granulomatous with examples, Repair, Wound healing by primary and secondary union, factors promoting and delaying the process, Healing in specific site including bone healing	**CO-2** **BTL-2**
MODULE 3: IMMUNOPATHOLOGY	**(7L+2P=9)**
Immune system, General concepts, Hypersensitivity, type and examples, antibody and cell mediated tissue injury with examples, Secondary immunodeficiency including HIV infection, Auto-immune disorders, Basic concepts and classification, SLE, AIDS-Aetiology, Modes of transmission, Diagnostic procedures, handling of infected material and health education	**CO-3** **BTL-3**
MODULE 4: INFECTIOUS DISEASES (7L+2P=9)	
Mycobacterial diseases: Tuberculosis, Leprosy and Syphilis, Bacterial disease: Pyogenic, Diphtheria, Gram negative infection, Bacillary dysentery, Viral diseases: Poliomyelitis, Herpes, Rabies, Measles, Rickttsia, Chlamydial infection, HIV infection, Fungal disease and opportunistic infections, Parasitic diseases: Malaria, Filaria, Amoebiasis, Kala-azar, Cysticercosis, Hydatid cyst.	**CO-4** **BTL-2**
MODULE 5: GROWTH DISTURBANCES, NUTRITIONAL AND GENETIC DISORDERS ((7L+2P=9)	
Growth disturbances - Atrophy, Hypertrophy, Hyperplasia, Aplasia, Hypoplasia, Metaplasia, Malformation, agenesis, dysplasia, Precancerous lesions, Neoplasia: Definition, classification, Biological behaviour: Benign and Malignant, Carcinoma and Sarcoma, Malignant Neoplasia: Grades and Stages, Local & Distant spread, Carcinogenesis: Environmental carcinogens, chemical, viral, occupational. Heredity and cellular oncogenes and prevention of cancer, Benign & Malignant epithelial tumours Eg. Squamous papilloma, Squamous cell carcinoma, Malignant melanoma. Benign & Malignant mesenchymal tumours Eg: Fibroma, Lipoma, Neurofibroma, Fibrosarcoma, Liposarcoma, Rhabdo-myosarcoma, Teratoma. Nutritional Disorders – Protein energy malnutrition: Marasmus, Kwashiorkor, and Vitamin deficiency disorders, classification with specific examples. Genetic Disorders – Basic concepts of genetic disorders and some common examples and congenital malformation.	**CO-5** **BTL-2**
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 of the Disease, 7th Edition, Elsevier, New Delhi,2004
2	SR Lakhani Susan AD& Caroline JF: Basic Pathology: An introduction to the mechanism of disease,1993.
E BOOKS	
1.	https://www.ebooks.com/en-us/subjects/medicine-pathology-ebooks/1186/

COURSE TITLE	**GEOMETRICAL OPTICS**			**CREDITS**	**3**
COURSE CODE	**HSB1223**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**2-1-0-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	This will the continuing part of Geometrical Optics-I and will be known as Geometrical Optics-II				
Course Objective	The objective of this course is to equip the students with a thorough knowledge of optical systems and its components. At the end of this course, students will be able to understand and interpret the image formed on the retina by the optics of the eye.				
Course Outcome	Upon completion of this course, the students will be able to 1. The principal application of geometrical optics remains in the field of optical design				

	2. Students will be able to use the mirror equation to predict the position and magnification of real and virtual images formed by flat, concave, and convex mirrors. 3. After completing this module students will be able to work problems involving the laws of reflection and refraction 4. Understand in detail about the image formation by different type of lenses 5. To study and practically understand prentice rule with different lenses

Prerequisites: HSG11120 – GEOMETRICAL OPTICS - I

CO & PO MAPPING

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	1	3	2	2	-	-	-	-	-	-	-	2	1	-
CO-2	-	1	3	2	2	-	-	-	-	-	-	-	2	1	-
CO-3	-	1	3	2	2	-	-	-	-	-	-	-	2	1	-
CO-4	-	1	2	1	2	-	-	-	-	-	-	-	2	1	-
CO-5	-	1	3	1	2	-	-	-	-	-	-	-	2	1	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: ELECTRO MAGNETIC RADIATION	**(8L+1T=9)**
Introduction: Electromagnetic radiation, Absorption, Reflection, Scattering, Point sources, wavefronts and rays, converging wavefronts, point images and blur circles; Diverging wavefronts, plane waves and optical infinity, the concept of vergence, upstream and downstream vergence, Generalized and reduced vergence	**CO-1** **BTL-2**
MODULE 2: LAWS OF REFLECTION & REFRACTION (8L+1T=9)	
Laws of Reflection: Image formed by a plane mirror (point object and extended object); Image reversal. Minimum size of the mirror to get full image of the object. Rotation of the mirror Spherical mirrors- convex and concave; sign conversion, ray tracing and image formation, mirror equation, uses of spherical mirrors	**CO-2** **BTL-2**

Laws of refraction (Snell's law) Lateral shift, normal shift, apparent and real depth	
MODULE 3: PRISM DIOPTRE (8L+1T=9)	
Thin prism –definition; definition of Prism dioptre. deviation produced by a thin prism, its dependence on refractive index. Refraction by a spherical surface; sign convention; introduction to spherical aberration using image formed by a spherical surface of a distance object; sag formula Paraxial approximation; derivation of vergence equation Imaging by a positive powered surface and negative powered surface Vergence at a distance formula; effectivity of a refracting surface. Definition of a lens as a combination of two surfaces; different types of lens shapes.	**CO-3** **BTL-3**
MODULE 4: IMAGE FORMATION BY A LENS (8L+1T=9)	
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 focal length, Newton's formula; linear magnification; angular Magnification. Nodal Planes Thin lens as a special case of thick lens; review of sign convention Imaging by a thin convex lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions. Imaging by a thin concave lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions.	**CO-4** **BTL-2**

MODULE 5: PRENTICE'S RULE (8L+1T=9)	
Prentice's Rule 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.	**CO-5** **BTL-2**

TEXT BOOKS	
1.	Arthur Beiser, Shobhit Mahajan and S. Rai Choudhury, Concepts of Modern Physics (SIE) | 7th Edition Paperback, McGraw Hill Education, 2017. ISBN-10: 9789351341857.
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 BOOKS	
1.	https://www.springer.com/gp/book/9789811022982

COURSE TITLE	**GEOMETRICAL OPTICS – PRACTICAL**			**CREDITS**	**2**
COURSE CODE	**HSG1121**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**0-1-2-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**

15%	15%	10%	5%	5%	50%

Course Description	This will the continuing part of Geometrical Optics-I and will be known as Geometrical Optics-II
Course Objective	The objective of this course is to equip the students with a thorough knowledge of optical systems and its components. At the end of this course, students will be able to understand and interpret the image formed on the retina by the optics of the eye.
Course Outcome	Upon completion of this course, the students will be able to 1. After completing this module students will be able to work problems involving the laws of reflection and refraction 2. Students should measure lateral shift and refractive index of glass and water 3. Measurement of ray tracing through prism 4. To find the focal length of convex and concave mirror using UV mirror 5. To find the focal length of convex and concave mirror using combination and shift mirror

Prerequisites: GEOMETRICAL OPTICS – PRACTICAL

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	1	3	2	2	-	-	-	-	-	-	-	1	2	-
CO-2	-	1	3	2	2	-	-	-	-	-	-	-	1	2	-
CO-3	-	1	3	2	2	-	-	-	-	-	-	-	1	2	-
CO-4	-	1	2	1	2	-	-	-	-	-	-	-	1	2	-
CO-5	-	1	3	1	2	-	-	-	-	-	-	-	1	2	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: VERIFICATION OF LWS OF REFLECTION & REFRACTION (1L+5P=6)

Verification of laws of reflection - ray tracing Verification of laws of refraction - ray tracing	**CO-1** **BTL-2**
MODULE : REFRACTIVE INDEX MEASUREMENT	**(1L+5P=6)**
Measurement of lateral shift Refractive index of glass and water by normal shift method.	**CO-2** **BTL-2**
MODULE 3: REFRACTIVE INDEX OF PRISM	**(1L+5P=6)**
Ray tracing through a prism and finding the angle of minimum deviation and refractive index of the material of the prism (I-d curve)	**CO-3** **BTL-3**
MODULE 4:FOCAL LENGTH MEASURMENT	**(1L+5P=6)**
Finding the focal length of a concave mirror using UV method and normal incidence method. Finding the focal length of a concave mirror using auxiliary lens method.	**CO-4** **BTL-2**
MODULE 5: FOCAL LENGTH MEASUREMENT	**(1L+5P=6)**
Finding the focal length of a thin convex lens using UV method and shift method. Finding the focal length of a concave lens using combination method.	**CO-5** **BTL-2**
TEXT BOOKS	
1.	Yuriy A. Gabreski (Author), Anatoliy V. Leshchenko (Author), A Practical Guide to Experimental Geometrical Optics Hardcover – 28 December 2017
REFERENCE BOOKS	
1	Arthur Beiser, Shobhit Mahajan and S. Rai Choudhury, Concepts of Modern Physics (SIE) |

	7th Edition Paperback, McGraw Hill Education, 2017. ISBN-10: 9789351341857.
E BOOKS	
1.	https://www.amazon.in/Practical-Guide-Experimental-Geometrical-Optics/dp/110717094X

COURSE TITLE	**BASICS OF COMPUTERS**			**CREDITS**	**2**
COURSE CODE	**HSG1121**	**COURSE CATEGORY**	**BS**	**L-T-P-S**	**2-0-0-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	The course has focus on computer organization, computer operating system and software, and MS windows, word processing, excel data worksheet and Power Point presentation				
Course Objective	The course has focus on computer organization, computer operating system and software, and MS windows, word processing, excel data worksheet and Power Point presentation				
Course Outcome	Upon completion of this course, the students will be able to 1. The course has focus on computer organization, computer operating system and software, and MS windows, word processing, excel data worksheet and Power Point presentation. 2. To Explain and operate MS Excel & MS word. 3. To Explain about worksheet, entering information in Excel. 4. To Explain PowerPoint presentation and its tools 5. Application of Computers in clinical settings				
Prerequisites: HSG11713 – BASICS OF COMPUTERS					

CO & PO MAPPING

CO	**PO -1**	**PO-2**	**PO-3**	**PO-4**	**PO-5**	**PO-6**	**PO-7**	**PO-8**	**PO-9**	**PO -10**	**PO-11**	**PO-12**	**PSO-1**	**PSO-2**	**PSO-3**
CO-1	-	-	-	-	-	-	-	-	-	-	**2**	-	-	**2**	**2**

CO-2	-	-	-	-	-	-	-	-	-	-	**2**	-	-	**2**	**2**
CO-3	-	-	-	-	-	-	-	-	-	-	**2**	-	-	**2**	**2**
CO-4	-	-	-	-	-	-	-	-	-	-	**2**	-	-	**2**	**2**
CO-5	-	-	-	-	-	-	-	-	-	-	**2**	-	-	**2**	**2**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: FUNDAMENTALS OF COMPUTERS	**(2L+4P=6)**
Introduction to computer: Introduction, characteristics of computer - Block diagram of computer - Generations of computer - Input output devices - Processor and memory - The Central Processing Unit (CPU) - Main memory.	**CO-1** **BTL-2**
MODULE 2: INTRODUCTION TO WINDOWS	**(2L+4P=6)**
Introduction of Windows - Introduction to MS Word – Creating a Document – Basic Skills - Formatting – Editing – Table Design – Layout - Alignment – Review – Keyboard Shortcut keys	**CO-2** **BTL-2**
MODULE 3: INTRODUCTION TO EXCEL	**(2L+4P=6)**
Introduction to Excel – Microsoft Excel Basic Skills – Excel Charts - Data Entry – Formulas – Functions - SUM – AUTOSUM – AVERAGE – MAX – MIN – Calculations across sheets – Managing Rows and Columns – Find and Replace – Filtering – Sorting – Conditional formatting	**CO-3** **BTL-3**
MODULE 4: INTRODUCTION TO POWER POINT (2L+4P=6)	
Introduction to Power point – working with slides and files – Creating and saving a power point presentation - Select a presentation – Build a presentation – Layout – Editing – Insert – Table - Images – shapes – Word art – SmartArt - smart Art – charts – Audio – video – Format objects – Animate objects – Review	**CO-4** **BTL-2**
MODULE 5: CASE STUDY	**(2L+4P=6)**
CASE Study 1 - Create a document with a necessary graphs/Tables/contents and analysis for the _____ CASE Study 2 - Develop and deliver a presentation for the	**CO-5** **BTL-2**

TEXT BOOKS	
1	Michael Miller by (Author) Computer Basics Absolute Beginner's Guide, Windows 10 Edition (includes Content Update Program) Paperback – 28 August 2015.
REFERENCE BOOKS	
1	John Monyjok Maluth (author) Basic computer knowledge (computer basics book 3) kindle

	edition 28 December 2016.
E BOOKS	
1	https://www.amazon.in/Basic-Computer-Knowledge-Basics-Book-ebook

SEMESTER III

COURSE TITLE	**OCULAR MICROBIOLOGY**			**CREDITS**	**2**
COURSE CODE	**HSG1201**	**COURSE CATEGORY**	**BS**	**L-T-P-S**	**2-0-0-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	This course covers the basic biological, biochemical and pathogenic characteristics of micro organisms				
Course Objective	The objectives of the course are: 1. To prepare the students to gain essential knowledge about the characteristics of bacteria, viruses, fungi and parasites 2. To acquire knowledge of the principles of sterilization and disinfection in hospital and ophthalmic practice				

Course Outcome	Upon completion of this course, the students will be able to 1. Explain the basic biological, biochemical and pathogenic characteristics of pathogenic organisms. 2. Familiarize and diagnose common bacterial infections of the eye. 3. Explain diagnose common fungal infections of the eye 4. Explain & diagnose common viral infections of the eye 5. Diagnose common parasitic infections of the eye

Prerequisites:

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	1	-	-	-	-	-	-	1	-	-	1	-	-
CO-2	-	-	2	-	-	-	-	-	-	1	-	-	1	-	-
CO-3	-	-	2	-	-	-	-	-	-	1	-	-	1	-	-
CO-4	-	-	1	-	-	-	-	-	-	1	-	-	1	-	-
CO-5	-	-	2	-	-	-	-	-	-	1	-	-	1	-	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: MORPHOLOGY OF BACTERIA	**(6L=6)**
1. Morphology and principles of cultivating bacteria 2. Sterilizationanddisinfectionsusedinlaboratoryandhospitalpractice	**CO-1** **BTL-2**
MODULE 2: OCULAR BACTERIAL INFECTION	**(6L=6)**
Common bacterial infections of the eye.	**CO-2** **BTL-2**
MODULE 3: OCULAR FUNGAL INFECTIONS	**(6L=6)**

Common fungal infections of the eye	**CO-3** **BTL-3**
MODULE 4: OCULAR VIRAL INFECTIONS	**(6L=6)**
Common viral infections of the eye	**CO-4** **BTL-2**
MODULE 5: PARASITIC INFECTION	**(6L=6)**
Common parasitic infections of the eye	**CO-5** **BTL-2**

TEXT BOOKS	
1.	Burtong.r.w.w: Microbiology for the health sciences, sixth edition, j.p. Lippincott., St Louis, 2008.
2.	MJPelczar(Jr),ECSChan,NRKrieg:Microbiology,fifthedition,TATAMcGRAW-HILL Publisher, NewDelhi,2013.
REFERENCE BOOKS	
1	Kjryan,cgray: sherries medical microbiology-an introduction to in factious diseases, fourth edition, McGraw HILL Publisher, New Delhi, 1994 MACKIE & McCartney Practical medical microbiology
E BOOKS	
1.	https://books.google.co.in/books/about/Ocular_Microbiology

COURSE TITLE	**VISUAL OPTICS - I**			**CREDITS**	**2**
COURSE CODE	**HSG1202**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**2-0-0-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	This course deals with the concept of eye as an optical instrument and thereby covers different optical components of eye, types of refractive errors, clinical approach in diagnosis and management of various types of refractive errors.
Course Objective	Upon completion of the course, the student should be able: 1. To understand the fundamentals of optical components of the eye 2. To gain theoretical knowledge and practical skill of visual acuity measurement, objective and subjective clinical refraction
Course Outcome	Upon completion of this course, the students will be able to 1. Explain the concept of eye as an optical instrument and there by covers various optical components of eye, types of refractive errors, clinical approach in diagnosis and management of various types of refractive errors 2. Calculate vergence and power manually with the formulas 3. Explain the optics of the ocular structure 4. Measure the optical constant of the eye 5. Measure the refractive anomalies and causes

Prerequisites:

CO & PO MAPPING

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	3	2	1	-	-	-	-	-	-	-	2	1	-
CO-2	-	-	3	3	1	-	-	-	-	-	-	-	2	1	-
CO-3	-	-	2	2	1	-	-	-	-	-	-	-	2	1	-
CO-4	-	-	2	2	1	-	-	-	-	-	-	-	2	1	-
CO-5	-	-	3	2	1	-	-	-	-	-	-	-	2	1	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE - 1: REVIEW OF GEOMETRICAL OPTICS **(6L=6)**

Review of Geometrical Optics: Vengeance and power 1. Conjugacy, object space and image space 2. Sign convention 3. Spherical refracting surface 4. Spherical mirror; catoptric power 5. Cardinal points	**CO-1** **BTL-2**
MODULE - 2: VERGENCE AND POWER	**(6L=6)**
1. Magnification 2. Light and visual function 3. Clinical relevance of: fluorescence, interference, diffraction, polarization, bi-refringence, dichroism 4. Aberration and application spherical and chromatic	**CO-2** **BTL-2**
MODULE - 3: OPTICS OF OCULAR STRUCTURE	**(6L=6)**
1. Cornea and aqueous 2. Crystalline lens 3. Vitreous 4. Schematic and reduced eye	**CO-3** **BTL-3**
MODULE - 4: MEASUREMENTS OF OPTICAL CONSTANTS OF THE EYE	**(6L=6)**
Measurements of Optical Constants of the Eye: 1.Corneal curvature and thickness 2. Keratometry 3. Curvature of the lens and ophthalmophakometry 4. Axial and axis of the eye Basic Aspects of Vision. 5. Visual Acuity 6. Light and Dark Adaptation 7. Colour Vision 8. Spatial and Temporal Resolution 9. Science of Measuring visual performance and application to Clinical Optometry.	**CO-4** **BTL-2**
MODULE - 5: REFRACTIVE ANOMALIES AND THEIR CAUSES	**(6L=6)**
1. Ethology of refractive anomalies 2. Contributing variability and their ranges 3. Populating distributions of anomalies. 4. Optical component measurements 5. Growth of the eye in relation to refractive errors	**CO-5** **BTL-2**
TEXT BOOKS	
1	MH Freeman, C.C. Hall: Optics, 11th edition, Butterworth - Heinemann, 2003.
2	A Jenkins and HE White: Fundamentals of Optics, 4th edition, McGraw - Hill book company.
REFERENCE BOOKS	

1	Keating PM: Geometric, Physical and Visual Optics, Butterworth- Heinemann, 2002
E BOOKS	
1.	https://www.taylorfrancis.com/books/handbook-visual-optics

COURSE TITLE	**OPTOMETRIC OPTICS - I**			**CREDITS**	**2**
COURSE CODE	**HSG1203**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**2-0-0-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	This course deals with understanding the theory behind spectacle lenses and frames, their materials, types, advantages and disadvantages, calculations involved, when and how to prescribe				
Course Objective	Upon completion of the course, the student should be able: 1. To understand the fundamentals of optical components of the eye 2. To gain theoretical knowledge and practical skill of visual acuity measurement, objective and subjective clinical refraction				
Course Outcome	Upon completion of this course, the students will be able to 1. Explain the theory behind spectacle lenses and frames, their materials, types, advantages and disadvantages, calculations involved, when and how to prescribe 2. It will impart construction, design application and development of lenses, particularly of the methods of calculating their power and effect. 3. To measure lens power, centration and perform transposition. 4. Magnification in high plus lenses, Magnification in high minus lenses 5. To gain knowledge of spectacle lenses and ophthalmic prisms.				

Prerequisites:

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	3	2	3	-	-	-	-	-	-	-	2	1	2
CO-2	-	-	3	3	3	-	-	-	-	-	-	-	2	1	2
CO-3	-	-	2	2	3	-	-	-	-	-	-	-	2	1	2
CO-4	-	-	2	2	3	-	-	-	-	-	-	-	2	1	2
CO-5	-	-	3	2	3	-	-	-	-	-	-	-	2	1	2

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE - 1: INTRODUCTION TO LIGHT	**(7L+2T=9)**
1. Introduction –Light, Mirror, Reflection, Refraction and absorption 2. Prisms–Definition,properties,Refractionthroughprisms,Thicknessdifference,Base-apex notation,uses,nomenclatureandunits,signconventions,Fresnel'sprisms,rotaryprisms 3. Lenses–Definition, units, terminology used to describe, form flenses.	**CO-1** **BTL-2**
MODULE 2: MEASUREMENT OF VERTEX DISTANCE AND POWER	**(7L+2T=9)**
Vertex distance and vertex power, Effectively calculations Lensshape,sizeandtypesi.e.Spherical,cylindricalandSphero-cylindrical	**CO-2** **BTL-2**
MODULE 3: TRASPOSITION	**(7L+2T=9)**
1. Transpositions –Simple, Toric and Spherical equivalent 2. Prismatic effect, centration, decent ration and Prentice rule, Prismatic effect of Plano-cylinder and Sphero cylinder lenses.	**CO-3** **BTL-3**
MODULE 4: SPEEDOMETER AND MAGNIFICATION	**(7L+2T=9)**

1. Speedometer& Sag formula, Edge thickness calculations 2. Magnification in high plus lenses, Magnification in high minus lenses	**CO-4** **BTL-2**
MODULE 5: TILT INDUCED POWER AND ABBERTAION	**(7L+2T=9)**
1.Tilt induced power in spectacles 2. Aberration in Ophthalmic Lenses	**CO-5** **BTL-2**
TEXT BOOKS	
1.	A. K. Khurana (Author) by Theory and Practice of Optics & Refraction Paperback – 1 January 2016.
2.	David Wilson: practical optical dispensing, often-de, nswtaf commission, 1999.
REFERENCE BOOKS	
1	A. K. Khurana (Author) by Theory and Practice of Optics & Refraction Paperback – 1 January 2016.
E BOOKS	
1.	https://www.kobo.com/us/en/ebook/optical-devices-in-ophthalmology-and-optometry

COURSE TITLE	**OPTOMETRIC INSTRUMENTATION**			**CREDITS**	**3**
COURSE CODE	**HSG1204**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**3-0-0-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**

Course Description	This course covers instruments used commonly in eye care practice, its optical principle, clinical procedure and interpretation of the results.
Course Objective	At the end of the course, To gain knowledge on the optical principle, instrumentation and basic practical skill in handling the instruments used in eye care.
Course Outcome	Upon completion of this course, the students will be able to 1. Use instruments, its basic principle, description and Explain its usage in clinical practice 2. Demonstrate ophthalmoscopes and other devices 3. Assess ocular structures with ophthalmic instruments 4. Assess ocular structures with ophthalmic instruments1 5. Explain and demonstrate vision testing procedures

Prerequisites:

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	3	2	3	-	-	-	-	-	-	-	2	1	3
CO-2	-	-	3	3	3	-	-	-	-	-	-	-	2	1	3
CO-3	-	-	2	2	3	-	-	-	-	-	-	-	2	1	3
CO-4	-	-	2	2	3	-	-	-	-	-	-	-	2	1	3
CO-5	-	-	3	2	3	-	-	-	-	-	-	-	2	1	3

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: (7L+2P=9)

REFRACTIVE INSTRUMENTS

Refractive instruments: 1. Opto types and MTF, Spatial Frequency 2. Test charts standards 3. Choice of test charts 3. Trial case lenses 4. Refractor (phoropter) head units 5. Optical considerations of refractor units 6. Trial frame design 7. Near vision difficulties with units and trial frames 8. Retina scope – types available 9. Adjustment of Retina scopes - special features 10. Objective optometry 11. Infrared optometry devices 12 .Projection charts 13. Illumination of the consulting room 14. Brightness acuity test 15. Vision analyser 16. Pupil	**CO-1** **BTL-2**

meter 17. Potential acuity meter 18. Aerometer	
MODULE 2: OPHTHALMOSCOPES AND RELATED DEVICES	**(7L+2P=9)**
Ophthalmoscopes and related devices: 1.Design of ophthalmoscopes –illumination 2. Design of ophthalmoscopes-viewing 3. Ophthalmoscope disc 4. Filters for ophthalmoscopy 5. Indirect ophthalmoscope.	**CO-2** **BTL-2**
MODULE 3: OCULAR STRUCTURE ASSESSMENT INSTRUMENTS	**(7L+2P=9)**
1. keratometry and corneal topography 2. Refract meter 3. Orthoptic Instruments (Synoptophore Only)	**CO-3** **BTL-3**
MODULE 4: VISION TESTING PROCEDURES	**(7L+2P=9)**
1. Colour Vision Testing Devices 2. Fields of Vision And Screening Devices 3. Scans 4. ERG 5. New Instruments	**CO-4** **BTL-2**
MODULE 5: OCULAR STRUCTURE ASSESSMENT INSTRUMENTS	**(7L+2P=9)**
1. Lens meter, Lens gauges or clock 2. Slit lamp 3. tonometer	**CO-5** **BTL-2**

TEXT BOOKS	
1.	DavidHenson:OptometricInstrumentations,Butterworth-Heinnemann,UK, 2001
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 BOOKS	
1.	https://openlibrary.org/books/OL21589460M/Optometric_instrumentation

COURSE TITLE	**OCULAR DISEASES -I**			**CREDITS**	**3**
COURSE CODE	**HSG1205**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**2-0-2-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	This course deals with various ocular diseases affecting various parts of the eye. It covers clinical signs and symptoms,cause,pathophysiological mechanism, diagnostic approach, differential diagnosis and management aspects of the ocular diseases				
Course Objective	Able to understand various ocular diseases affecting various parts of the eye. It covers clinical signs and symptoms,cause,pathophysiological mechanism, diagnostic approach, differential diagnosis and management aspects of the ocular diseases				
Course Outcome	Upon completion of this course, the students will be able to 1. Explain various ocular diseases affecting various parts of the eye. It covers clinical signs and symptoms,cause,pathophysiological mechanism, diagnostic approach, differential diagnosis and management aspects of the ocular diseases 2. Explain the anatomy & etiology of lids and lacrimal system & identify all the parts 3. Explain the anatomy & etiology of conjunctiva identify all the parts 4. Explain the anatomy and physiology of the cornea 5. Know the details about uveal tract and sclera				

Prerequisites:

CO & PO MAPPING

CO	PO 1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO 10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	3	3	2	-	-	-	-	2	-	-	2	3	-
CO-2	-	-	3	3	2	-	-	-	-	2	-	-	2	3	-
CO-3	-	-	2	3	2	-	-	-	-	2	-	-	2	3	-
CO-4	-	-	3	2	2	-	-	-	-	2	-	-	2	3	-
CO-5	-	-	2	3	2	-	-	-	-	2	-	-	2	3	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: ORBIT	**(9L=9)**
1. Applied Anatomy 2.Proptosis (Classification, Causes, Investigations) 3. Exophthalmos 4. Developmental Anomalies (craniosynostosis, Craniofacial Dysostosis, Hypertelorism, Median facial cleft syndrome) 5. Orbital Inflammations (Preseptal cellulites, Orbital cellulitis Orbital Periostitis, cavernous sinus Thrombosis) 6. Grave's Ophthalmopathy 7. Orbital tumours (Dermoid, capillary haemangioma, Optic nerve glioma) 8. Orbital blow out fractures 9. Orbital surgery (Orbitotomy) 10. Orbital tumours 11. Orbital trauma 12. Approach to a patient with proptosis	**CO-1** **BTL-2**
MODULE 2: LIDS & LACRIMALSYSTEM	**(9L=9)**
Lids: 1. Applied anatomy 2.Congenitalanomalies(Ptosis,Coloboma,Epicanthus,Distichiasis,Cryptophthalmos) 3. Oedema of the eyelids (Inflammatory, Solid, Passive oedema) 4. Inflammatory disorders (Blepharitis, External Hordeolum, Chelation, Internal hordeolum, molluscum contagiosum) 5. Anomalies in the position of the lashes and Lid Margin (Trichiasis, Ectropionise, Entropionise, Symblepharon, Blepharophimosis, Lagophthalmos, Blepharospasm, Ptosis) 6. Tumours (Papilloma, Xanthelasma, Haemangioma, Basal carcinoma, Squamous cell carcinoma, sebaceous gland melanoma) 7. Lacrimal system 8. Applied anatomy 9. Tear film 10. The Dry Eye (Sjogren's Syndrome) 11. The watering eye (Ethology, clinical evaluation) 12. Dacryocystitis 13. Swelling of the Lacrimal gland(Dacryoadenitis)	**CO-2** **BTL-2**
MODULE 3: CONJUNCTIVA & LENS	**(9L=9)**
Conjunctiva 1. AppliedAnatomy2. Inflammation so of conjunctiva(Infective conjunctivitis–	**CO-3**

bacterial,chlamydial,viral, Allergic conjunctivitis, Granulomatous conjunctivitis) 3. Degenerative conditions (Pinguecula, Pterygium, Concretions) 4. Symptomatic conditions (Hyperaemia, Chemosis, Ecchymosis, Xerosis, Discoloration), Lens anatomy, physiology, morphology, cataract types, cataract surgery, Subluxation. **(10L=10)** 5. Cysts and Tumours.	**BTL-3**
MODULE 4: CORNEA	**(9L=9)**
1. Applied Anatomy and Physiology 2. Congenital Anomalies (Megalocornea, Microcornea, Cornea plana, Congenital cloudy cornea) 3. Inflammations of the cornea (Topographical classifications: Ulcerative keratitis and No ulcerative 4. Etiologicalclassifications:Infective,Allergic,Trophic,Traumatic,Idiopathic) 5. Degenerations (classifications, Arcussenilis, Vogt's white limbal girdle, Hazel-hen bodies, Lipoid Keratopathy, Band shaped keratopathy, Salzmann's nodular degeneration, Droplet keratopathy, Pellucid Marginal degeneration)6. Dystrophies (Reis Buckler dystrophy, Recurrent corneal erosion syndrome, Granular dystrophy, Lattice dystrophy, Macular dystrophy, cornea guttata, Fuchs's epithelial endothelial dystrophy, Congenital hereditary endothelial dystrophy) 7. Keratoconus, Keratoglobus 8. Corneal oedema, Corneal opacity, Corneal vascularisation 8.PenetratingKeratoplasty.	**CO-4** **BTL-2**
MODULE 5: UVEAL TRACT AND SCLERA	**(9L=9)**
1. Uveal Tract and Sclera 2.Applied Anatomy 3.Classification of uveitis 4.Ethology 5.Pathology 6. Anterior Uveitis 7.Posterior Uveitis 8.Purulent Uveitis 9.Endophthalmitis 10.Panophthalmitis 11. Pars Plan 12. Tumours of uveal tract(Melanoma) 13.Episcleritis and sclerotize 14.Clinical examination of Uveitis and Sclerotize.	**CO-5** **BTL-2**

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,6thedition, Butterworth-Heinemann,2007
2	StephenJ.Miller:ParsonsDiseasesoftheEye,18thedition,ChurchillLivingstone,1990
E BOOKS	
1.	ttps://store.kortext.com/ocular-disease-mechanisms-and-management-ebook-198249

COURSE TITLE	CLINICAL EXAMINATION OF VISUAL SYSTEM			CREDITS	2
COURSE CODE	HSG1206	COURSE CATEGORY	PC	L-T-P-S	2-0-2-0
Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL-3
ASSESSMENT SCHEME					
First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%
Course Description	This course covers various clinical optometry procedures involving external examination, anterior segment and posterior segment This course covers various clinical optometry procedures involving external examination, anterior segment and posterior segment				
Course Objective	1. To learn and practice the necessary clinical skills to conduct an Optometric Examination. 2. Students will be performing the techniques on their own classmates as well as on patients under the supervision of faculty members. 3. Along with the routine eye examination, students will receive training on speciality areas like contact lenses, binocular vision examination and low vision assessment				
Course Outcome	Upon completion of this course, the students will be able to 1. Demonstrate various clinical optometry procedures involving external examination, anterior segment and posterior segment This course covers various clinical optometry procedures involving external examination, anterior segment and posterior segment. 2. Familiarize with instruments, its basic principle, description and Explain its usage in clinical practice 3. The student should demonstrate non-contact ophthalmic procedures 4. Use slit lamp examination and photo stress test 5. Measure ROPLAS and Amslers test				
Prerequisites:					
CO & PO MAPPING					

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	**-**	**-**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**1**	**-**
CO-2	**-**	**-**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**	**-**	**1**	**-**
CO-3	**-**	**-**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**1**	**-**
CO-4	**-**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**1**	**-**
CO-5	**-**	**-**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**1**	**-**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: HISTORY TAKING	**(2L+4P=6)**
1.History taking 2.Visual acuity estimation 3.Extra ocular motility, Cover test, Alternating cover test 4.Hirschberg test, Modified krimsky	**CO-1** **BTL-2**
MODULE 2: PUPIL EXAMINATION	**(2L+4P=6)**
1.Pupils Examination 2.Maddox Rod 3.Van Herrick 4.External examination of the eye, Lid Eversion	**CO-2** **BTL-2**
MODULE 3: ANTERIOR SEGMENT EXAMNINATION	**(2L+4P=6)**
1.Schemer's, TBUT, tear meniscus level, NITBUT (Keratometry), 2. Colour Vision 3. Stereopsis 4.Confrontation test	**CO-3** **BTL-3**
MODULE 4: SLIT LAMP EXAMNINATION	**(2L+4P=6)**

1.Photostresstest 2. Slit lamp bio microscopy 3.Ophthalmoscopy 4.Tonometry	**CO-4** **BTL-2**
MODULE 5: BASIC OPTOMETRY EXAMINATION (2L+4P=6)	
1.ROPLAS 2.Amsler test 3.Contrast sensitivity function test 4.Saccades and pursuit test	**CO-5** **BTL-2**

TEXT BOOKS	
1.	T Grosvenor: Primary Care Optometry, 5thedition, Butterworth–Heinemann, USA,2007.
REFERENCE BOOKS	
1	DB. Elliott: Clinical Procedures in Primary Eye Care, 3rdedition, Butterworth-Heinemann, 2007
2	JackJ.Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth-Heinemann,2007
E BOOKS	
1.	https://books.google.co.in/books/about/Clinical Examination in Ophthalmology

COURSE TITLE	**INTRODUCTION TO QUALITY AND PATIENT SAFTEY**			**CREDITS**	**2**
COURSE CODE	**HSS1227**	**COURSE CATEGORY**	**BS**	**L-T-P-S**	**2-0-2-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**

Course Description	This course deals with Quality assurance and Management
Course Objective	This course deals with Quality assurance and Management
Course Outcome	Upon completion of this course, the students will be able to 1. Explain Quality assurance and Management 2. Familiarize with basics of emergency care and life support skills 3. Explain biomedical waste management and environment safety 4. Explain infection and prevention control 5. Know the details about antibiotic resistance

Prerequisites:

CO & PO MAPPING

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	1	3	-	-	-	-	3	-	1	2	-	-	-	2	-
CO-2	1	3	-	-	-	-	2	-	1	1	-	-	-	2	-
CO-3	1	3	-	-	-	-	2	-	1	2	-	-	-	2	-
CO-4	1	3	-	-	-	-	2	-	1	1	-	-	-	2	-
CO-5	1	3	-	-	-	-	2	-	1	1	-	-	-	2	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1:QUALITY ASSURANCE AND MANAGMENT	**(6L=6)**
Quality assurance and Management	**CO-1** **BTL-2**
MODULE 2: BIOMEDICAL WASTE MANAGMENT	**(6L=6)**
Biomedical and plastic waste management and environment safety	**CO-2** **BTL-2**

MODULE 3: INFECTION AND PREVENTION CONTROL	(6L=6)
Infection and prevention control	CO-3 BTL-3
MODULE 4: BASIC EMMERGENCY AND LIFE SUPPORT	**(6L=6)**
Basics of emergency care and life support skills & First aid	CO-4 BTL-2
MODULE 5: ANTIBIOTIC RESISTANCE	**(6L=6)**
Antibiotic resistance, Disaster preparedness and management, COVID	CO-5 BTL-2

TEXT BOOKS	
1.	Patrice Spath (Author), by Introduction to Healthcare Quality Management, Third Edition (Gateway to Healthcare Management) Paperback – Import, 30 March 2018
REFERENCE BOOKS	
1	Thomas K. Ross (Author) by Health Care Quality Management: Tools and Applications Paperback – Illustrated, 18 February 2014.
E BOOKS	
1.	https://www.amazon.in/Introduction-Healthcare-Quality-Management-Patrice/dp/1567939856

COURSE TITLE	CLINICAL OPTOMETRY I			CREDITS	6
COURSE CODE	HSG1208	COURSE CATEGORY	PC	L-T-P-S	2-0-2-0
Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL-3
ASSESSMENT SCHEME					
First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE

15%	15%	10%	5%	5%	50%

Course Description	Know all the clinical aspects of optometry
Course Objective	Learn and practice the necessary clinical skills to conduct an Optometric Examination. Students will be performing the techniques on their own classmates as well as on patients under the supervision of faculty members. Along with the routine eye examination, students will receive training on speciality areas like contact lenses, binocular vision examination and low vision assessment.
Course Outcome	Upon completion of this course, the students will be able to 1. Explain the importance of history taking and should know the specific history taken for ophthalmology patients. 2. Use tonometer and gonios copy and should interpret visual field assessment 3. Measure proptosis with exopthalmometer 4. Demonstrate and interpret findings using biomicroscopes with different lenses 5. Apply knowledge from previous clinical learning experience under the supervision of are registered optometrist. Students are tested on intermediate clinical optometry skills.

Prerequisites: CSB231 - Cryptography and Network Security

CO & PO MAPPING

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	3	2	2	-	-	-	-	2	-	-	2	1	-
CO-2	-	-	2	2	2	-	-	-	-	1	-	-	2	1	-
CO-3	-	-	3	2	2	-	-	-	-	2	-	-	2	1	-
CO-4	-	-	3	3	2	-	-	-	-	2	-	-	2	1	-
CO-5	-	-	3	2	2	-	-	-	-	1	-	-	2	1	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: HISTORY TAKING & VISION ASSESSMENT (2L+8P=10)

History taking Visual Acuity Assessment for- distance and near, Contrast sensitivity testing, Trial set: Identification of different lenses & accessories, Phoropter	**CO-1** **BTL-2**
MODULE 2: TRAIL SET & RETINOSCOPY	**(6P=6)**
Trial set: Identification of different lenses & accessories, Phoropter Basics of Retinoscopy -Spot & Streak Keratometry & corneal topography Lensometry	**CO-2** **BTL-2**
MODULE 3: EXTRAOCULAR MOTILITY TESTING	**(8P=8)**
Extraocular Motility testing, Cover tests, Modified krimsky & Hirschberg test Introduction to convergence/accommodation tests , Measurement of HVID, Pupillary Distance, Pupillary evaluation	**CO-3** **BTL-3**
MODULE 4: SLIT LAMP EXAMINATION	**(6L=6)**
Slit lamp examination, corneal sensitivity, tear film evaluation, Pachymetry & Biometry	**CO-4** **BTL-2**
MODULE 5: JOURNAL, CASE DISCUSSION & CLINICAL POSTING	**(50P=50)**
Intraocular pressure, Visual fields Basics of Visual field assessment / Amsler grid testing/colour vision assessment , Fundus biomicroscope	**CO-5** **BTL-2**
TEXT BOOKS	
1.	A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international(p)Ltd. Publishers, New Delhi,2007
REFERENCE BOOKS	

1	JB Eskeridge, John F. Amos, Jimmy D. Bartlett: Clinical Procedures in Optometry, Lippincott-Williams
2	DB. Elliott: Clinical Procedures in Primary Eye Care, 3rdedition, Butterworth-Heinemann, 2007

SEMESTER IV

COURSE TITLE	**OPTOMETRIC OPTICS II AND DISPENSING OPTICS**			**CREDITS**	**4**
COURSE CODE	**HSS1223**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**2-0-4-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	This course deals with understanding the theory behind spectacle lenses and frames, their materials, types, advantages and disadvantages, calculations involved, when and how to prescribe. It will impart construction, design application and development of lenses, particularly of the methods of calculating their power and effect. In addition deals with role of optometrists in optical set-up				
Course Objective	1. To know the theory behind spectacle lenses and frames, their materials, types, advantages and disadvantages, calculations involved, when and how to prescribe. 2. To impart construction, design application and development of lenses, particularly of the methods of calculating their power and effect.				

Course Outcome	Upon completion of this course, the students will be able to 1. Explain the theory behind spectacle lenses and frames, their materials, types, advantages and disadvantages, calculations involved, when and how to prescribe. It will impart construction, design application and development of lenses, particularly of the methods of calculating their power and effect. In addition deals with role of optometrists in optical set-up 2. Know the characteristics of tinted lenses Absorptive Glasses 3. Explain the reflection from spectacle lens surface & lens coatings 4. Familiarize with the Components of spectacle prescription & interpretation 5. To Explain trouble shooting with spectacles

Prerequisites: CSB231 -

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	1	2	-	-	3	-	-	-	2	-	-	3	1	3
CO-2	-	1	2	-	-	3	-	-	-	2	-	-	3	1	3
CO-3	-	1	2	-	-	3	-	-	-	1	-	-	3	1	3
CO-4	-	1	2	-	-	3	-	-	-	1	-	-	3	1	3
CO-5	-	1	2	-	-	3	-	-	-	1	-	-	3	1	3

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: MANUFACTURING OF EYE GLASSES	**(4L+8P=12)**
Spectacle Lenses - II: 1.Manufacture of glass 2.Lensmaterials 3.Lens surfacing 4.Principle of surface generation and glass cements 5 .Terminology used in Lens workshop 6.Lens properties 7.Lens quality 8.Faultsinlensmaterial 9.Faultsonlenssurface 10.Methods of Inspecting the quality of lenses 11.Safety standards for ophthalmic lenses(FDA, ANSI, ISI, Others) Spectacle Frames: 1.Types and parts 2.Classification of spectacle frames-material, weight, temple position, Coloration 3.Frameconstruction 4.Frameselection 5.Size,shape,mountingandfieldofviewofophthalmiclenses	**CO-1** **BTL-2**
MODULE 2: TINTED & PROTECTIVE LENSES	**(4L+8P=12)**

Tinted & Protective Lenses: 1. Characteristics of tinted lenses Absorptive Glasses 2.Polarizing Filters, Photochromic & Reflecting filters 3.Safety lenses-Toughened lenses, Laminated Lenses, CR 39, Polycarbonate lenses Multifocal Lenses: 1.Introduction, history and development, type's 2.Bifocal lenses, Trifocal & Progressive addition lenses.	**CO-2** **BTL-2**
MODULE 3: REFLECTIONS FROM SPECTACLEL LENS COATING	**(4L+8P=12)**
Reflection from spectacle lens surface & lens coatings: Reflectionfromspectaclelenses-ghostimages-Reflectionsinbifocalsatthe dividing line Anti-reflection coating, Mirror coating, Hard Multi Coating [HMC], Hydrophobic coating Miscellaneous Spectacle: 1. Iseikonic lenses 2.Spectaclemagnifiers 3.Recumbentprismss 4.Fresnel prism and lenses 5.Lenticular & A spherical lenses 6.High Refractive index glasses	**CO-3** **BTL-3**
MODULE 4: COMPONENTS OF SPECTACLE PRESCRIPTION	**(4L+8P=12)**
Components of spectacle prescription & interpretation, transposition, Add and near power relation Frame selection –based on spectacle prescription, professional requirements, age group, face shape Measuring Inter-pupillary distance (IPD) for distance & near, bifocal height Lens&Framemarkings,Pupillarycenters,bifocalheights,Progressivemarkings& adjustments –facial wrap, pan to scope tilt Recording and ordering of lenses (power, add, diameter, base, material, type, lens enhancements), Neutralization –Hand &lens meter, axis marking, prism marking.	**CO-4** **BTL-2**
MODULE 5: TROUBLESHOOTING	**(4L+8P=12)**
Faults in spectacles (lens fitting, frame fitting, patients complaints, description, detection and correction) Final checking & dispensing of spectacles to customers, counselling on wearing & maintaining of spectacles, Accessories –Bands, chains, boxes, slevets, cleaners, screwdriver kit Spectacle repairs –tools, methods, soldering, riveting, frame adjustments Special types of spectacle frames Monocles	**CO-5** **BTL-2**

Ptosis crutches Industrial safety glasses Welding glasses Frame availability in Indian market FAQ's by customers and their ideal answers	
TEXT BOOKS	
1.	Jolie MO: Ophthalmic lens and Dispensing, 3rdedition,Butterworth–Heinemann, 2008
REFERENCE BOOKS	
1	C W Brooks, IM Borish: System for Ophthalmic Dispensing, 3rdedition, Butterworth - Heinemann,2007
2	Michael P Keating: Geometric, Physical & Visual Optics, 2nd edition, Butterworth – Heinemann,2002
E BOOKS	
1.	https://www.amazon.in/Text-Visual-Optics-optometry-Ophthalmology/dp/938527421X

COURSE TITLE	**VISUAL OPTICS -II**			**CREDITS**	**2**
COURSE CODE	**HSS1224**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**2-0-2-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	This course deals with the concept of eye as an optical instrument and there by covers different optical components of eye, types of refractive errors, clinical approach in diagnosis and management of various types of refractive errors.				

Course Objective	Upon completion of the course, the student should be able: 1. To understand the fundamentals of optical components of the eye 2. To gain theoretical knowledge and practical skill of visual acuity measurement, objective and subjective clinical refraction
Course Outcome	Upon completion of this course, the students will be able to 1. Explain the concept of eye as an optical instrument and there by covers different optical components of eye, types of refractive errors, clinical approach in diagnosis and management of various types of refractive errors 2. Measure convergence with different methods 3. Demonstrate objective refraction on subjects with different procedures 4. Demonstrate subjective refraction on subjects with different procedures 5. Measure effective power and magnification

Prerequisites: CSB231 - Cryptography and Network Security

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	1	2	-	-	3	-	-	-	2	-	-	2	1	-
CO-2	-	1	2	-	-	3	-	-	-	2	-	-	2	1	-
CO-3	-	1	2	-	-	3	-	-	-	1	-	-	2	1	-
CO-4	-	1	2	-	-	3	-	-	-	1	-	-	2	1	-
CO-5	-	1	2	-	-	3	-	-	-	1	-	-	2	1	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: ACCOMMODATION & PRESBYOPIA	**(6L =6)**
Accommodation & Presbyopia 1.Far and near point of accommodation 2.Range and amplitude of accommodation 3.Mechanism of accommodation Variation of accommodation with age 1.Anomalies of accommodation	**CO-1** **BTL-2**

2.Presbyopia Hypermetropia and accommodation	
MODULE 2: CONVERGENCE	**(6L =6)**
Convergence: Type, Measurement and Anomalies Relationship between accommodation and convergence-AC/A ratio	**CO-2** **BTL-2**
MODULE 3: OBJECTIVE REFRACTION (STATIC & DYNAMIC)	**(6L =6)**
Objective Refraction (Static & Dynamic) 1.Streakretinoscopy 2.Principle, Procedure, Difficulties and interpretation of findings 3.Transposition and spherical equivalent 4.Dynamic radioscopy various methods 5.Radical radioscopy and near retina scope Cyclopaedic refraction.	**CO-3** **BTL-3**
MODULE 4: SUBJECTIVE REFRACTION	**(6L =6)**
Subjective Refraction: 1.Principle and fogging 2.Fixedastigmaticdial (Clock dial), Combination of fixed and rotator dial (Fan and block test),J.C.C 3.Duochrometest 4.Binocular balancing- alternate occlusion, prism dissociation, dissociate Duo chrome balance, Borish dissociated fogging Binocular refraction-Various techniques	**CO-4** **BTL-2**
MODULE 5: EFFECTIVE POWER &MAGNIFICATION	**(6L =6)**
Effective Power &Magnification: 1. Ocular refraction vs. Spectacle refraction 2. Spectacle magnification vs. Relative spectacle magnification 3. Axial vs. Refractive ametropia, Knapp's law 3. Ocular accommodation vs. Spectacle accommodation Retinal image blur-Depth of focus and depth of field.	**CO-5** **BTL-2**
TEXT BOOKS	

1.	Theodore Grosvenor: Primary Care Optometry, 5th edition, Butterworth –Heinemann, 2007
REFERENCE BOOKS	
1	AI Lens: Optics, Radioscopy, and Refractometry: 2nd edition, SLACK Incorporated (p) Ltd,2006
2	David B. Elliot: Clinical Procedures in Primary Eye care, 3rd edition, Butterworth – Heinemann,2007
E BOOKS	
1.	https://www.amazon.in/Handbook-Visual-Optics-One-Fundamentals-ebook/dp/B06WP81YXQ

COURSE TITLE	**OCULAR DISEASES II AND GLAUCOMA**			**CREDITS**	**3**
COURSE CODE	**HSS1225**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**2-0-2-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	This course deals with various ocular diseases affecting various parts of the eyes.				
Course Objective	Know various ocular diseases affecting various parts of the eyes. linical signs and symptoms, cause, pathophysiological mechanism, diagnostic approach, differential diagnosis and management aspects of the ocular diseases				

Course Outcome	Upon completion of this course, the students will be able to 1. Know various ocular diseases affecting various parts of the eyes. 2. Familiarize with clinical signs and symptoms, cause, pathophysiological mechanism, diagnostic approach, differential diagnosis and management aspects of the ocular diseases 3. Explain applied anatomy and physiology and clinical examinations of lens 4. Explain applied anatomy and physiology and clinical examinations of neuro ophthalmology 5. Explain applied anatomy and physiology and clinical examinations of glaucoma

Prerequisites:

CO & PO MAPPING

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	2	2	1	2	2	2	2	2	-	-	1	-	-
CO-2	-	-	3	2	2	2	2	2	2	2	-	-	1	-	-
CO-3	-	-	3	2	1	2	2	2	2	2	-	-	1	-	-
CO-4	-	-	2	2	2	2	2	2	2	2	-	-	1	-	-
CO-5	-	-	2	2	1	2	2	2	2	2	-	-	1	-	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1:RETINA AND VITREOUS:	**(9L=9)**
Retina and Vitreous: 1.AppliedAnatomy 2. Congenital and Developmental Disorders (Optic Disc: Coloboma, Drusen, Hypoplasia, Medullated nerve fibres; Persistent Hyaloid Artery) 3. Inflammatory disorders (Retinitis: Acute purulent, Bacterial, Virus, mycotic) 4. Retinal Vasculitis (Eales's) 5. Retinal Artery Occlusion (Central retinal Artery occlusion) 6. Retinal Vein occlusion Ischaemic, Non Ischaemic , Branch retinal vein occlusion) 7.Retinaldegenerations:RetinitisPigmentosa,Latticedegenerations 8. Macular disorders: Solar retinopathy, central serous retinopathy, cystoid macular edema, Age related macular degeneration. 9.Retinal Detachment: Rhegmatogenous, Tractional, Exudative) 10.Retinablastoma 11.Diabeticretinopathy	**CO-1** **BTL-2**

MODULE 2: OCULAR INJURIES	(9L=9)
OcularInjuries: Terminology:Closedglobeinjury(contusion,lamellarlaceration)Open globeinjury(rupture,laceration,penetratinginjury,perforatinginjury) 1.Mechanical injuries (Extra ocular foreign body, blunt trauma, perforating injury, sympathetic ophthalmitis) 2.NonMechanicalInjuries(Chemical injuries,Thermal,Electrical,Radiational) Clinical approach towards ocular injury patients	**CO-2** **BTL-2**
MODULE 3: LENS	**(9L=9)**
1.Applied Anatomy and Physiology 2. Clinical examination 3. Classification of cataract 4.Congenital and Developmental cataract 5.Acquired (Senile, Traumatic, Complicated, Metabolic, Electric, Radiational, Toxic) 6. Morphological: Capsular, Sub capsular, Cortical, Supranuclear, Nuclear, Polar. 7.Management of cataract (Non-surgical and surgical measures; preoperative evaluation, Types of surgeries,) 8.Complications of cataract surgery 9. Displacement of lens: Subluxation, Displacement Lens coloboma, Lenticonus, Micro phakia.	**CO-3** **BTL-3**
MODULE 4: CLINICAL NEURO OPHTHALMOLOGY	**(9L=9)**
1.Anatomy of visual pathway 2.Lesions of the visual pathway 3.Pupillary reflexes and abnormalities (Amaurotic light reflex, Efferent pathway defect,Wernicke'shemianopicpupil,Marcusgunnpupil.ArgyllRobetsonpupil, Adie's tonic pupil) 4. Optic neuritis, Anterior Ischemic optic neuropathy, Papilledema, optic atrophy 5. Cortical blindness 6. Malingering 7.Nystagmus 8.Clinical examination.	**CO-4** **BTL-2**
MODULE 5: GLAUCOMA	**(9L=9)**
Glaucoma: 1.Applied anatomy and physiology of anterior segment 2.ClinicalExamination 3.Definitions and classification of glaucoma 4.Pathogenesis of glaucomatous ocular damage 5.Congenitalglaucoma's 6.Primary open angle glaucoma 7.Ocularhypertension 8.Normal Tension Glaucoma 9.Primary angle closure glaucoma (Primary angle closure suspect, Intermittent glaucoma, acute congestive, chronic angle closure) 10.SecondaryGlaucoma's 11.Management:commonmedications	**CO-5** **BTL-2**

TEXT BOOKS	
1.	A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (P. Ltd). Publishers, New Delhi,2007.
REFERENCE BOOKS	

1	Stephen Miller: Parsons Diseases of the Eye,18thedition,ChurchillLivingstone,1990
2	Jack Kanski Clinical Ophthalmology: A Systematic Approach,6thedition,Butterworth-Heinemann,2007
E BOOKS	
1.	https://www.intechopen.com/books/ocular-diseases

COURSE TITLE	**BASIC AND OCULAR PHARMACOLOGY**			**CREDITS**	**2**
COURSE CODE	**HSS1226**	**COURSE CATEGORY**	**BS**	**L-T-P-S**	**2-0-2-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	Pharmacologist / Ophthalmologist Course Description: This course covers the actions, uses, adverse effects and mode of administration of drugs, especially related to eyes.				
Course Objective	This course covers the actions ,uses, adverse effects and mode of administration of drugs, especially related to eyes				

Course Outcome	Upon completion of this course, the students will be able to 1. Explain the uses, adverse effects and mode of administration of drugs, especially related to eyes 2. Explain different drugs used and the effects of the drugs 3. Explain different drugs used in Ophthalmology 4. The applications of diagnostic and therapeutic drugs 5. The drugs used for ophthalmic infections

CO & PO MAPPING

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	3	2	-	-	3	-	-	-	-	-	3	2	-
CO-2	-	-	2	2	-	-	3	-	-	-	-	-	3	2	-
CO-3	-	-	3	2	-	-	3	-	-	-	-	-	3	2	-
CO-4	-	-	3	1	-	-	3	-	-	-	-	-	3	2	-
CO-5	-	-	3	1	-	-	3	-	-	-	-	-	3	2	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: GENERAL PHARMACOLOGY	**(6L=6)**
General pharmacology: Introduction & sources of drugs, Routes of drug administration, Pharmacokinetics(emphasisonocularpharmacokinetics),Pharmacodynamics&factors modifying drug actions	**CO-1** **BTL-2**
MODULE 2: SYSTEMIC PHARMACOLOGY	**(6L=6)**
Systemic pharmacology:Autonomicnervoussystem:Drugsaffectingpapillarysizeand light reflex, Intraocular tension, Accommodation; Cardiovascular system: Anti-hypertensive sand drugs useful in Angina; Diuretics: Drugs used in ocular disorders; Central Nervous System: Alcohol, sedative hypnotics, General & local anaesthetics, Opioids&non-opioids;Chemotherapy:Introductionongeneralchemotherapy,Specific chemotherapy –Antiviral, antifungal, antibiotics; Hormones : Corticosteroids, Antidiabetics; Blood Coagulants	**CO-2** **BTL-2**

MODULE 3:OCULAR PHARMACOLOGY (6L=6)	
Ocular Pharmacology: Ocular preparations, formulations and requirements of an ideal Agent, Ocular Pharmacokinetics,methodsofdrugadministration&Specialdrugdelivery system; Ocular Toxicology	**CO-3** **BTL-3**
MODULE 4: APPLICATION OF DIAGNOSTIC AND THERAPEUTIC DRUGS (6L=6)	
Diagnostic&TherapeuticapplicationsofdrugsusedinOphthalmology:Diagnostic Drugs & biological agents used in ocular surgery, Anaesthetics used in ophthalmic procedures, Anti-glaucoma drugs	**CO-4** **BTL-2**
MODULE 5: PHARMACOLOGY OF OCULAR INFECTIONS (6L=6)	
Pharmacotherapy of ocular infections–Bacterial, viral,fungal&chlamydial;Drugsusedinallergic,inflammatory&degenerativeconditionsof the eye; Immune modulators in Ophthalmic practice, Wetting agents & tear substitutes, Antioxidants	**CO-5** **BTL-2**

TEXT BOOKS	
1.	Ashok Garg, Manual of Ocular Therapeutics ,Jaypee, New Delhi,1996
REFERENCE BOOKS	
1	TJZimmerman,KSKooner:TextBookofOcularPharmacology,Lippincott-Raven,1997
2	CORTON KUMAR AND ROBINS: Pathological Basis of the Disease, 7th Edition, Elsevier, New Delhi,2004
E BOOKS	
1.	https://www.elsevier.com/books/handbook-of-basic-and-clinical-ocular-pharmacology-and-therapeutics/sharif/978-0-12-819291-7

COURSE TITLE	**INDIAN MEDICINE AND TELEMEDICINE**			**CREDITS**	**2**
COURSE CODE	**HSG1207**	**COURSE CATEGORY**	**BS**	**L-T-P-S**	**2-0-2-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**

ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**

Course Description	To understand epidemiology about disease monitoring and surveillances in detail along with article search
Course Objective	Understand the existing healthcare system in India
Course Outcome	Upon completion of this course, the students will be able to 1. The student should know the existing healthcare system in India. 2. Explain in detail about Ayush system of medicine 3. Explain health scenario in India present, past and future 4. The student should know demography and vital statistic of health policies in India 5. Explain epidemiology about disease monitoring and surveillances in detail along with article search

Prerequisites: CSB231 - Cryptography and Network Security

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	-	-	-	-	-	2	2	-	1	-	-	1	-
CO-2	-	-	-	-	-	-	-	2	2	-	1	-	-	1	-
CO-3	-	-	-	-	-	-	-	3	2	-	1	-	-	1	-
CO-4	-	-	-	-	-	-	-	2	2	-	1	-	-	1	-
CO-5	-	-	-	-	-	-	-	2	2	-	1	-	-	1	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: HEALTHCARE SYSTEM IN INDIA (4L+2T=6)

Introduction to healthcare delivery system 1. Health care delivery system in India at primary, secondary and tertiary care 2. Community participation in healthcare delivery system 3. Health system in developed countries. 4.Private Sector 5. National Health Mission 6. National Health Policy 7.Issues in Health Care Delivery System in India National Health Programme - Background objectives, action plan, targets, operations, achievements and constraints in various National Heath Programme.	**CO-1** **BTL-2**
MODULE 2: INTRODUCTION TO AYUSH SYSTEM OFMEDICINE	**(4L+2T=6)**
1. Introduction to AYUSH system of medicine 2. Introduction to Ayurveda. 3.Yoga and Naturopathy 4.Unani 5.Siddha 6.Homeopathy7.Need for integration of various system of medicine	**CO-2** **BTL-2**
MODULE 3: HEATH SCENARIO IN INDIA	**(4L+2T=6)**
1.Health scenario of India- past, present and future	**CO-3** **BTL-3**
MODULE 4: DEMOGRAPHY & VITALSTATISTICS	**(4L+2T=6)**
Demography & Vital Statistics: 1.Demography – its concept 2.Vital events of life & its impact on demography 3.Significance and recording of vital statistics 4.Census & its impact on health policy	**CO-4** **BTL-2**
MODULE 5: EPIDEMIOLOGY	**(4L+2T=6)**
1.Principles of Epidemiology 2. Natural History of disease 3. Methods of Epidemiological studies 4.Epidemiology of communicable & non-communicable diseases, disease transmission, host defence immunizing agents, cold chain, immunization, disease monitoring and surveillance	**CO-5** **BTL-2**
TEXT BOOKS	

1.	Margie Lovett Scott, Faith Prather. Global health systems comparing strategies for delivering health services. Joney & Bartlett learning, 2014
REFERENCE BOOKS	
1	Shashi Gogia (Editor) by Fundamentals of Telemedicine and Telehealth Paperback – Import, 8 November 2019.
E BOOKS	
1.	https://www.amazon.in/Telemedicine-Technologies-Information-Medicine-Telehealth-ebook/dp/B005HF2HL8

COURSE TITLE	**MEDICAL PSYCHOLOGY**			**CREDITS**	**2**
COURSE CODE	**HSS1228**	**COURSE CATEGORY**	**BS**	**L-T-P-S**	**2-0-2-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	This course covers various aspects of medical psychology essential for the optometrist.				
Course Objective	This course covers various aspects of medical psychology essential for the optometrist.				

Course Outcome	Upon completion of this course, the students will be able to 1. Explain various aspects of medical psychology essential for the optometrist. 2. Body Integrity – one's body image, The patient in his Millen 3. The student should Explain the self-concepts of therapist 4. Explain the maladies of the age and their impact on the patient's own and others concept of his body image 5. Explain the major perspectives of psychology

Prerequisites: Basic clinical knowledge

CO & PO MAPPING

CO	PO - 1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO - 10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	1	1	-	-	-	-	-	-	3	1	-	-	-	2	-
CO-2	1	1	-	-	-	-	-	-	3	1	-	-	-	2	-
CO-3	1	1	-	-	-	-	-	-	3	1	-	-	-	2	-
CO-4	1	1	-	-	-	-	-	-	3	1	-	-	-	2	-
CO-5	1	1	-	-	-	-	-	-	3	1	-	-	-	2	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: INTRODUCTION TO PSYCHOLOGY	**(6L=6)**
1.Introduction to Psychology 2.Intelligence Learning, Memory, Personality, Motivation	**CO-1** **BTL-2**
MODULE 2: BODY INTEGRITY	**(6L=6)**
1.Body Integrity – one's body image, The patient in his Millen	**CO-2** **BTL-2**
MODULE 3: CONCEPT OF THERAPIST	**(6L=6)**

The self-concept of the therapist, Therapist-patient relationship–some guidelines 2. Illness, its impact on the patient	**CO-3** **BTL-3**
MODULE 4: MALADIES OF AGE (6L=6)	
1.Maladies of the age and their impact on the patient's own and others concept of his body image	**CO-4** **BTL-2**
MODULE 5: MAJOR PERSPECTIVE F PSYCHOLOGY (6L=6)	
Major perspectives of psychology: Behavioural, psychoanalytic, cognitive and biological	**CO-5** **BTL-2**

TEXT BOOKS	
1.	Patricia Bark way. Psychology for health professionals, 2nd edition, Elsevier, 2013
REFERENCE BOOKS	
1	Morgan, C. T., King, R. A., Weisz, J. R., & Schopler, J. Introduction to Psychology and General Psychology, India. (2001).
2	T.s. Ranganathan: textbook of human Psychology, s. Chand & co., new Delhi. 1982
E BOOKS	
1.	https://www.amazon.in/Contributions-Medical-Psychology-psychology-international-ebook/dp/B01E3EOY5U

COURSE TITLE	**CLINICAL OPTOMETRY PRACTICAL II**			**CREDITS**	**6**
COURSE CODE	**HSS1229**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**3-0-6-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**

Course Description	To learn and practice the necessary clinical skills to conduct an Optometric Examination. Students will be performing the techniques on their own classmates as well as on patients under the supervision of faculty members. Along with the routine eye examination, students will receive training on speciality areas like contact lenses, binocular vision examination and low vision assessment
Course Objective	To learn and practice the necessary clinical skills to conduct an Optometric Examination. Students will be performing the techniques on their own classmates as well as on patients under the supervision of faculty members. Along with the routine eye examination, students will receive training on speciality areas like contact lenses, binocular vision examination and low vision assessment
Course Outcome	Upon completion of this course, the students will be able to 1. PICO search and case discussion 2. Demonstrate contact lens fitting for soft lenses 3. Demonstrate binocular vision assessment 4. Demonstrate low vision management and testing methods 5. Clinical practice

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	2	2	3	-	-	-	-	2	1	1	3	2	-
CO-2	-	-	2	2	3	-	-	-	-	2	1	1	3	2	-
CO-3	-	-	2	1	3	-	-	-	-	1	1	1	3	2	-
CO-4	-	-	2	1	3	-	-	-	-	1	1	1	3	2	-
CO-5	-	-	1	1	3	-	-	-	-	1	1	1	3	2	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: RETINISCOPY **(2T+8D=10)**

Retinoscopy- Objective Subjective refraction-Subjective verification, Subjective refinement and binocular balancing various techniques Dynamic	**CO-1** **BTL-2**
MODULE 2: VISUAL FIELD ASSESSMENT	**(10P=10)**
Basics of Visual field assessment / Amsler grid testing/colour vision assessment	**CO-2** **BTL-2**
MODULE 3: GLAUCOMA EVALUATION	**(6P=6)**
Tonometry ,Gonioscopy, Visual field assessments & interpretation	**CO-3** **BTL-3**
MODULE 4: FUNDUS EXAMINATION	**(4P=4)**
Fundus biomicroscope (+78D & +90D) Ophthalmoscopy-Direct & Indirect	**CO-4** **BTL-2**
MODULE 5: CLINICAL PRACTICE	**(30P=30)**
Clinical Optometry practice – Objective/ Subjective refraction	**CO-5** **BTL-2**

TEXT BOOKS	
1.	AJJackson,JSWolffsohn:LowVisionManual,ButterworthHeinnemann,2007
REFERENCE BOOKS	
1	IACLE Module, 2nd edition, 2018
2	A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd.

	Publishers, New Delhi, 2007
E BOOKS	
1.	https://libguides.umsl.edu/optometry/books

SEMESTER V

COURSE TITLE	**CONTACT LENS -I**			**CREDITS**	**3**
COURSE CODE	**HSP1317**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**2-0-2-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	The subject provides the student with suitable knowledge both in theoretical and practical aspects of RGP Contact Lenses and an overview on specialty contact lenses				

Course Objective	On successful completion of this course, a student is expected to be able 1. To understand the basics of RGP contact lenses & Their designs 2. To Recognize various types of fitting & trouble shoot
Course Outcome	Upon completion of this course, the students will be able to 1. Demonstrate both in theoretical and practical aspects of Contact Lenses. 2. Explain different materials used for contact lenses 3. Explain contact lens fitting and assessment for soft and rgp lenses 4. Write contact lens prescription 5. Demonstrate care and maintenance for soft and rgp lenses

CO & PO MAPPING

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	2	-	-	-	-	1	1	2	-	-	2	-	-
CO-2	-	-	3	-	-	-	-	1	1	1	-	-	2	-	-
CO-3	-	-	3	-	-	-	-	1	1	1	-	-	2	-	-
CO-4	-	-	2	-	-	-	-	1	1	1	-	-	2	-	-
CO-5	-	-	2	-	-	-	-	1	1	2	-	-	2	-	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1:INTRODUCTION TO CONTACT LENS	**(7L+2P=9)**
1.Introduction to Contact lenses: Definition, Classification /Types 2.History of Contact Lenses 3.Optics of Contact Lenses: Magnification & Visual field, Accommodation & Convergence, Back & Front Vertex Power/ Vertex distance calculation 4.Review of Anatomy & Physiology of: Tear film, Cornea, Lids & Conjunctiva 5.Introduction to CL materials: Monomers, Polymers	**CO-1** **BTL-2**

MODULE 2: CONTACT LENS MATERIAL **(7L+2P=9)**

1.Properties of CL materials: Physiological (Dk, Ionicity, Water content) Physical (Elasticity, Tensile strength, Rigidity) Optical (Transmission, Refractive index) 2.Indications and contraindications 3.Parameters/Designs of Contact Lenses & Terminology 4.RGP Contact Lens materials 4.Manufacturing Rigid and Soft Contact Lenses – various methods	**CO-2** **BTL-2**
MODULE 3: FITTING CHARECTERISTICS (7L+2P=9)	
1.Pre-Fittingexamination–steps, significance, recording of results 2. Correction of Astigmatism with RGP lens 3. Types of fit–Steep, Flat, Optimum–on spherical cornea with spherical lenses 4. Types of fit–Steep, Flat, Optimum–on Toric cornea with spherical lenses 5. Calculation and finalising Contact lens parameters.	**CO-3** **BTL-3**
MODULE 4: ORDERING CONTACT LENS (7L+2P=9)	
1.Ordering Rigid Contact Lenses–writing a prescription to the Laboratory 2. Checking and verifying Contact lenses from Laboratory 3. Modifications possible with Rigid lenses 4.Common Handling Instructions 5.Insertion & Removal Techniques 6.Do's and Don'ts	**CO-4** **BTL-2**
MODULE 5: CARE AND MAINTAINANCE (7L+2P=9)	
1.Care and Maintenance of Rigid lenses 2.Cleaning agents &Importance 3.Rinsing agents &Importance 4.Disinfecting agents & importance 5.Lubricating & Enzymatic cleaners 6.Follow up visit examination 7.Complications of RGP lenses	**CO-5** **BTL-2**

TEXT BOOKS	
1.	AnthonyJ.Phillips:ContactLenses,5thedition,Butterworth-Heinemann,2006
REFERENCE BOOKS	
1	Elisabeth A.W. Millis : Medical Contact Lens Practice,Butterworth-Heinemann,2004
2	E S. Bennett ,V A Henry :Clinical manual of Contact Lenses, 3rd edition, Lippincott Williams and Wilkins,2008
E BOOKS	
1.	https://www.amazon.in/Contact-Practice-Book-Nathan-Efron-ebook/dp/B0054JE436

COURSE TITLE	**LOW VISION**	**CREDITS**	**2**

COURSE CODE	HSP1318	COURSE CATEGORY	PC	L-T-P-S	2-0-2-0
Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	This course deal with the definition of low vision, epidemiology aspect of visual impairment, types of low vision devices and its optical principles, clinical approach of the low vision patients, assistive devices for totally visually challenged, art of prescribing low vision devices and training the low vision patients and other rehabilitation measures.
Course Objective	At the end of the course, the student will be knowledgeable in the following: Definition and epidemiology of Low Vision Causes of Low Vision & Clinical examination of Low vision subjects
Course Outcome	Upon completion of this course, the students will be able to 1. Know the definition of low vision, epidemiology aspect of visual impairment, types of low vision devices and its optical principles, clinical approach of the low vision patients, assistive devices for totally visually challenged, art of prescribing low vision devices and training the low vision 2. Familiarize with pre-clinical evaluation of low vision 3. Able to assess low vision patients vision using specialised charts 4. Know the dispensing & prescribing aspects 5. Explain legal aspects of Low vision in India

Prerequisites: CSB231 - Cryptography and Network Security

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	2	-	-	-	-	1	1	2	-	-	2	1	-
CO-2	-	-	3	-	-	-	-	1	1	1	-	-	2	1	-

CO-3	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**1**	**1**	**1**	**-**	**-**	**2**	**1**	**-**
CO-4	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**1**	**1**	**1**	**-**	**-**	**2**	**1**	**-**
CO-5	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**1**	**1**	**2**	**-**	**-**	**2**	**1**	**-**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: INTRODUCTION TO LOW VISION (4L+2T=6)	
1.Definitions & classification of Low vision 2.Epidemiology of low vision 3.Model of low vision service	**CO-1** **BTL-2**
MODULE 2: CLINICAL EVALUATION OF LOW VISION PATIENTS (4L+2T=6)	
1.Clinical evaluation–assessment of visual acuity ,visual field, selection of low vision aids, instruction &training 2.Pediatric Low Vision care	**CO-2** **BTL-2**
MODULE 3: PRE CLINICAL EVALUATION (4L+2T=6)	
1.Pre-clinicalevaluationoflowvisionpatients–prognostic&psychologicalfactors;psycho-social impact of low vision 2.Typesoflowvisionaids–opticalaids,non-opticalaids&electronicdevices 3.Optics of low vision aids	**CO-3** **BTL-3**
MODULE 4: LOW VISION AIDS (4L+2T=6)	
1.Low vision aids – dispensing & prescribing aspects 2.Visual rehabilitation & counselling	**CO-4** **BTL-2**
MODULE 5:LEGAL ASPECTS OF LOW VISION (4L+2T=6)	
1.Legal aspects of Low vision in India 2.Case Analysis	**CO-5** **BTL-2**

TEXT BOOKS	
1.	Christine Dickinson: Low Vision: Principles And Practice Low Vision Care, 4th Edition, Butterworth-Heinemann,2008
REFERENCE BOOKS	
1	Sarika g, sail Aja mvse vaithilingam: practice of low vision –a guide book, medical research foundation, 2015.
E BOOKS	
1.	https://www.ebooks.com/en-st/730171/low-vision-aids/chaudhry-monica/

COURSE TITLE	GERIATRIC OPTOMETRY			CREDITS	2
COURSE CODE	HSP1319	COURSE CATEGORY	PC	L-T-P-S	2-0-2-0
Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL-3
ASSESSMENT SCHEME					
First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%
Course Description	This course deals with general and ocular physiological changes of ageing, common geriatric systemic and ocular diseases, clinical approach of geriatric patients, pharmacological aspects of ageing, and spectacle dispensing aspects in ageing patients				
Course Objective	At the end of the course, the student will be knowledgeable in the following Identify and investigate the age related changes in the eyes Counselling the elderly				

Course Outcome	Upon completion of this course, the students will be able to 1. Explain the ocular physiological changes of ageing, common geriatric systemic and ocular diseases, clinical approach of geriatric patients, pharmacological aspects of ageing, and spectacle dispensing aspects in ageing patients 2. Explain & diagnose the common ocular disease in geriatric population 3. Demonstrate specific history and vision assessment for geriatric population 4. Explain Geriatric eye disorders & diagnose 5. Explain anterior segment dysgenesis and low vision assessment

Prerequisites: CSB231 - Cryptography and Network Security

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO - 10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	-	-	-	-	3	2	1	1	-	-	2	-	-
CO-2	-	-	-	-	-	-	3	2	1	1	-	-	2	-	-
CO-3	-	-	-	-	-	-	3	2	1	1	-	-	2	-	-
CO-4	-	-	-	-	-	-	2	1	1	1	-	-	2	-	-
CO-5	-	-	-	-	-	-	3	2	1	1	-	-	2	-	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: INRODUCTION TO GERIATRIC OPTOETRY	**(7L+2P=9)**
1.Structural , and morphological changes of eye in elderly 2.Physiological changes in eye in the course of aging 3.Introduction to geriatric medicine – epidemiology , need for optometry care, systemic diseases (Hypertension, Atherosclerosis, coronary heart disease, congestive Heart failure, Cerebrovascular disease, Diabetes, COPD) 4.OptometricExaminationoftheOlderAdult	**CO-1** **BTL-2**

MODULE 2: GERIATRIC EYE DISEASES **(7L+2P=9)**

1.Oculardiseasescommoninoldeye,withspecialreferencetocataract,glaucoma,macular disorders, vascular diseases of the eye 2.Contact lenses in elderly 3.Pharmacological aspects of aging 4.Low vision causes, management and rehabilitation in geriatrics 5.pectacledispensinginelderly–Considerationsofspectaclelensesandframes	**CO-2** **BTL-2**
MODULE 3: REFRACTIVE GERIATRIC CHANGES.	**(7L+2P=9)**
Optical & refractive changes (Cornea, lens & vitreous) due to diabetes, cataract & uveitis	**CO-3** **BTL-3**
MODULE 4: OPTOMETRY GERIATRIC EXAMINATION	**(7L+2P=9)**
Optometric Examination of the Older Adult	**CO-4** **BTL-2**
MODULE 5: ELDERLY OCULAR EYE DISEASES	**(7L+2P=9)**
Ocular disease common in elderly eye (Glaucoma, Macular, Vascular diseases) Dispensing in elderly (Brief on Contact lens & Spectacles	**CO-5** **BTL-2**

TEXT BOOKS	
1.	A.J. Rosen bloomer & M.W. MORGAN, vision and aging, Butterworth- Heinemann, Missouri,2007
REFERENCE BOOKS	
1	OP Sharma: Geriatric Care –A textbook of geriatrics and Gerontology, viva books, New Delhi,2005
2	William Harvey / Bernard gill martin, Butterworth –Heinemann Paediatric optometry, 2004.
E BOOKS	
1.	https://www.eu.elsevierhealth.com/medicine-and-surgery/optometry

COURSE TITLE	**PEDIATRIC OPTOMETRY**			**CREDITS**	**2**
COURSE CODE	**HSP1320**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**2-0-2-0**

Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL-3
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	This course deals with general and ocular physiological changes of ageing, common geriatric systemic and ocular diseases, clinical approach of geriatric patients, pharmacological aspects of ageing, and spectacle dispensing aspects in ageing patients				
Course Objective	At the end of the course, the student will be knowledgeable in the following 1. To Identify and investigate the age related changes in the eyes Counselling the elderly				
Course Outcome	Upon completion of this course, the students will be able to 1. Explain common paediatric systemic and ocular diseases, clinical approach of geriatric patients, pharmacological aspects of ageing, and spectacle dispensing aspects in ageing patients 2. Explain & diagnose the common ocular disease in paediatric population 3. The student should be able to take specific history and vision assessment for paediatric population 4. Should Explain paediatric eye disorders : Cataract, Retinopathy of Prematurity, Retinoblastoma, Neuromuscularconditions(myotonicdystrophy,mitochondrialcytopathy),andGenetics 5. Explain Anterior segment dysgenesis & Paediatric contact lens and low vision assessment.				

CO	PO 1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO - 10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	2	-	-	-	2	1	1	2	-	-	2	-	-

CO-2	**-**	**-**	**3**	**-**	**-**	**-**	**2**	**1**	**1**	**1**	**-**	**-**	**2**	**-**	**-**
CO-3	**-**	**-**	**3**	**-**	**-**	**-**	**2**	**1**	**1**	**1**	**-**	**-**	**2**	**-**	**-**
CO-4	**-**	**-**	**2**	**-**	**-**	**-**	**2**	**1**	**1**	**1**	**-**	**-**	**2**	**-**	**-**
CO-5	**-**	**-**	**2**	**-**	**-**	**-**	**2**	**1**	**1**	**2**	**-**	**-**	**2**	**-**	**-**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: DEVOLOPMENT OF EYE AND VISION (7L+2P=9)	
1.The Development of Eye and Vision 2.History taking Paediatric subjects 3.Assessment of visual acuity 4.Normal appearance, pathology and structural anomalies of 5.Orbit, Eye lids, Lacrimal system, 6.Conjunctiva,Cornea,ScleraAnteriorchamber,Uvealtract,Pupil 7.Lens, vitreous, Fundus Oculomotor system 8.RefractiveExamination	**CO-1** **BTL-2**
MODULE 2: HISTORY TAKING IN PAEDIATRIC SUBJECTS (7L+2P=9)	
Birth history (Prenatal, Perinatal & Postnatal) Ocular & family history Genetics Development & assessment of Binocular vision status ,Extra ocular motility , Saccades & pursuits, Accommodative - Vergence system, Stereopsis Bruckner test	**CO-2** **BTL-2**
MODULE 3: ASSESMENT OF REFRACTIVE STATUS (7L+2P=9)	
Mohindra retinoscopy Cycloplegic Refraction & agents - Revision , Guidelines for correcting refractive errors in Paediatric age groups , Compensatory treatment and remedial therapy for : Myopia, Pseudo myopia, Hyperopia, Astigmatism, Anisometropia & Amblyopia , Spectacle dispensing for children	**CO-3** **BTL-3**
MODULE 4: SENSOR MOTOR ADAPTABILITY	**(7L+2P=9)**

1.Determining binocular status 2.Determining sensory motor adaptability 3. Compensatory treatment and remedial therapy for: Myopia, Pseudo myopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia 4.Remedial and Compensatory treatment of Strabismus and Nystagmus 5. Paediatric eye disorders : Cataract, Retinopathy of Prematurity, Retinoblastoma, Neuromuscularconditions(myotonicdystrophy,mitochondrialcytopathy),andGenetics	**CO-4** **BTL-2**
MODULE 5: PAEDIATRIC OCULAR DISEASES (7L+2P=9)	
1.Anterior segment dysgenesis, Aniridia, Microphthalmos ,Coloboma ,Albinism 2.Spectacle dispensing for children 3. Paediatric contact lenses 4.Low vision assessment in children.	**CO-5** **BTL-2**
TEXT BOOKS	
1.	William Harvey, Bernard Gilmartin: Paediatric Optometry, Butterworth - Heinemann, 2004
REFERENCE BOOKS	
1	Leonard B. Nelson, Scott E. Olitzky: Paediatric Ophthalmology, 5th edition, Lippincott Williams & Wilkins, 2005
2	William Harvey / Bernard gill martin, Butterworth –Heinemann Paediatric optometry, 2004.
E BOOKS	
1.	https://www.eu.elsevierhealth.com/medicine-and-surgery/optometry

COURSE TITLE	**BINOCULAR VISION -I**			**CREDITS**	**3**
COURSE CODE	**HSP1321**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**2-0-2-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**

Course Description	This course provides theoretical aspects of Binocular Vision and its clinical application. It deals with basis of normal binocular vision and space perception, Gross anatomy and physiology of extra ocular muscles', various binocular vision anomalies, its diagnostic approaches and management
Course Objective	The objective of this course is to inculcate the student with the knowledge of different types of strabismus its etiology signs and symptoms, necessary investigations and also management. The student on completion of the course should be able to independently investigate and diagnose a case of strabismus with comments in respect to retinal correspondence and binocular single vision.
Course Outcome	Upon completion of this course, the students will be able to 1. Explain the theoretical aspects of Binocular Vision and its clinical application. It deals with basis of normal binocular vision and space perception, Gross anatomy and physiology of extra ocular muscles', various binocular vision anomalies, its diagnostic approaches and management 2. Explain the laws of ocular motility 3. The student should be able to use different methods for convergence and divergence abnormality 4. Explain suppression, investigations, management ,blind spot syndrome, abnormal retinal correspondence, investigation and management, Blind spot syndrome 5. Investigate and manage cases of amblyopia

Prerequisites:

CO & PO MAPPING

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	2	-	-	-	2	1	1	2	-	-	2	-	-
CO-2	-	-	3	-	-	-	2	1	1	1	-	-	2	-	-
CO-3	-	-	3	-	-	-	2	1	1	1	-	-	2	-	-
CO-4	-	-	2	-	-	-	2	1	1	1	-	-	2	-	-
CO-5	-	-	2	-	-	-	2	1	1	2	-	-	2	-	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: Binocular Vision and Space Perception
(7L+2P=9)

Binocular Vision and Space perception. 2. Relative subjective visual direction. 3.Retino motor value 4. Grades of BSV 5.SMP and Cyclopean Eye 6. Correspondence, 7.Fusion, Diplopia, Retinal rivalry 8.Horopter 9.Physiological Diplopia and Suppression 10.Stereopsis, Panum's area, BSV 11.Stereopsis and monocular clues -significance. 12. Egocentric location, clinical applications 13.Theories of Binocular vision 14.Anatomy of Extra Ocular Muscles 15.Rectii and Oblique's, LPS 16.Innervation & Blood Supply 17.Physiology of Ocular movements 18.Center of rotation, Axes of Fick. 19. Action of individual muscle.	**CO-1** **BTL-2**
MODULE 2: Ocular Motility	**(7L+2P=9)**
1. Laws of ocular motility 2.Donder's and Listing's law 3.Sherrington'slaw 4.Hering'slaw 5.Uniocular & Binocular movements - fixation, saccadic &pursuits. 6. Version & Vergence. 7. Fixation & field of fixation 8.Near Vision Complex Accommodation 9. Definition and mechanism (process).10. Methods of measurement 11. Stimulus and innervation 12. Types of accommodation 13.Anomalies of accommodation – aetiology and management.	**CO-2** **BTL-2**
MODULE 3: Convergence & Divergence (7L+2P=9)	
1. Convergence 2. Definition and mechanism. 3. Methods of measurement. 4. Types and components of convergence -Tonic, accommodative, fusional, proximal. 5. Anomalies of Convergence – aetiology and management. 6.Sensory adaptations 7.Confusion	**CO-3** **BTL-3**
MODULE 4: Suppression	**(7L+2P=9)**
1.Suppression 2.Investigations 3.Management 4.Blind spot syndrome 5.Abnormal Retinal Correspondence 6.Investigation and management 7.Blind spot syndrome	**CO-4** **BTL-2**
MODULE 5: Eccentric Fixation (7L+2P=9)	
1.Eccentric fixation 2.Investigation and management 3.Amblyopia 4.Classsification 5.Aeitiology 6.Investigation 7.Management	**CO-5** **BTL-2**
TEXT BOOKS	

1.	Fiona J. Rowe : Clinical Ortho optics , second edition, ,Blackwell Science Ltd, 2004
REFERENCE BOOKS	
1	C.V. Mosby Co. St. Louis - VON NOORDEN G K Burien Von Noor den's, 2nd Ed., , Binocular Vision and Ocular Motility 1980.
2	Susan J Lead, Rosalyn H Shute, Carol A Westall.45Oxford: Assessing Children's Vision. Butterworth-Heinemann,1999
E BOOKS	
1.	https://www.amazon.in/Fundamentals-Binocular-Vision-Ridgevue-Raghunandan-ebook/dp/B0838LWLC5

COURSE TITLE	**SYSTEMIC DISEASE**			**CREDITS**	**3**
COURSE CODE	**HSP1322**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**1-0-0-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	This course deals with definition, classification, clinical diagnosis, complications, and management of various systemic diseases. In indicated cases ocular manifestations also will be discussed.				
Course Objective	At the end of the course, student should get acquainted with the following Common Systemic conditions: Definition, diagnostic approach, complications and management options Ocular findings of the systemic conditions				

Course Outcome	Upon completion of this course, the students will be able to 1. Define, classify & clinical diagnose complications and management of various systemic diseases. In indicated cases ocular manifestations also will be discussed 2. Explain the etiology, incidence and therapy of all the systemic diseases associated with ophthalmology 3. Explain and diagnose the auto and acquired immunodeficiency in the human body 4. Have a basic knowledge of psychiatric conditions and patient's management 5. Genetic counselling and genetic engineering

Prerequisites: CSB231 - Cryptography and Network Security

CO & PO MAPPING

CO	PO - 1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO - 10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	1	2	-	-	-	2	1	1	2	-	-	2	-	-
CO-2	-	1	3	-	-	-	2	1	1	1	-	-	2	-	-
CO-3	-	1	3	-	-	-	2	1	1	1	-	-	2	-	-
CO-4	-	1	2	-	-	-	2	1	1	1	-	-	2	-	-
CO-5	-	1	2	-	-	-	2	1	1	2	-	-	2	-	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: INTRODUCTION TO SYSTEMIC DISEASES	**(9L=9)**
1.Hypertension 2. Definition, classification, Epidemiology, clinical examination, complications, and management.3. Hypertensive retinopathy 4. Diabetes Mellitus 5. Classification, pathophysiology, clinical presentations, diagnosis, and management, Complications 6. Diabetic Retinopathy 7. Thyroid Disease 8.Physiology, testing for thyroid disease, Hyperthyroidism, Hypothyroidism, Thyroiditis, Thyroid tumours 9.Grave'sOphthalmopathy 10. Acquired Heart Disease 11. Ischemic Heart Disease, Congestive heart failure, Disorders of cardiac rhythm 12. Ophthalmic considerations	**CO-1** **BTL-2**
MODULE 2: OPHTHALMIC OCULAR MANIFESTATIONS	**(9L=9)**

Cancer: 1. Incidence 2. Etiology 3. Therapy 4. Ophthalmologic considerations 5. Connective Tissue Disease 6. Rheumatic arthritis 7. Systemic lupus erythematosus 8. Scleroderma 9. Polymyositis and dermatomyositis 10. Sjogren syndrome 11. Bechet's syndrome 12. Eye and connective tissue disease 13. Tuberculosis 14. Aetiology, pathology, clinical features, pulmonary tuberculosis, diagnosis, complications, treatment tuberculosis and the eye. 15.Herpesvirus (Herpes simplex, Varicella Zoster, Cytomegalo virus, Epstein Barr Virus) 16. Herpes and the eye.	**CO-2** **BTL-2**
MODULE 3: IMMUNODEFICIENCY	**(9L=9)**
1.Hepatitis (Hepatitis A, B,C) 2.Acquired Immunodeficiency Syndrome 3.Anemia (Diagnosis, clinical evaluation, consequences, Sickle cell disease, treatment, Ophthalmologic considerations) 4. Common Tropical Medical Ailments 5.Malaria 6.Typhoid 7.Dengue 8.Filariases 9.Onchocerciasis 10.Cysticercosis 11.Leprosy.	**CO-3** **BTL-3**
MODULE 4: NUTRITIONAL AND METABOLIC DISORDER	**(9L=9)**
1.Nutritional and Metabolic disorders 2.Obesity 3.Hyperlipidaemias 4.Kwashiorkor 5.Vitamin A Deficiency 6.Vitamin D Deficiency 7.Vitamin E Deficiency 8.Vitamin K Deficiency 9.Vitamin B1,B2,Deficiency 10.Vitamin CD efficiency 11.Myasthenia Gravis 12.FirstAid 13.General Medical Emergencies 14.Preoperative precautions in ocular surgeries 15.Psychiatry 16.BasicknowledgeofpsychiatricconditionandPatientManagement	**CO-4** **BTL-2**
MODULE 5: INTRODUCTION TO GENETICS	**(9L=9)**
1.Genetics 2. Introduction to genetics 3. Organisation of the cell 4. Chromosome structure and cell division 5. Gene structure and basic principles of Genetics. 6. Genetic disorders and their diagnosis. 7.Genes and the eye 8. Genetic counselling and genetic engineering.	CO-5 BTL-2

TEXT BOOKS	
1.	Chislett, Erchilvers, nabob, nrcoledge, jaahunter: Davidson's Principles and Practice of Medicine, Ed. John Macleod, 19th Ed., ELBS/Churchill Livingstone. (PPM), 2002
REFERENCE BOOKS	
1	Basic and clinical Science course: Update on General Medicine, American Academy of Ophthalmology, Section 1,1999
2	A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007

E BOOKS	
1.	https://www.kobo.com/us/en/ebook/the-eye-in-systemic-disease

COURSE TITLE	RESEARCH METHDOLOGY AND BIOSTATISTICS			CREDITS	4
COURSE CODE	HSP1323	COURSE CATEGORY	BS	L-T-P-S	1-0-0-0
Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL
ASSESSMENT SCHEME					
First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%
Course Description	The course introduces the student to the Statistics which can be applied in biomedical science. Objective tests, case presentations and problem based analysis will be conducted by integrating all the subjects in the semester.				
Course Objective	1. To provide the students an understanding about the basic procedures of research and statistical methods applied to analyse the results obtained. 2. To helps the candidates to carry out their project work in the 6th semester				
Course Outcome	Upon completion of this course, the students will be able to 1. Explain the basic principles of research and methods applied to draw inferences from their search findings. 2. Explain and diagrammatically present tabular presentation of data 3. Measures of Variation, Inter-quartile range, Variance & Standard deviation 4. Explain Probability & non probability sampling 5. Know the Definition, Uses. Descriptive Epidemiology Designs				
Prerequisites:					

CO & PO MAPPING															
CO	PO - 1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO - 10	PO-11	PO-12	PSO-1	PSO-2	PSO-3

CO-1	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**3**	**1**	**2**	**0**
CO-2	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**3**	**1**	**2**	**-**
CO-3	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**2**	**1**	**2**	**-**
CO-4	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**3**	**1**	**2**	**-**
CO-5	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**2**	**1**	**2**	**-**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: INTRODUCTION TO BIOSTATISTICS (12L=12)	
1. Definition of Biostatistics 2.Characteristics of statistical data [5] 3.Role of statistics in health sciences [1] [5] Variables [4]: 1.Qualitative & Quantitative 2.Continuous & Discrete 3.Nominal & Ordinal. Scales of Measurement[1]: 1.Nominal 2.Ordinal 3.Interval 4.Ratio	**CO-1** **BTL-2**
MODULE 2: PRESENTATION (12L=12)	
Tabular presentation of data [1][5]: 1.Types of class intervals: Inclusive, Exclusive & Open ended 2.Frequency, Relative and Cumulative frequency 3.Frequency Table Graphical presentation of data[1][5]: 1.Histogram 2.Frequency Polygon 3.Frequency Curve Diagrammatic presentation of data[5]: 1.Bar diagram: Simple, Clustered and Stacked 2.Pie diagram	**CO-2** **BTL-2**
MODULE 3: BIOSTATISTICS (12L=12)	
Measures of Variation (Definition, computation, merits, demerits & application) [1][5]: 1.Range 2.Inter-quartile range 3.Variance 4.Standard deviation 5.Coefficient of variation	**CO-3** **BTL-3**
MODULE 4: SAMPLING (12L=12)	
Population & Sample: 1.Reasons for sampling 2.Errors in sampling 3.Non probability & probability sampling (comparison).Probability Sampling (Method, Merits & Demerits)[1]:1.Simple random 2.Stratified 3.Systematic 4.Cluster Non Probability Sampling (Methods, Merits & Demerits)[1][5]	**CO-4** **BTL-2**

MODULE 5: EPIDEMIOLOGY	(12L=12)
Definition, Uses. Descriptive Epidemiology Designs: 1.Case Reports 2.Case Series 3.Cross Sectional Studies 4.Ecological Descriptive Studies	**CO-5** **BTL-2**
TEXT BOOKS	
1.	Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs,2015
REFERENCE BOOKS	
1	Richard F. Morton & Richard Hebdo: A study guide to Epidemiology and Biostatistics,2nd Ed., University Park Press, Baltimore.
E BOOKS	
1.	https://www.scribd.com/book/433834188/Biostatistics-and-Research-Methodology

COURSE TITLE	**CLINICAL OPTOMETRY – PRACTICAL III**			**CREDITS**	**5**
COURSE CODE	**HSP1324**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**2-0-2-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	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				
Course Objective	1. To learn and practice the necessary clinical skills to conduct an Optometric Examination. 2. To perform the techniques on their own classmates as well as on patients under the supervision of faculty members. Along with the routine eye examination, students will receive training on speciality areas like contact lenses, binocular vision examination				

	and low vision assessment
Course Outcome	Upon completion of this course, the students will be able to 1. 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. 2. Gain hands-on experience under supervision will be provided in various outreach programmes namely, school vision screening, glaucoma and diabetic retinopathy screening etc 3. Gain -on practical sessions on the following courses namely, contact lens, low vision care, geriatric optometry and paediatric optometry 4. Gain hand-on practical sessions on contact lens 5. Hands-on experience under supervision will be provided in various outreach programmes namely, school vision screening, glaucoma and diabetic retinopathy screening etc

Prerequisites:

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	3	2	1	1	1	1	1	2	-	-	-	2	-
CO-2	-	-	2	2	1	1	1	1	1	1	-	-	-	2	-
CO-3	-	-	3	2	1	1	1	1	1	1	-	-	-	2	-
CO-4	-	-	2	2	1	1	1	1	1	2	-	-	-	2	-
CO-5	-	-	3	2	1	1	1	1	1	2	-	-	-	2	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: CASE PRESENTATION AND JOURNAL CLUBS (2L+8P=10)

Evidence Based approach for case presentation	**CO-1** **BTL-2**
MODULE 2: REFRACTION **20P=20**	
Objective & Subjective refraction	**CO-2** **BTL-2**
MODULE 3: CONTACT LENS **(20P=20)**	
1.Pre fitting examination 2. Insertion & removal techniques 3. Care & maintenance -lens handling 4.RGP fitting 5. Dispensing & follow up care 6.Specialty contact lens fitting.	**CO-3** **BTL-3**
MODULE 4: BINOCULAR VISION **(20P=20)**	
1.Squint History 2.Qualitative and Quantitative assessment of squint 3.Parks three step test 4.Diplopia testing 5.Hess charting 6.Ptosis evaluation 7.Double Maddox test/ Baglioni test.	**CO-4** **BTL-2**
MODULE 5: CLINICAL OPHTHALMOLOGY **(5P=5)**	
History taking and torch light examination, Intra ocular pressure measurement, Slit lamp examination, retina examination with 78D and 90D lenses	**CO-5** **BTL-2**
TEXT BOOKS	
1.	A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007
2.	C W Brooks, IM Borish: System for Ophthalmic Dispensing, 3rd edition, Butterworth – Heinemann, 2007
REFERENCE BOOKS	

1	JB Eskeridge, John F. Amos, Jimmy D. Bartlett: Clinical Procedures of Optometry, Lippincott Williams & Wilkins, USA
2	Theodore Grosvenor: Primary Care Optometry, 5th edition, Butterworth – Heinemann, 2007
E BOOKS	
1.	https://www.eu.elsevierhealth.com/medicine-and-surgery/optometry

SEMESTER VI

COURSE TITLE	**CONTACT LENS -II**			**CREDITS**	**2**
COURSE CODE	**HSB1331**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**2-0-0-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	The subject provides the student with suitable knowledge both in theoretical and practical aspects of RGP Contact Lenses and an overview on specialty contact lenses				

Course Objective	1. To understand the basics of RGP contact lenses & Their design 2. To recognize various types of fitting & trouble shoot
Course Outcome	Upon completion of this course, the students will be able to 1. Familiarize with suitable knowledge both in theoretical and practical aspects of Contact Lenses 2. Assess the Soft Contact Lens fitting 3. Know the manufacturing techniques for making soft and rgp lenses 4. Explain and trouble shoot contact lens complications 5. Demonstrate contact lenses prescribed for speciality cases

Prerequisites: CSB231 – Cryptography and Network Security

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	2	-	-	-	2	1	1	2	-	-	2	-	-
CO-2	-	-	3	-	-	-	2	1	1	1	-	-	2	-	-
CO-3	-	-	3	-	-	-	2	1	1	1	-	-	2	-	-
CO-4	-	-	2	-	-	-	2	1	1	1	-	-	2	-	-
CO-5	-	-	2	-	-	-	2	1	1	2	-	-	2	-	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1:CONTACT LENS MATERIAL	**(5L+2T=6)**
1.SCL Materials & Review of manufacturing techniques 2.Comparison of RGP vs SCL 3.Pre-fitting considerations for SCL	**CO-1** **BTL-2**

MODULE – 2:CONTACT LENS FITTING **(5L+2T=6)**

1.Fitting philosophies for SCL 2.FitassessmentinSoftContactLenses:Typesoffit–Steep, Flat, Optimum 3.Calculation and finalising SCL parameters 4.Disposablelenses 5.Advantages and availability	**CO-2** **BTL-2**
MODULE – 3:MANUFACTURING TECHNIQUES (5L+2T=6)	
1.Soft Toric CL 2.Stabilization techniques 3.Parameter selection 4.Fitting assessment 5.Common Handling Instructions 6.Insertion & Removal Techniques Do's and Don'ts: 1. Care and Maintenance of Soft lenses 2. Cleaning agents & Importance 3.Rinsing agents &Importance 4.Disinfecting agents &importance 5.Lubricating & Enzymatic cleaners	**CO-3** **BTL-3**
MODULE – 4:CONTACT LENS COMPLICATIONS (5L+2T=6)	
Follow up visit examination: 1.Complications of Soft lenses 2.Therapeutic contact lenses 3.Indications 4.Fittingconsideration	**CO-4** **BTL-2**
MODULE – 5:SPECIALITY CONTACT LENS (5L+2T=6)	
1.Specialtyfitting 2.Aphakia 3.Pediatric 4.Post refractive surgery 5.Management of Presbyopia with Contact lenses	**CO-5** **BTL-2**
TEXT BOOKS	
1.	Anthony. Phillips: contact lenses,5thedition,Butterworth-Heinemann,2006
REFERENCE BOOKS	
1	E S. Bennett ,V A Henry :Clinical manual of Contact Lenses, 3rd edition, Lippincott Williams and Wilkins,2008
E BOOKS	
1.	https://www.ebooks.com/en-ad/book/209550733/contact-lenses-e-book/139nthony-j-phillips/

COURSE TITLE	BINOCULAR VISION -II	CREDITS	2

COURSE CODE	HSB1332	COURSE CATEGORY	PC	L-T-P-S	2-0-0-0
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL**

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	**15%**	**10%**	**5%**	**5%**	**50%**

Course Description	This course deals with understanding of strabismus, its classification, necessary orthoptic investigations, diagnosis and nonsurgical management. Along with theoretical knowledge it teaches the clinical aspects and application
Course Objective	1. To inculcate the student with the knowledge of different types of strabismus its etiology signs and symptoms, necessary investigations and also management 2. To independently investigate and diagnose a case of strabismus with comments in respect to retinal correspondence and binocular single vision. 3. To perform all the investigations to check retinal correspondence, state of Binocular single vision, angle of deviation and special investigations for paralytic strabismus
Course Outcome	Upon completion of this course, the students will be able to 1. Explain strabismus, its classification, necessary orthoptic investigations, diagnosis and non-surgical management. Along with theoretical knowledge it teaches the clinical aspects and application. 2. Explain the classification, investigation and management of Strabismus 3. Explain Distinction from commutant and restrictive Squint 4. Amblyopia and its management 5. Explain the features of strabismus and syndromes associated

Prerequisites:

CO & PO MAPPING

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	2	-	-	-	2	1	1	2	-	-	2	-	-
CO-2	-	-	3	-	-	-	2	1	1	1	-	-	2	-	-
CO-3	-	-	3	-	-	-	2	1	1	1	-	-	2	-	-

CO-4	**-**	**-**	**2**	**-**	**-**	**-**	**2**	**1**	**1**	**1**	**-**	**-**	**2**	**-**	**-**
CO-5	**-**	**-**	**2**	**-**	**-**	**-**	**2**	**1**	**1**	**2**	**-**	**-**	**2**	**-**	**-**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE – 1:NEURO MASCULAR ABNORMALITIES	**(5L+2T=6)**
Neuro – muscular anomalies 2. Classification and etiological factors 3. History – recording and significance. 4.Convergentstrabismus 5.Accommodative convergent squint Classification 1.Investigation and Management 2.Non accommodative Convergent squint Classification 1.Investigation and Management	**CO-1** **BTL-2**
MODULE – 2:STRABISMUS	**(5L+2T=6)**
1.DivergentStrabismus Classification: 1.A& V phenomenon 2.Investigation and Management 3.Verticalstrabismus Classification: 1.Investigation and Management 1.ParalyticStrabismus 2.Acquired and Congenital 3.Clinical Characteristics	**CO-2** **BTL-2**
MODULE – 3:COMITANT AND RESTRICTIVE SQUINT	**(5L+2T=6)**
1.Distinction from comitant and restrictive Squint Investigations: 1.History and symptoms2.HeadPosture Diplopia Charting 1.Hesschart 2.PBCT 3.Ninedirections 4.Binocular field of vision	**CO-3** **BTL-3**
MODULE – 4:AMBLYOPIA	**(5L+2T=6)**
1.Amblyopia and Treatment of Amblyopia 2.Nystagmus 3.Non-surgical Management of Squint	**CO-4** **BTL-2**
MODULE – 5:RESTRICTIVE STRABISMUS	**(5L+2T=6)**
1.RestrictiveStrabismus 2.Features 3.Musculo-fascicalanomalies 4.Duane's Retraction syndrome 5.Clinical features and management 6.Brown's Superior oblique sheath syndrome 7.Strabismusfixus 8.Congenital muscle fibrosis 9.Surgicalmanagement	**CO-5** **BTL-2**

TEXT BOOKS	
1.	Pradeep Sharma: Strabismus simplified, New Delhi, Firstedition,1999, Modern publishers.
2.	FionaJ.Rowe:ClinicalOrthoptics,secondedition,2004,BlackwellScienceLtd
REFERENCE BOOKS	
1	Gunter K. Von Norden: BURIAN- VON NOORDEN'S Binocular vision and ocular motilitytheoryandmanagementofstrabismus,Missouri,Secondedition,1980,
2.	Mitchell Scheinman; Bruce Wick: Clinical Management of Binocular Vision Heterophobia, Accommodative, and Eye Movement Disorders, 2008,
E BOOKS	
1.	https://www.amazon.in/Fundamentals-Binocular-Vision-Ridgevue-Raghunandan-ebook/dp/B0838LWLC5

COURSE TITLE	PUBLIC HEALTH AND COMMUNITY OPTOMETRY			CREDITS	2
COURSE CODE	HSB1333	COURSE CATEGORY	PC	L-T-P-S	2-0-0-0
Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL
ASSESSMENT SCHEME					
First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%
Course Description	Introduction to the foundation and basic sciences of public health optometry with an emphasis on the epidemiology of vision problems especially focused on Indian scenario				

Course Objective	At the end of the course, the student will be knowledgeable in the following areas: Community based eye care in India. Prevalence of various eye diseases
Course Outcome	Upon completion of this course, the students will be able to 1. Familiarize with the foundation and basic sciences of public health optometry with an emphasis on the epidemiology of vision problems especially focused on Indian scenario. 2. Explain the importance of optometrist in primary health care 3. Explain nutritional blindness with reference to Vita A deficiency 4. Know the importance of optometrist role in public health and evaluation and assessment of health programme 5. Explain Optometrists role in school eye health programmes & Basics of Tele Optometry and its application in Public Health

Prerequisites: CSB231 – Cryptography and Network Security

CO & PO MAPPING

CO	PO - 1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO - 10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	3	3	-	-	-	2	-	1	-	-	2	1	-
CO-2	-	-	3	2	-	-	-	2	-	2	-	-	2	1	-
CO-3	-	-	3	3	-	-	-	2	-	2	-	-	2	1	-
CO-4	-	-	3	2	-	-	-	2	-	2	-	-	2	1	-
CO-5	-	-	2	2	-	-	-	2	-	1	-	-	2	1	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE – 1:PUBLIC HEALTH IN OPTOMETRY (4L+2T=6)

1.PublicHealthOptometry:Conceptsandimplementation,Stagesofdiseases 2.Dimensions, determinants and indicators of health 3.Levels of disease prevention and levels of health care patterns 4.Epidemiology of blindness–Defining blindness and visual impairment	**CO-1** **BTL-2**

MODULE – 2:EYE IN PRIMARY HEALTH CARE	(4L+2T=6)
1.Eye in primary healthcare 2.Contrasting between Clinical and community health programs 3.Community Eye Care Programs 4.Community based rehabilitation programs	**CO-2** **BTL-2**
MODULE – 3:NUTRITIONAL BLINDNESS	**(4L+2T=6)**
1.Nutritional Blindness with reference to Vitamin A deficiency 2.Vision 2020: The Right to Sight 3.Screening for eye diseases 4.National and International health agencies, NPCB	**CO-3** **BTL-3**
MODULE – 4:OPTOMETRIST ROLE IN PUBLIC HEALTH	**(4L+2T=6)**
1.Role of an optometrist in Public Health 2.OrganizationandManagementofEyeCarePrograms–ServiceDeliverymodels 3.Health manpower and planning & Health Economics 4.Evaluation and assessment of health programmes	**CO-4** **BTL-2**
MODULE – 5:OPTOMETRIST ROLE IN SCHOOL EYE HEALTH PROGRAMME	**(4L+2T=6)**
1.Optometrists role in school eye health programmes 2.Basics of Tele Optometry and its application in Public Health 3.Information, Education and Communication for Eye Care programs	**CO-5** **BTL-2**

TEXT BOOKS	
1.	GVS Murthy, S K Gupta, D Bachani: The principles and practice of community Ophthalmology,Nationalprogrammeforcontrolofblindness,NewDelhi,2002
2.	Newcomb RD, Jolley JL : Public Health and Community Optometry, Charles C Thomas Publisher, Illinois,1980
REFERENCE BOOKS	
1.	Banasura's Bhanot publishers, Jabalpur,2007
2.	MC Gupta, Mahajan BK, Murthy GVS, 3rd edition. Text Book of Community Medicine, Jaypee Brothers, New Delhi, 2002

E BOOKS	
1.	https://www.amazon.in/Public-Health-Community-Optometry-Newcomb/dp/0409901075

COURSE TITLE	PRACTICE MANAGEMENT			CREDITS	3
COURSE CODE	HSB1334	COURSE CATEGORY	BS	L-T-P-S	3-0-0-0
Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL-3
ASSESSMENT SCHEME					
First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%
Course Description	This course deal with all aspects of optometry practice management Business, accounting, taxation, professional values, and quality & safety's aspects				
Course Objective	To understand the various aspect of running an Optometric practice				
Course Outcome	Upon completion of this course, the students will be able to 1. Familiarize with all aspects of optometry practice management Business, accounting, taxation, professional values, and quality & safety's aspects. 2. Describe accounting principles 3. Taxation and taxation planning 4. Professionalism and values 5. Professionalism and values				
CO & PO MAPPING					

CO	PO - 1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO - 10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	-	-	-	-	-	2	-	3	3	1	1	2	-
CO-2	-	-	-	-	-	-	-	2	-	2	3	1	1	2	-
CO-3	-	-	-	-	-	-	-	3	-	2	3	1	1	2	-
CO-4	-	-	-	-	-	-	-	2	-	3	3	1	1	2	-
CO-5	-	-	-	-	-	-	-	2	-	2	3	1	1	2	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE – 1:BUSINESS MANAGEMENT (9L=9)	
1.BusinessManagement: 2.Practice establishment and development 3.Stock control and costing 4.Staffing and staff relations 5.Businesscomputerization	**CO-1** **BTL-2**
MODULE – 2:ACCOUNTING PRINCIPLES (9L=9)	
1.AccountingPrinciples 2.Sources of finance 3.Bookkeeping and cash flow	**CO-2** **BTL-2**
MODULE – 3:TAXATION AND TAXATION PLANNING (9L=9)	
Taxation and taxation planning	**CO-3** **BTL-3**
MODULE – 4: PROFESSIONALISM AND VALUES (9L=9)	

1.Professionalism and Values 2.Professional values- Integrity, Objectivity, Professional competence and due care, Confidentiality 3.Personal values- ethical or moral values 4.Attitudeandbehaviour-professionalbehaviour,treatingpeopleequally	**CO-4** **BTL-2**
MODULE – 5:PROFESSIONALISM AND VALUES (9L=9)	
1.Professionalism and Values 2.Codeofconduct,professionalaccountabilityandresponsibility,misconduct 3.Differences between professions and importance of team efforts 4.Cultural issues in the healthcare environment	**CO-5** **BTL-2**
TEXT BOOKS	
1.	Cathy Reisenwitz in Medical Software Best Medical Practice Management Books For Small Practices Published Jan. 12, 2017 by
REFERENCE BOOKS	
1	AAPC (Author) Practice Management Reference Guide 2020 – First Edition Paperback – March 16, 2020
E BOOKS	
1.	https://www.amazon.in/Practice-Management-Peter-F-Drucker-ebook/dp/B003F1WM8E

COURSE TITLE	OCCUPATIONAL OPTOMETRY			CREDITS	2
COURSE CODE	HSB1335	COURSE CATEGORY	PC	L-T-P-S	2-0-0-0
Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	This course deals with general aspects of occupational health, Visual demand in various job, task analysing method, visual standards for various jobs, occupational hazards and remedial aspects through classroom sessions and field visit to the factories.
Course Objective	1. Able to gain knowledge on visual requirements of jobs 2. Explain the definitions and units of light 3. To know occupational hazards and preventive / protective methods 4. To know Vision Standards – Railways, Roadways, Airlines Explain Visual Display Units
Course Outcome	Upon completion of this course, the students will be able to 1. Have in-depth knowledge on occupational health, Visual demand in various job, task analysing method, visual standards for various jobs occupational hazards and remedial aspects through classroom sessions and field visit to the factories. 2. Explain the definitions and units of light 3. Know occupational hazards and preventive / protective methods 4. Know Vision Standards – Railways, Roadways, Airlines 5. Explain Visual Display Units

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3

CO-1	-	-	3	2	-	-	-	2	-	-	-	-	-	2	-
CO-2	-	-	2	2	-	-	-	1	-	-	-	-	-	2	-
CO-3	-	-	3	2	-	-	-	1	-	-	-	-	-	2	-
CO-4	-	-	2	2	-	-	-	1	-	-	-	-	-	2	-
CO-5	-	-	3	1	-	-	-	2	-	-	-	-	-	2	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE – 1: OCCUPATIONAL HEALTH (4L+2P=6)	
1. Introduction to Occupational health, hygiene and safety, international bodies like ILO, WHO, National bodies etc. 2. Acts and Rules – Factories Act, WCA, ESI Act.	**CO-1** **BTL-2**
MODULE – 2: OCCUPATIONAL LIGHT WORKERS (4L+2P=6)	
1.Light–Definitions and units, Sources, advantage sand disadvantages, standards 2.Color–Definition,Colortheory,Colorcoding,Colordefects,colorvisiontests	**CO-2** **BTL-2**
MODULE – 3: OCCUPATIONAL HAZARD (4L+2P=6)	
1.Occupational hazards and preventive / protective methods 2.TaskAnalysis	**CO-3** **BTL-3**
MODULE – 4: INDUSTRIAL VISION SCREENING (4L+2P=6)	
1.IndustrialVisionScreening–ModifiedclinicalmethodandIndustrialVisiontest 2.Vision Standards – Railways, Roadways, Airlines	**CO-4** **BTL-2**

MODULE 5: VISUAL DISPLAY UNIT	(4L+2P=6)
1.Visual Display Units 2.Contact lens and work	CO-5 BTL-2

TEXT BOOKS	
1.	PP Santhanam, R Krishnakumar, Monica R. Dr. Santhanam's text book of Occupational optometry.1stedition,PublishedbyEliteSchoolofoptometry,unitofMedicalResearch Foundation, Chennai, India ,2015
2.	RVNorth:Workandtheeye,Secondedition,ButterworthHeinemann,2001
REFERENCE BOOKS	
1.	J Anshel: Visual Ergonomics Handbook, CRC Press,2005
2.	Gcarson,Sdoshi,Wharvey:EyeEssentials:Environmental&OccupationalOptometry, Butterworth-Heinemann,2008
E BOOKS	
1.	https://store.kortext.com/optometry-opticians

COURSE TITLE	MEDICAL LAW AND ETHICS			CREDITS	3
COURSE CODE	HSB1336	COURSE CATEGORY	BS	L-T-P-S	2-1-0-0
Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL-3
ASSESSMENT SCHEME					
First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%
Course Description	Medical ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analysing, and attempting to resolve the ethical problems that arise in practice				

Course Objective	The goal is "to improve the quality of patient care by identifying, analysing, and attempting to resolve the ethical problems that arise in practice".
Course Outcome	Upon completion of this course, the students will be able to 1. Formulate legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. 2. Improve the quality of patient care by identifying, analysing, and attempting to resolve the ethical problems that arise in practice". Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal frame work to regulate medical practice.. 3. Know care of the terminally ill-Euthanasia Organ transplantation 4. Explain medico legal aspects of medical records 5. Familiarize with the development of standardized protocol to avoid near miss or sentinel events

CO & PO MAPPING

CO	PO - 1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO - 10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	3	-	-	-	-	-	3	2	1	1	1	-	2	-
CO-2	-	3	-	-	-	-	-	3	1	1	1	1	-	2	-
CO-3	-	3	-	-	-	-	-	3	1	1	1	1	-	2	-
CO-4	-	3	-	-	-	-	-	2	1	1	1	1	-	2	-
CO-5	-	3	-	-	-	-	-	2	1	1	1	1	-	2	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: MEDICAL (6L+3T=9)

1.Medical ethics – Definition – Goal – Scope 2.Introduction to Code of conduct 3.Basic principles of medical ethics–Confidentiality	**CO-1** **BTL-2**

MODULE 2: MALPRACTICE AND NEGLIGANCE (6L+3T=9)	
1.Malpractice and negligence-Rational and irrational drug therapy 2.Autonomy and informed consent – Right of patients	**CO-2** **BTL-2**
MODULE 3: CARE OF THE TERMINALLY ILL EUTHANKSIA (6L+3T=9)	
1.Care of the terminally ill-Euthanasia 2.Organtransplantation	**CO-3** **BTL-3**
MODULE 4:MEDICO LEGAL ASPECTS (6L+3T=9)	
1. 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. 2.Professional Indemnity insurance policy	**CO-4** **BTL-2**
MODULE 5: STANDARDIZED PROTOCOLS 6L+3T=9)	
1.Development of standardized protocol to avoid near miss or sentinel events. 2. Obtaining an informed consent.	**CO-5** **BTL-2**

TEXT BOOKS	
1.	Stephen H, Optometry Law Book Outskirts Press, Inc. (9 July 2012)
REFERENCE BOOKS	
1	Bonnie F. Fremgen (Author) Medical Law and Ethics Paperback – Import, 29 December 2010.
E BOOKS	
1.	https://www.kobo.com/us/en/ebook/medical-law-and-medical-ethics.

COURSE TITLE	CLINICAL OPTOMETRY – PRACTICAL IV			CREDITS	6
COURSE CODE	HSB1334	COURSE CATEGORY	PC	L-T-P-S	3-0-6-0
Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	To learn and practice the necessary clinical skills to conduct an Optometric Examination. Students will be performing the techniques on their own classmates as well as on patients under the supervision of faculty members. Along with the routine eye examination, students will receive training on speciality areas like contact lenses, binocular vision examination and low vision assessment
Course Objective	To learn and practice the necessary clinical skills to conduct an Optometric Examination. Students will be performing the techniques on their own classmates as well as on patients under the supervision of faculty members. Along with the routine eye examination, students will receive training on speciality areas like contact lenses, binocular vision examination and low vision assessment
Course Outcome	1. PICO search and case discussion 2. Demonstrate contact lens fitting for soft lenses 3. Demonstrate binocular vision assessment 4. Demonstrate low vision management and testing methods 5. Clinical practice

Prerequisites:

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	2	2	-	-	-	-	-	2	1	1	3	2	0

CO-2	**-**	**-**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**2**	**1**	**1**	**3**	**2**	**0**
CO-3	**-**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**1**	**3**	**2**	**0**
CO-4	**-**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**1**	**3**	**2**	**0**
CO-5	**-**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**1**	**3**	**2**	**0**

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE 1: CASE DISCUSSIONS AND JOURNAL CLUBS (2T+8D=10)	
Evidence based practice case discussion, PICO search	**CO-1** **BTL-2**
MODULE 2: CONTACT LENS - SOFT & SOFT TORIC (10P=10)	
1.Demonstrations of different lenses 2.Pre fitting examination 3.Insertion & removal techniques 4.Care & maintenance -lens handling 5.CL fitting-soft & soft tori 6.Dispensing & follow up care	**CO-2** **BTL-2**
MODULE 3: BINOCULAR VISION (6P=6)	
1.Cranial nerve testing 2.Visual acuity and tests for fixation 3.Sensory and motor tests 4.Paediatric Rations copy 5.Accommodative and vengeance tests	**CO-3** **BTL-3**
MODULE 4: LOW VISION (4P=4)	
1.History taking in low vision 2.Clinical evaluation of low vision patient 3.Optical devices (Telescopes, Magnifiers) 4.Non optical devices	**CO-4** **BTL-2**
MODULE 5: CLINICAL POSTING & CAMP (30P=30)	

Clinical Optometry practice – Objective/ Subjective refraction	**CO-5** **BTL-2**
TEXT BOOKS	
1.	AJJackson,JSWolffsohn:LowVisionManual,ButterworthHeinnemann,2007
REFERENCE BOOKS	
1	IACLE Module, 2nd edition, 2018
2	A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international (p) Ltd. Publishers, New Delhi, 2007
E BOOKS	
1.	https://libguides.umsl.edu/optometry/books

COURSE TITLE	**REARCH PROJECT**			**CREDITS**	**6**
COURSE CODE	**HSB1338**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**5-0-0-0**
CIA	**50%**			**ESE**	**50%**
LEARNING LEVEL	**BTL**				
Objective: To learn and practice the necessary clinical skills to perform an Optometric Examination. Students will be performing the techniques on their own classmates as well as on patients under the supervision of faculty members. Along with the routine eye examination, students will receive training on speciality areas like contact lenses, binocular vision examination and low vision assessment. A total of 6 credit hours will be dedicated for practical skills in this semester.					

SEMESTER VII

COURSE TITLE	LIFE COPING SKILLS: PART I			CREDITS	2
COURSE CODE	HSP1424	COURSE CATEGORY	BS	L-T-P-S	2-0-2-0
Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	This course helps us to acquire knowledge to create an awareness on psychological issues such as loneliness, depression and shyness
Course Objective	1. To develop leadership qualities & Career guidance 2. To acquire problem solving and decision making skills and to management of time and stress management 3. To define the meaning and process of goal setting
Course Outcome	Upon completion of this course, the students will be able to 1. Explain the need for life coping skills such as self-awareness and self-esteem. 2. To acquire problem solving and decision making skills and to management of time and stress management 3. To define the meaning and process of goal setting 4. Explain problem solving and decision making 5. Know time and stress management

CO & PO MAPPING

CO	PO - 1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO - 10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	-	-	-	-	-	2	1	1	1	-	1	2	-
CO-2	-	-	-	-	-	-	-	3	1	1	2	-	1	2	-

CO-3	-	-	-	-	-	-	-	2	1	1	1	-	1	2	-
CO-4	-	-	-	-	-	-	-	2	1	1	1	-	1	2	-
CO-5	-	-	-	-	-	-	-	3	1	1	2	-	1	2	-
1: Weakly related, 2: Moderately related and 3: Strongly related															

MODULE - 1: INTRODUCTION (4L+2P=6)	
Definition of life skills, categories of life skills, importance of Life skills, indicators of life skills development.	**CO-1** **BTL-2**
MODULE - 2:CONCEPT OF SELF (4L+2P=6)	
Understanding the concept of self, self-awareness, self-esteem, self-acceptance and personality development.	**CO-2** **BTL-2**
MODULE - 3: GOAL SETTING (4L+2P=6)	
Positive Thinking, Creative thinking, Critical thinking, Motivation and Self-actualization Meaning, definition, types of goals.	**CO-3** **BTL-3**
MODULE - 4: PROBLEM SOLVING AND DECISION MAKING (6L+6P=12)	
Definition, process of problem solving. Skills and techniques of decision making.	**CO-4** **BTL-2**
MODULE 5: TIME AND STRESS MANAGEMENT (4L+2P=6)	
Definition, steps and skills in time management. Causes, consequences of stress, steps followed for stress management.	**CO-5** **BTL-2**
TEXT BOOKS	

1.	https://www.eu.elsevierhealth.com/medicine-and-surgery/optometry
E BOOKS	
1.	www.amazon.com › Coping-Skills-Workbook-Essential... www.goodreads.com › shelf › show › coping-skills

COURSE TITLE	**INTERPERSONAL RELATIONSHIP AND COMMUNICATION SKILLS: PART I**			**CREDITS**	**2**
COURSE CODE	**HSP1425**	**COURSE CATEGORY**	**BS**	**L-T-P-S**	**2-0-2-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	This course helps us acquire knowledge on problem solving and discussion making skills and to management of time and stress management				
Course Objective	To understand the various aspect of solving and discussion making skills.				
Course Outcome	Upon completion of this course, the students will be able to 1. Demonstrate the need for life coping skills such as self-awareness and self-esteem. 2. To acquire problem solving and decision-making skills and to management of time and stress management 3. To define the meaning and process of communication 4. To know various attributes of situational language 5. To develop communication skill in terms of using coding and decoding criteria				

Prerequisites: CSB231 - Cryptography and Network Security

CO & PO MAPPING

CO	PO -1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO -10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	-	-	-	-	-	2	3	1	-	-	1	2	3
CO-2	-	-	-	-	-	-	-	2	2	2	-	-	1	2	3
CO-3	-	-	-	-	-	-	-	2	1	1	-	-	1	2	3
CO-4	-	-	-	-	-	-	-	2	2	2	-	-	1	2	3
CO-5	-	-	-	-	-	-	-	2	2	2	-	-	1	2	3

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE - 1:MEANING AND PROCESS OF COMMUNICATION (4L+2P=6)	
Meaning, process , types of communication, Elements of communication, Barriers of effective communication, guidelines for effective communication	**CO-1** **BTL-2**
MODULE - 2: INTERPERSONAL COMMUNICATION (4L+2P=6)	
Meaning and nature, Skills of Interpersonal Communication and uses in various setup.	**CO-2** **BTL-2**
MODULE - 3: SITUATIONAL LANGUAGE (4L+2P=6)	
Greetings, Introduction, Inviting Someone, Making requests, Offering help and assistance, Seeking Permission, Asking for Advice, Expressing Gratitude, Asking about remembering, Persuasion, Complimenting and Congratulating, Expressing Sympathy and Condolence, Complaining, Apologizing, Making Suggestions, Warning Someone, Ending a Conversation.	**CO-3** **BTL-3**
MODULE - 4: CODING AND DECODING (4L+2P=6)	
Introduction, Meaning, need and importance of coding and decoding, process of coding and decoding	**CO-4** **BTL-2**
MODULE – 5: COMMUNICATION AIDS (4L+2P=6)	
Puppetry, Street theatre, Role play, Skit, Drama etc.	**CO-5**

					BTL-2
TEXT BOOKS					
1.	Elizabeth C. Arnold (Author), Kathleen Underman Boggs (Author) Interpersonal Relationships (8 January 2015)				
REFERENCE BOOKS					
1	Prof. Bhagyashree A. Dudhade (Author) Life Skills Education; January 2016				
E BOOKS					
1.	sourcesofinsight.com › interpersonal-skills-books				
MOOC					
1	www.scionpublishing.com › book-images › samples				
COURSE TITLE	**INTERNSHIP - 1**			**CREDITS**	**20**
COURSE CODE	**HSP1426**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**4-0-0-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Objective	To provide the necessary exposure to the students to practice Optometry comprehensively. The training centres (external) will be chosen based on the quality of clinical exposure facility. Students are expected to spend their training duration in Primary eye care, Dispensing optics and Specialty Optometry. Clinical competency of the interns will be assessed throughout. 750 hours in each semester				

SEMESTER VIII

COURSE TITLE	LIFE COPING SKILLS: PART II			CREDITS	2
COURSE CODE	HSP1440	COURSE CATEGORY	BS	L-T-P-S	2-0-2-0
Version	1.0	Approval Details	23 ACM, 06.02.2021	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz	Attendance	ESE
15%	15%	10%	5%	5%	50%

Course Description	This course helps us to acquire knowledge to create an awareness on psychological issues such as loneliness, depression and shyness
Course Objective	To develop leadership qualities & Career guidance
Course Outcome	Upon completion of this course, the students will be able to 1. Create an awareness on psychological issues such as loneliness, depression and shyness. 2. Develop leadership qualities 3. Formulate a career guidance and know the work environment 4. Explain the importance of team work 5. Explain the nature of work environment

CO & PO MAPPING

CO	PO - 1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO - 10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	-	-	-	-	-	2	1	1	1	-	1	2	-
CO-2	-	-	-	-	-	-	-	3	1	1	2	-	1	2	-
CO-3	-	-	-	-	-	-	-	2	1	1	1	-	1	2	-

CO-4	-	-	-	-	-	-	-	2	1	1	1	-	1	2	-
CO-5	-	-	-	-	-	-	-	3	1	1	2	-	1	2	-

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE - 1: COPING WITH PSYCHOLOGICAL PROBLEMS (6L = 6)	
Shyness, Loneliness, Depression, Fear, Anger, Verbal Abuse, Failure, Criticism, Alcoholism and Substance Abuse - Causes, Symptoms, Prevention Measures and Treatment.	**CO-1** **BTL-2**
MODULE 2: CONCEPT OF SEX AND SEXUALITY SEX EDUCATION (6L = 6)	
Understanding human sexuality and reproductive health, Characteristics of Adolescent period. Sex education and healthy sexual practices.	**CO-2** **BTL-2**
MODULE - 3: LEADERSHIP (6L = 6)	
Causes, Symptoms, Treatment, Prevention and coping techniques. Definition, Understanding the nature and types of Leadership, Characteristics of a good leader.	**CO-3** **BTL-3**
MODULE 5: WORK ENVIRONMENT (6L = 6)	
Concept, Importance of team work, Team building. Types of career, Factors to consider for choosing a career.	**CO-4** **BTL-2**
MODULE - 5: QUALITIES AND CHARECTERISTICS (6L = 6)	
Understanding the nature of work environment, Qualities and Characteristics Required for good worker.	**CO-5** **BTL-2**
TEXT BOOKS	
1.	Prof. Bhagyashree A. Dudhade (Author) Life Skills Education 1 January 2016.
REFERENCE BOOKS	

1.	Elizabeth C. Arnold (Author), Kathleen Underman Boggs (Author) Interpersonal Relationships (8 January 2015)
2.	Prof. Bhagyashree A. Dudhade (Author) Life Skills Education 1 January 2016.
E BOOKS	
1.	www.amazon.com › Coping-Skills-Workbook-Essential... www.goodreads.com › shelf › show › coping-skills

COURSE TITLE	**INTERPERSONAL RELATIONSHIP & COMMUNICATION SKILLS PART II**			**CREDITS**	**2**
COURSE CODE	**HSP1441**	**COURSE CATEGORY**	**BS**	**L-T-P-S**	**2-0-2-0**
Version	**1.0**	**Approval Details**	**23 ACM, 06.02.2021**	**LEARNING LEVEL**	**BTL-3**
ASSESSMENT SCHEME					
First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments/ Project**	**Surprise Test / Quiz**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**
Course Description	This course helps us acquire knowledge on problem solving and discussion making skills and to management of time and stress management				
Course Objective	To understand the various aspect of solving and discussion making skills.				

Course Outcome	Upon completion of this course, the students will be able to 1. Acquire problem solving and discussion making skills and to management of time and stress management 2. Explain the meaning and process of communication 3. Describe various attributes of situational language 4. Develop communication skill in terms of using coding and decoding criteria 5. Discuss all the modules

Prerequisites: CSB231 - Cryptography and Network Security

CO & PO MAPPING

CO	PO - 1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO - 10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	3	-	-	2	-	-	-	-	-	-	2	1	2	3
CO-2	3	2	-	-	2	-	-	-	-	-	-	1	1	2	3
CO-3	3	2	-	-	2	-	-	-	-	-	-	1	1	2	3
CO-4	3	3	-	-	2	-	-	-	-	-	-	1	1	2	3
CO-5	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3

1: Weakly related, 2: Moderately related and 3: Strongly related

MODULE - 1: GROUP DISCUSSION	**(6L = 6)**
Public speaking, Just A Minute (JAM) - skills required	**CO-1** **BTL-2**
MODULE - 2: INTERVIEW SKILLS	**(6L = 6)**
Skills required for interview, Presentation, listening and writing	**CO-2** **BTL-2**
MODULE - 3: LEADERSHIP COMMUNICATION	**6L = 6)**
Meaning, Types of Leadership Communication	**CO-3** **BTL-3**

MODULE - 4: TEAM COMMUNICATION	(6L = 6)
Meaning, Nature, Learn to value the strength of others, Steps to develop Team work, Skills required for Team communication.	**CO-4** **BTL-2**
MODULE – 5: DISCUSSIONS	**(6P = 6)**
Discuss all four modules	

TEXT BOOKS	
1.	Elizabeth C. Arnold (Author), Kathleen Underman Boggs (Author) Interpersonal Relationships (8 January 2015)
REFERENCE BOOKS	
1.	Prof. Bhagyashree A. Dudhade (Author) Life Skills Education; January 2016
2.	
E BOOKS	
1.	sourcesofinsight.com › interpersonal-skills-books
MOOC	
1	www.scionpublishing.com › book-images › samples

SEMESTER – VII & VIII

INTERSHIP

Objective: To provide the necessary exposure to the students to practice Optometry comprehensively. The training centres (external) will be chosen based on the quality of clinical exposure facility. Students are expected to spend their training duration in Primary eye care, Dispensing optics and Specialty Optometry. Clinical competency of the interns will be assessed throughout.

Project work

1. All students shall undertake a short-term project work either as original research work or systematic review in the third year. The proposal is to be presented at the beginning of the sixth semester and the work must be completed and submitted at the end of the seventh semester.
2. The evaluation of the project work will be based on the quality of the report and students' performance in the viva-voce