ROYAL GLOBAL UNIVERSITY
GUWAHATI

ROYAL SCHOOL OF MEDICAL AND ALLIED SCIENCES(RSMAS)

COURSE STRUCTURE AND SYLLABUS

(BASED ON NATIONAL EDUCATION POLICY 2020)

FOR

Bachelor in Optometry

(4 YEARS SINGLE MAJOR)

W.E.F

AY: 2025 - 26

1. Preamble

The National Education Policy (NEP) 2020 conceives a new vision for India's higher education system. It recognizes that higher education plays an extremely important role in promoting equity, human as well as societal well-being and in developing India as envisioned in its Constitution. It is desired that higher education will significantly contribute towards sustainable livelihoods and economic development of the nation as India moves towards becoming a knowledge economy and society.

If we focus on the 21st century requirements, the higher education framework of the nation must aim to develop good, thoughtful, well-rounded, and creative individuals and must enable an individual to study one or more specialized areas of interest at a deep level, and also develop character, ethical and Constitutional values, intellectual curiosity, scientific temper, creativity, spirit of service, and twenty-first-century capabilities across a range of disciplines including sciences, social sciences, arts, humanities, languages, as well as professional, technical, and vocational subjects. A quality higher education should be capable enough to enable personal accomplishment and enlightenment, constructive public engagement, and productive contribution to the society. Overall, it should focus on preparing students for more meaningful and satisfying lives and work roles and enable economic independence.

Towards the attainment of holistic and multidisciplinary education, the flexible curricula of the University will include credit-based courses, projects in the areas of community engagement and service, environmental education, and value-based education. As part of holistic education, students will also be provided with opportunities for internships with local industries, businesses, artists, crafts persons, and so on, as well as research internships with faculty and researchers at the University, so that students may actively engage with the practical aspects of their learning and thereby improve their employability.

The undergraduate curriculums are diverse and have varied subjects to be covered to meet the needs of the programs. As per the recommendations from the UGC, introduction of courses related to Indian Knowledge System (IKS) is being incorporated in the curriculum structure which encompasses all of the systematized disciplines of Knowledge which were developed to a high degree of sophistication in India from ancient times and all of the traditions and practises that the various communities of India—including the tribal communities—have evolved, refined and preserved over generations, like for example Vedic Mathematics, Vedangas, Indian Astronomy, Fine Arts, Metallurgy, etc.

At RGU, we are committed that at the societal level, higher education will enable each student to develop themselves to be an enlightened, socially conscious, knowledgeable, and skilled citizen who can find and implement robust solutions to its own problems. For the students at the University, Higher education is expected to form the basis for knowledge creation and innovation thereby contributing to a more vibrant, socially engaged, cooperative community leading towards a happier, cohesive, cultured, productive, innovative, progressive, and prosperous nation."

2. Introduction

The National Education Policy (NEP) 2020 clearly indicates that higher education plays an extremely important role in promoting human as well as societal well-being in India. As envisioned in the 21st-century requirements, quality higher education must aim to develop good, thoughtful, well-rounded, and creative individuals. The NEP highlights that the following fundamental principles that have a direct bearing on the curricula would guide the education system at large, viz.

i. Recognizing, identifying, and fostering the unique capabilities of each student to promote her/his holistic development.

ii. Flexibility, so that learners can select their learning trajectories and programmes, and thereby choose their own paths in life according to their talents and interests.

iii. Multidisciplinary and holistic education across the sciences, social sciences, arts, humanities, and sports for a multidisciplinary world.

iv. Emphasis on conceptual understanding rather than rote learning, critical thinking to encourage logical decision-making and innovation; ethics and human & constitutional values, and life skills such as communication, teamwork, leadership, and resilience.

v. Extensive use of technology in teaching and learning, removing language barriers, increasing access for Divyang students, and educational planning and management.

vi. Respect for diversity and respect for the local context in all curricula, pedagogy, and policy.

2.1 Choice Based Credit System (CBCS) By UGC: Under the CBCS system, the requirement for awarding a degree or diploma or certificate is prescribed in terms of number of credits to be earned by the students. This framework is being implemented in several universities across States in India. The main highlights of CBCS are as below:

- The CBCS provides flexibility in designing curriculum and assigning credits based on the course content and learning hours.
- The CBCS provides for a system wherein students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning.
- CBCS also provides opportunity for vertical mobility to students from a bachelor's degree programme to masters and research degree programmes.

2.2 Academic Credit: An academic credit is a unit by which a course is weighted. It is fixed by the number of hours of instructions offered per week. As per the National Credit Framework:

1 Credit = 30 NOTIONAL CREDIT HOURS (NCH)

Yearly Learning Hours = 1200 Notional Hours (@40 Credits x 30 NCH)

30 Notional Credit Hours		
Lecture/Tutorial	**Practicum**	**Experiential Learning**
1 Credit = 15 -22 Lecture Hours	10-15 Practicum Hours	0-8 Experiential Learning Hours

2.3 Course of Study: Course of study indicate pursuance of study in a particular discipline/programme. Discipline/Programmes shall offer Major Courses (Core), Minor Courses, Skill Enhancement Courses (SEC), Value Added Courses (VAC), Ability Enhancement Compulsory Courses (AECCs) and Interdisciplinary courses.

2.4 Disciplinary Major: The major would provide the opportunity for a student to pursue in-depth study of a particular subject or discipline. Students may be allowed to change major within the broad discipline at the end of the second semester by giving her/him sufficient time to explore interdisciplinary courses during the first year. Advanced-level disciplinary/interdisciplinary courses, a course in research methodology, and a project/dissertation will be conducted in the seventh semester. The final semester will be devoted to seminar presentation, preparation, and submission of project report/dissertation. The project work/dissertation will be on a topic in the disciplinary programme of study or an interdisciplinary topic.

2.5 Disciplinary/interdisciplinary minors: Students will have the option to choose courses from disciplinary/interdisciplinary minors and skill-based courses. Students who take a sufficient number of courses in a discipline or an interdisciplinary area of study other than the chosen major will qualify for a minor in that discipline

or in the chosen interdisciplinary area of study. A student may declare the choice of the minor at the end of the second semester, after exploring various courses.

2.6 Courses from Other Disciplines (Interdisciplinary): All UG students are required to undergo 3 introductory-level courses relating to any of the broad disciplines given below. These courses are intended to broaden the intellectual experience and form part of liberal arts and science education. Students are not allowed to choose or repeat courses already undergone at the higher secondary level (12th class) in the proposed major and minor stream under this category.

i. *Natural and Physical Sciences:* Students can choose basic courses from disciplines such as Natural Science, for example, Biology, Botany, Zoology, Biotechnology, Biochemistry, Chemistry, Physics, Biophysics, Astronomy and Astrophysics, Earth and Environmental Sciences, etc.

ii. *Mathematics, Statistics, and Computer Applications:* Courses under this category will facilitate the students to use and apply tools and techniques in their major and minor disciplines. The course may include training in programming software like Python among others and applications software like STATA, SPSS, Tally, etc. Basic courses under this category will be helpful for science and social science in data analysis and the application of quantitative tools.

iii. *Library, Information, and Media Sciences:* Courses from this category will help the students to understand the recent developments in information and media science (journalism, mass media, and communication).

iv. *Commerce and Management:* Courses include business management, accountancy, finance, financial institutions, fintech, etc.,

v. *Humanities and Social Sciences:* The courses relating to Social Sciences, for example, Anthropology, Communication and Media, Economics, History, Linguistics, Political Science, Psychology, Social Work, Sociology, etc. will enable students to understand the individuals and their social behaviour, society, and nation. Students be introduced to survey methodology and available large-scale databases for India. The courses under humanities include, for example, Archaeology, History, Comparative Literature, Arts & Creative expressions, Creative Writing and Literature, language(s), Philosophy, etc., and interdisciplinary courses relating to humanities. The list of Courses can include interdisciplinary subjects such as Cognitive Science, Environmental Science, Gender Studies, Global Environment & Health, International Relations, Political Economy and Development, Sustainable Development, Women's, and Gender Studies, etc. will be useful to understand society.

2.7 Ability Enhancement Courses (AEC): Modern Indian Language (MIL) & English language focused on language and communication skills. Students are required to achieve competency in a Modern Indian Language (MIL) and in the English language with special emphasis on language and communication skills. The courses aim at enabling the students to acquire and demonstrate the core linguistic skills, including critical reading and expository and academic writing skills, that help students articulate their arguments and present their thinking clearly and coherently and recognize the importance of language as a mediator of knowledge and identity. They would also enable students to acquaint themselves with the cultural and intellectual heritage of the chosen MIL and English language, as well as to provide a reflective understanding of the structure and complexity of the language/literature related to both the MIL and English language. The courses will also emphasize the development and enhancement of skills such as communication, and the ability to participate/conduct discussion and debate.

2.8 Skill Enhancement Course (SEC): These courses are aimed at imparting practical skills, hands-on training, soft skills, etc., to enhance the employability of students and should be related to Major Discipline. They will aim at providing handson training, competencies, proficiency, and skill to students. SEC course will be a basket course to provide skill-based instruction. For example, SEC of English Discipline may include Public Speaking, Translation & Editing and Content writing. A student shall have the choice to choose from a list, a defined track of courses offered from 1st to 3rd semester.

2.9 Value-Added Courses (VAC):

i. *Understanding India:* The course aims at enabling the students to acquire and demonstrate the knowledge

and understanding of contemporary India with its historical perspective, the basic framework of the goals and policies of national development, and the constitutional obligations with special emphasis on constitutional values and fundamental rights and duties. The course would also focus on developing an understanding among student-teachers of the Indian knowledge systems, the Indian education system, and the roles and obligations of teachers to the nation in general and to the school/community/society. The course will attempt to deepen knowledge about and understanding of India's freedom struggle and of the values and ideals that it represented to develop an appreciation of the contributions made by people of all sections and regions of country, and help learners understand and cherish the values enshrined in the Indian Constitution and to prepare them for their roles and responsibilities as effective citizens of a democratic society.

ii. *Environmental science/education:* The course seeks to equip students with the ability to apply the acquired knowledge, skills, attitudes, and values required to take appropriate actions for mitigating the effects of environmental degradation, climate change, and pollution, effective waste management, conservation of biological diversity, management of biological resources, forest and wildlife conservation, and sustainable development and living. The course will also deepen the knowledge and understanding of India's environment in its totality, its interactive processes, and its effects on the future quality of people's lives.

iii. *Digital and technological solutions:* Courses in cutting-edge areas that are fast gaining prominences, such as Artificial Intelligence (AI), 3-D machining, big data analysis, machine learning, drone technologies, and Deep learning with important applications to health, environment, and sustainable living that will be woven into undergraduate education for enhancing the employability of the youth.

iv. *Health & Wellness, Yoga education, sports, and fitness:* Course components relating to health and wellness seek to promote an optimal state of physical, emotional, intellectual, social, spiritual, and environmental well-being of a person. Sports and fitness activities will be organized outside the regular institutional working hours. Yoga education would focus on preparing the students physically and mentally for the integration of their physical, mental, and spiritual faculties, and equipping them with basic knowledge about one's personality, maintaining self-discipline and self-control, to learn to handle oneself well in all life situations. The focus of sports and fitness components of the courses will be on the improvement of physical fitness including the improvement of various components of physical and skills-related fitness like strength, speed, coordination, endurance, and flexibility; acquisition of sports skills including motor skills as well as basic movement skills relevant to a particular sport; improvement of tactical abilities; and improvement of mental abilities.

2.10 Summer Internship /Apprenticeship: The intention is induction into actual work situations. All students must undergo internships / Apprenticeships in a firm, industry, or organization or Training in labs with faculty and researchers in their own or other HEIs/research institutions during the summer term. Students should take up opportunities for internships with local industry, business organizations, health and allied areas, local governments (such as panchayats, municipalities), Parliament or elected representatives, media organizations, artists, crafts persons, and a wide variety of organizations so that students may actively engage with the practical side of their learning and, as a by-product, further improve their employability. Students who wish to exit after the first two semesters will undergo a 4-credit work-based learning/internship during the summer term to get a UG Certificate.

i. *Community engagement and service:* The curricular component of 'community engagement and service' seeks to expose students to the socioeconomic issues in society so that the theoretical learnings can be supplemented by actual life experiences to generate solutions to real-life problems. This can be part of summer term activity or part of a major or minor course depending upon the major discipline.

ii. *Field-based learning/minor project:* The field-based learning/minor project will attempt to provide opportunities for students to understand the different socio-economic contexts. It will aim at giving students exposure to development-related issues in rural and urban settings. It will provide opportunities for students to observe situations in rural and urban contexts, and to observe and study actual field situations regarding issues related to socioeconomic development. Students will be given opportunities to gain a first-hand

understanding of the policies, regulations, organizational structures, processes, and programmes that guide the development process. They would have the opportunity to gain an understanding of the complex socio-economic problems in the community, and innovative practices required to generate solutions to the identified problems. This may be a summer term project or part of a major or minor course depending on the subject of study.

2.11 Indian Knowledge System: In view of the importance accorded in the NEP 2020 to rooting our curricula and pedagogy in the Indian context all the students who are enrolled in the four-year UG programmes should be encouraged to take an adequate number of courses in IKS so that the total credits of the courses taken in IKS amount to at least five per cent of the total mandated credits (i.e. min. 8 credits for a 4 yr. UGP & 6 credits for a 3 yr. UGP). The students may be encouraged to take these courses, preferably during the first four semesters of the UG programme. At least half of these mandated credits should be in courses in disciplines which are part of IKS and are related to the major field of specialization that the student is pursuing in the UG programme. They will be included as a part of the total mandated credits that the student is expected to take in the major field of specialization. The rest of the mandated credits in IKS can be included as a part of the mandated Multidisciplinary courses that are to be taken by every student. All the students should take a Foundational Course in Indian Knowledge System, which is designed to present an overall introduction to all the streams of IKS relevant to the UG programme. The foundational IKS course should be broad-based and cover introductory material on all aspects. Wherever possible, the students may be encouraged to choose a suitable topic related to IKS for their project work in the 7/8th semesters of the UG programme.

2.12 Experiential Learning: One of the most unique, practical & beneficial features of the National Credit Framework is assignment of credits/credit points/ weightage to the experiential learning including relevant experience and professional levels acquired/ proficiency/ professional levels of a learner/student. Experiential learning is of two types:

i. Experiential learning as part of the curricular structure of academic or vocational program. E.g., projects/OJT/internship/industrial attachments etc. This could be either within the Program- internship/ summer project undertaken relevant to the program being studied or as a part time employment (not relevant to the program being studied- up to certain NSQF level only). In case where experiential learning is a part of the curricular structure the credits would be calculated and assigned as per basic principles of NCrF i.e., 40 credits for 1200 hours of notional learning.

ii. Experiential learning as active employment (both wage and self) post completion of an academic or vocational program. This means that the experience attained by a person after undergoing a particular educational program shall be considered for assignment of credits. This could be either Full or Part time employment after undertaking an academic/ Vocation program. In case where experiential learning is as a part of employment the learner would earn credits as weightage. The maximum credit points earned in this case shall be double of the credit points earned with respect to the qualification/ course completed. The credit earned and assigned by virtue of relevant experience would enable learners to progress in their career through the work hours put in during a job/employment.

3. Approach to Curriculum Planning

The objective of the B. Optometry programme is to equip the students with a skill set that will acquaint them to industry standards as well as route them into a smooth transition to higher level of education. Keeping in line with this objective, the university has devised an outcome-oriented undergraduate course for B. Optometry with UGC's learning outcomes- based curriculum framework (LOCF). The LOCF approach is aimed at structuring the teaching-learning experiences in a more student-centric manner. The LOCF approach has been adopted to strengthen students' experiences as they engage themselves in the programme of their choice.

The new curriculum of B. Optometry is designed aimed at creating computational thinking, analytical, and problem-solving skills, encouraging the building of a creative mind-set in the students. The programme prepares the students for higher studies and research in the area of functional component of eye and brain.

Understanding the need of awareness of particular diseases both nationally and internationally. The course focuses on providing diagnostic skills across various platforms that are relevant to the current industry standards. It is designed to encourage students to participate in discussions and implement the theoretical concepts to solve real world problems. The mode of learning shall be a blend of the formal and the inquiry-based methods, with special focus on practical and projects.

The Bachelor of Optometry (B.Optometry) course is framed as per the guidelines of the New Education Policy 2020 for the students to develop and enhance their analytical & critical thinking, and problem-solving skills. The students are tested on the basis of applicability of the theoretical concepts and implementation of practical knowledge. A student is awarded on the basis of the attainment of these outcomes at the end of the programme.

3.1 Nature and extent of the B. Optometry programme

Problem-solving is at the core of optometry, spanning the analysis, diagnosis, and treatment of various vision and eye-related issues. This field encompasses the design, development, and application of techniques and technologies to address a wide range of visual and ocular challenges. Key areas of study in optometry include ocular anatomy, vision science, clinical optometry, contact lenses, low vision rehabilitation, binocular vision, and ocular diseases. Students also have the opportunity to explore interdisciplinary subjects by selecting from a list of Generic Electives (GE), allowing for a broader understanding of topics such as physiology, psychology, photography, or other relevant disciplines. Skill enhancement courses enable students to acquire practical skills relevant to their future profession. Discipline-Specific Electives offer the flexibility to delve deeper into specific areas of interest within optometry. Additionally, Ability Enhancement Courses, such as Effective Communication in Optometry, Behavioral Science, and Professional Etiquette, play a crucial role in shaping students into well-rounded individuals, equipping them with communication and interpersonal skills essential for their future careers in optometry. The meticulously structured LOCF (Learning Outcome-Centric Framework) program in optometry aims to empower students with the necessary skills and knowledge to pursue diverse and rewarding opportunities within the field of eye care.

4. Award of the Degree

The structure and duration of undergraduate programmes of study offered by the University as per NEP 2020 include:

a. Undergraduate programmes of either 3 or 4-year duration with Single Major, with multiple entry and exit options, with appropriate certifications:

   i. **UG Certificate:** Students who opt to exit after completion of the first year and have secured 40 credits will be awarded a UG certificate if, in addition, they complete one vocational course of 4 credits during the summer vacation of the first year. These students are allowed to re-enter the degree programme within three years and complete the degree programme within the stipulated maximum period of seven years.

   ii. **UG Diploma:** Students who opt to exit after completion of the second year and have secured 80 credits will be awarded the UG diploma if, in addition, they complete one vocational course of 4 credits during the summer vacation of the second year. These students are allowed to re-enter within a period of three years and complete the degree programme within the maximum period of seven years.

   iii. **3-year UG Degree:** Students who will undergo a 3-year UG programme will be awarded UG Degree in the Major discipline after successful completion of three years, securing 120 credits and satisfying the minimum credit requirement.

   iv. **4-year UG Degree (Honours):** A four-year UG Honours degree in the major discipline will be awarded to those who complete a four-year degree programme with 160 credits and have satisfied the credit requirements as given in Table 6 in Section 5.

   v. **4-year UG Degree (Honours with Research):** Students who secure 75% marks and above in the first six semesters and wish to undertake research at the undergraduate level can

choose a research stream in the fourth year. They should do a research project or dissertation under the guidance of a Faculty Member of the University. The research project/dissertation will be in the major discipline. The students who secure 160 credits, including 12 credits from a research project/dissertation, will be awarded UG Degree (Honours with Research).

Award	Year	Credits to earn	Additional Credits	Re-entry allowed within (yrs)	Years to Complete
UG Certificate	1	40	4	3	7
UG Diploma	2	80	4	3	7
3-year UG Degree (Major)	3	120	x	x	x
4-year UG Degree (Honours)	4	160	x	x	x
4-year UG Degree (Honors with Research):	4	160	Students who secure cumulative 75% marks and above in the first six semesters		

5. Graduate Attributes

Graduate attributes are the high-level qualities, skills and understandings that a student should gain as a result of the learning and experiences they engage with, while at university. This 'graduateness' is what sets them apart from those without a degree and is the added value which graduates can enjoy and share with employers and the wider community. They equip students and graduates for lifelong personal development, learning and to be successful in society. There are 12 such identified attributes which are as follows:

• **GA1-Disciplinary Knowledge**: Attain comprehensive knowledge and a coherent understanding of the chosen areas of optometry and related disciplines.

• **GA2-Complex Problem Solving:** Apply diverse problem-solving strategies to address a range of complex visual and ocular issues in both familiar and unfamiliar scenarios. Utilize learned concepts in real-life situations within the context of optometry.

• **GA3-Analytical and Critical Thinking:** Apply analytical thinking skills to assess policies, practices, and clinical approaches in optometry. Recognize underlying assumptions, logical inconsistencies, and gaps in arguments. Analyze and synthesize data from various sources to draw well-founded conclusions and support them with relevant evidence.

• **GA4-Creativity:** Demonstrate creativity in approaching diverse optical challenges, finding innovative solutions that extend beyond conventional methods. Employ imaginative and lateral thinking, as well as interpersonal skills and emotional intelligence, to address complex optometric problems.

• **GA5-Communication Skills:** Engage in attentive listening, critically analyze research papers, and effectively communicate intricate information to diverse audiences within the field of optometry. Express ideas clearly and concisely through written and oral communication, utilizing appropriate communication channels.

• **GA6-Research-Related Skills:** Develop keen observation and inquiry skills, capable of posing pertinent questions in optometric contexts. Acquire the ability to formulate and design research proposals, identify research problems, develop relevant research questions, and test hypotheses using both quantitative and qualitative data. Demonstrate understanding of research ethics and ethical conduct in personal research

endeavors within the optometric domain.

• **GA7-Collaboration:** Collaborate effectively and respectfully within multidisciplinary teams, aligning efforts towards shared objectives within the realm of optometry.

• **GA8-Leadership Readiness/Qualities:** Cultivate the capacity to plan and organize team or organizational tasks in the optometry field. Formulate an inspiring vision and assemble a team capable of realizing this vision, showcasing leadership qualities within the optometric context.

• **GA9-Digital and Technological Skills:** Employ information and communication technology (ICT) proficiently in various optometry learning and work situations. Evaluate and utilize relevant information sources and apply appropriate software for data analysis within the scope of optometry.

• **GA10-Environmental Awareness and Action:** Mitigate the impact of environmental factors on ocular health within the optometry domain. Implement effective waste management techniques, contribute to the preservation of biological diversity, and promote sustainable practices for forest, wildlife, and overall environmental conservation in the context of optometry practice and education.

6. Programme Learning Outcomes for B. Optometry

- **PLO1- Develop knowledge of Optometry:** Ability to attain detailed knowledge and understanding of the origin and development of Optometry. Be able to develop skills to provide comprehensive eye examination
    a. To acquire knowledge on ocular structures, its functions and pathological changes
    b. To carryout ophthalmic investigations
    c. To impart knowledge with regard to common eye diseases
    d. To impart knowledge on treatment modalities from the perspective of counselling
    e. To acquire knowledge about the referral guidelines for ocular and systemic conditions

- **PLO2- Develop the ability to solve complex problems:** Improved reasoning with strong patient handling ability to Identify and analyze ocular conditions.

- **PLO3- Develop analytical and critical thinking skills:** Ability to substantiate critical cases while handling a patient with ocular complaints. Ability to analyze and interpret diagnosis of visual defects & impairments of various ocular conditions/pathologies – Refractive error, Strabismus, Cataract, Diabetic retinopathy, Glaucoma etc.

- **PLO4- Develop the ability to create:** Ability to design prosthesis and develop higher level VR therapies.

- **PLO5- Develop effective communication skills:** Must have reasonably good communication knowledge both in oral and writing.

- **PLO6- Develop research-related skills:** Ability to identify research gaps, formulate research questions

and ascertain relevant sources to find substantive explanations.

- **PLO7- Develop the ability to collaborate:** Ability to participate, contribute and provide constructive criticism while handling patient in a clinic/hospital.

- **PLO8- Develop leadership qualities:** Ability to develop personal qualities and creating a proper workspace by working with others; ability to lead group discussions.

- **PLO9- Develop digital and technological skills:** Ability to use digital sources for personal research, carry out presentations, postulate questions and search for answers.

- **PO10- Develop environmental awareness and ability to address the issue:** Exhibiting professional ethics to maintain the integrity in a working environment and also have concern about the rate of increase of the eye diseases around the world due to environmental and other factors.

7. Programme Specific Outcomes (PSOs)

PSO1. Be able to develop skills to provide comprehensive eye examination by correcting refractive error, provide spectacle prescription, to fit & dispense contact lenses and evaluate other ocular conditions along with performing pre & post operative workup.

PSO2. Be able to assess the low vision by providing comprehensive low vision care and also to develop adequate knowledge of manufacturing skills of spectacles, contact lenses & low vision devices

PSO3. Have detailed knowledge regarding organizations of eye banks i.e. preservation of ocular tissues., counselling on visual/ocular hygiene, nutritional and environmental modifications.

PSO4. Be able to do complete binocular vision assessment, manage non-strabismic binocular vision anomalies and refer condition which warrants surgery, have knowledge of counselling on visual/ocular hygiene, nutritional and environmental modifications

8. Teaching Learning Process

Teaching and Learning are two important fields which are required for effective teaching, and it helps the student in better understanding. A suitable pedagogy should be designed wisely by effective teachers. Following methods can be implemented for effective teaching:

- **Reinforced Teaching Method:** Every faculty has their sole style of teaching and students adopt the method, but this way student develops a tendency of selective studying. Thus, to break the conventional method, the teacher of the concerned subject may organize a tutorial class to be taken after completion of every chapter by the faculty from another section or a teacher who has taught the subject in the precedent semesters. This technique might give students a boost on placement-based preparations.
- **Framed Questioning Method:** It has always been observed that the knowledge of student become confined due to the lack of appropriate questions to be asked to a professor during his or her lecture. Few students who are attentive in the class are reluctant to ask questions either due to shyness or communication problems. This method suggests dividing the students into groups and asking them to give presentations on certain topics. Sometimes students feel more comfortable in

asking questions and sharing their view with their fellow friends than with faculty.

- **Model-Based Learning:** Model-based learning is a helpful and effective way of learning. To make it more comfortable and easier to understand, the faculty member may show a video presentation about the topic before starting the class. The students are best in visualization. Automatically, the students will be more attentive in the lecture. This method may make an impression on the memory of students for life-long remembering.
- **Tutorial and Group Discussion:** Tutorial teaching is a unique aspect of the educational experience. In Tutorial and Group Discussion, students discuss the topic with the faculty individually or in small groups which enhance their verbal communication skills and give them an opportunity to receive constant feedback. The faculty encourages the student to develop critical and analytical thinking as well as problem-solving skills. Discussion in tutorial helps students to see the significance and implications of their knowledge so they can apply what they have learned.
- **Seminars and Workshops:** Inviting eminent personalities who have achieved some feat in their field to take some seminars and workshops for the students greatly help them interact with present and ongoing advancements in the technology and market. Seminars and workshops are capable of keeping the students updated with the technology. Active participation in a workshop provides continuing resource of ideas, suggestions and possible solutions to the problems. Besides, workshops do tend to address issues faced by organizations which may be helpful in resolving many severities.
- **Projects and Assignments:** Project-based learning and regular assignments form an integral part of the academic curriculum and help the students to apply the concepts which result in deeper understanding of the subject and related topic.

9. Assessment Methods

<table>
<tr><th></th><th>Component of Evaluation</th><th>Marks</th><th>Frequency</th><th>Code</th><th>Weightage (%)</th></tr>
<tr><td>A</td><td>Continuous Evaluation</td><td></td><td></td><td></td><td></td></tr>
<tr><td>I</td><td>Analysis/Class test</td><td rowspan="5">Combination of any three from (i) to (v) with 5 marks each</td><td>1-3</td><td>C</td><td rowspan="6">25%</td></tr>
<tr><td>II</td><td>Home Assignment</td><td>1-3</td><td>H</td></tr>
<tr><td>III</td><td>Project</td><td>1</td><td>P</td></tr>
<tr><td>IV</td><td>Seminar</td><td>1-2</td><td>S</td></tr>
<tr><td>V</td><td>Viva-Voce/Presentation</td><td>1-2</td><td>V</td></tr>
<tr><td>VI</td><td>MSE</td><td>MSE shall be of 10 marks</td><td>1-3</td><td>Q/CT</td></tr>
<tr><td>VII</td><td>Attendance</td><td>Attendance shall be of 5 marks</td><td>100%</td><td>A</td><td>5%</td></tr>
<tr><td>B</td><td>Semester End Examination</td><td></td><td>1</td><td>SEE</td><td>70%</td></tr>
<tr><td></td><td>Project</td><td></td><td></td><td></td><td>100%</td></tr>
</table>

BACHELOR OF OPTOMETRY

1st SEMESTER					
COMPONENT	**COURSE CODE**	**COURSE TITLE**	**LEVEL**	**CREDIT**	**L-T-P**
Major (Core)	OPT242M101/ OPT242M111	General Anatomy + General Anatomy Lab	100	4	3+2
Major (Core)	OPT242M102/ OPT242M112	General Physiology + General Physiology Lab	100	4	3+2
Interdisciplinary (IDC)	IKS992K101	Iks-I	100	3	3
Ability Enhancement course (AEC)	CEN982A101/ BHS982A102	Communicative English I Behavioural Science I	100	2	2
Skill Enhancement Course (SEC)	OPT242S101	Biochemistry	100	3	3
Value Added Course (VAC)		Selected From the Pool of Courses Offered	100	3	3
SWAYAM Course			100	3	
TOTAL CREDIT FOR 1st SEMESTER				22	
2nd SEMESTER					
COMPONENT	**COURSE CODE**	**COURSE TITLE**	**LEVEL**	**CREDIT**	**L-T-P**
Major (Core)	OPT242M201/OPT242M211	OCULAR ANATOMY + OCULAR ANATOMY LAB	100	4	3+2
Major (Core)	OPT242M202/OPT242M212	OCULAR PHYSIOLOGY + PHYSIOLOGY LAB	100	4	3+2
IDC	IKS992K201	IKS-2	100	3	3
AEC	CEN982A201 BHS982A202	Communicative English II/ Behavioural Science II	100	2	2

SEC	OPT242S201/ OPT242S211	OPTOMETRIC OPTICS + OPTOMETRIC OPTICS LAB	100	3	2+2
VAC		Selected from the pool of courses offered	100	3	3
SWAYAM Course				3	
TOTAL CREDIT FOR 2nd SEMESTER				22	
3rd SEMESTER					
COMPONENT	**COURSE CODE**	**COURSE TITLE**	**LEVEL**	**CREDIT**	**L-T-P**
Major (Core)	OPT242M301/OPT242M311	OPHTHALMIC & OPTICAL INSTRUMENTATION & PROCEDURE + OPHTHALMIC & OPTICAL INSTRUMENTATION & PROCEDURE LAB	200	4	3+2
Major (Core)	OPT242CM302/OPT242CM312	VISUAL OPTICS +LAB	200	4	3+2
Major (Core)	OPT242M303	HUMAN VISUAL SYSTEM II	200	4	4
IDC			200	3	3
AEC	Communicative English-III Behavioural science-III	CEN982A301/ BHS982A302	200	2	2
SEC	MEDICAL PATHOLOGY & MICROBIOLOGY & PHARMACOLOGY	OPT242S304	200	3	3
SWAYAM Course				3	
TOTAL CREDIT FOR 3rd SEMESTER				23	
4th SEMESTER					
COMPONENT	**COURSE CODE**	**COURSE TITLE**	**LEVEL**	**CREDIT**	**L-T-P**
Major (Core)	OPT242M401/ OPT242M411	CLINICAL REFRACTION + CLINICAL REFRACTION LAB	200	4	3+2

Major (Core)	OPT242M403	OCULAR DISEASE I	200	4	4
Major (Core)	OPT242M402/OPT242M412	OPHTHALMIC LENS & DISPENSING OPTICS + OPHTHALMIC LENS & DISPENSING OPTICS LAB	200	4	3+2
Major (Core)	OPT242M413	CLINICAL POSTING	200	4	4
AEC	CEN982A401/ BHS982A402	COMMUNICATIVE ENGLISH / Behavioural science-IV	200	2	2
SWAYAM Course				3	
TOTAL CREDIT FOR 4th SEMESTER				21	
5th SEMESTER					
COMPONENT	**COURSE CODE**	**COURSE TITLE**	**LEVEL**	**CREDIT**	**L-T-P**
Major (Core)	OPT242M501	INTRODUCTION TO CONTACT LENS	300	4	4
Major (Core)	OPT242M502	BINOCULAR VISION & OCULAR MOTILITY	300	4	4
Major (Core)	OPT242M503	OCULAR DISEASE II	300	4	4
Major (Core)	OPT242M504	BASICS OF LOW VISION	300	4	4
Major (Core)	OPT242M511	CLINICAL POSTING	300	4	
TOTAL CREDIT FOR 5th SEMESTER				20	
6th SEMESTER					
COMPONENT	**COURSE CODE**	**COURSE TITLE**	**LEVEL**	**CREDIT**	**L-T-P**
Major (Core)	OPT242M601	SYSTEMIC CONDITIONS & THE EYE	300	4	4
Major (Core)	OPT242M602	LAW & OPTOMETRY+OCCUPATIONAL OPTOMETRY	300	4	4

Major (Core)	OPT242M603/OPT242M611	APPLIED OPTOMETRY & ORTHOPTICS +LAB	300	4	3+2
Major (Core)	OPT242M604/OPT242M612	CONTACT LENS II+ LAB	300	4	3+2
Major (Core)	OPT242M605/OPT242M613	LOW VISION AIDS & VISUAL REHABILITATION + LOW VISION AIDS & VISUAL REHABILITATION LAB	300	4	3+2
TOTAL CREDIT FOR 6th SEMESTER				20	
7th SEMESTER					
COMPONENT	**COURSE CODE**	**COURSE TITLE**	**LEVEL**	**CREDIT**	**L-T-P**
Major (Core)	OPT242M711	PEDIATRIC CLINIC SPECIALITY & GERIATRIC CLINIC SPECIALITY	400	4	4
Major (Core)	OPT242M712	LOW VISION SPECIALITY	400	4	4
Major (Core)	OPT242M713	CONTACT LENS SPECIALITY	400	4	4
Major (Core)	OPT242M714	BINOCULAR VISION SPECIALITY	400	4	4
TOTAL CREDIT FOR 7th SEMESTER				16	
8th SEMESTER					
COMPONENT	**COURSE CODE**	**COURSE TITLE**	**LEVEL**	**CREDIT**	**L-T-P**
Major (Core)	OPT242M811	CLINICAL EVALUATION	400	6	12
Major (Core)	OPT242M812	COMPREHENSIVE CLINICAL OPTOMETRY	400	6	12
Project / Dissertation	OPT242M814	Project / Dissertation	400	12	24
TOTAL CREDIT FOR 8th SEMESTER				24	

SYLLABUS (1ST SEM)	
PAPER /SUBJECT NAME: GENERAL ANATOMY + GENERAL ANATOMY LAB **SUBJECT CODE: OPT242M101/OPT242M111** **SCHEME OF EVALUATION: (T+ P)**	
Total Credits: 4	**L-T-P-C=3-0-2-4**

Course Objective:

The objective of this subject is to deal with the entire human anatomy with emphasis on different tissues, blood vessels, glands, nerves and the entire central nervous system in particular.

Course Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**identify** the microscopic structures of various tissues, and organs in the human body and correlate the structure with the functions.	**BT 1**
CO 2	**comprehend** the normal disposition, inter-relationships, gross, functional and applied anatomy of various structures in the human body	**BT 2**
CO 3	**applying** the knowledge of the basic structure and connections between the various parts of the central nervous system so as to analyse the integrative and regulative functions on the organs and systems.	**BT 3**
CO4	**analyze** the anatomical structures of the eye, explain their functional significance, and evaluate how alterations in these structures can lead to ocular disorders	**BT 4**

SYLLABUS: THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Introduction of anatomy – gross human anatomy & their relations : The skeleton – axial & appendicular (over view), Cavities of body- (cranial, thoracic, abdominal, pelvic). Structure of bone, Type & function of bone, Blood & nerve supply of the bone. Planes of the body. Anatomical terminology. Skull – General features, Cranial bones (frontal, parietal, temporal, occipital, sphenoid, ethmoid). Facial bone – (nasal, maxilla, zygomatic, lacrimal, palatine, inferior nasal conchae, vomar, mandible). Special feature of the skull (sutures, paranasal sinuses, foramina, fontanels, nasal septum). Joints – classification, fibrous joints, cartilaginous joints, synovial joints(structure & types). Types of movement at sinovial joints. Anatomy of muscular system – Skeletal muscle structure. Important skeletal muscle (muscles of facial expression, mastication. Muscle that move the head). Over view of Trunk muscles, upper limb muscles, lower limb muscles. Anatomy of nervous system – spinal cord anatomy (external & internal anatomy). Connection & distribution of spinal nerves-overview(Branches, plexuses. Intercostal nerves). Overview of brain organization & blood supply. Brief anatomical idea on – brain stem, cerebellum, diencephalon, cerebrum. Cranial nerves	**11**
2	Embryology – general Gametogenesis(spermatogenesis & oogenesis) –Structure of testis,ovary &sperm –Phases of embryonic development – formation of three germ layers- derivatives of germ layers –Embryonic or Foetal membrane (chorion, amnion, allantois, yolk sac) &placenta & its functions.	**11**
3	Cell Structure: Ultra structure and functions of cell- Plasma membrane- Nucleus – Mitochondria- Centrosome- Ribosome-Endoplasmic reticulum- Golgi body & lysosome. Nucleus – Ultra structure & functions. Chromosomes: Structure & chemical composition, types of chromosome. Chromosome aberration.	**11**

4	Cell Division: Amitosis- Mitosis- Meiosis- Significance of mitosis & meiosis- Cell cycle. Tissues: Structure, position and functions of epithelial, connective, muscular & nervous tissue.	**11**
	TOTAL	**44**

SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Identification of skull & skeleton (bones)[Skull-bones comprising, base of skull orbits]	**7.5**
2	Identification of organs & viscera	**7.5**
3	Identification of histological tissues . a) Epithelial tissue-squamous, columnar, cuboidal b) Connective tissue-skeletal muscle, cardiac muscle, smooth muscle c) Cytology-mitosis.	**7.5**
	TOTAL	**30**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXT BOOKS:-

1. PETER L. WILLIAMS AND ROGER WARWICK: - Gray's Anatomy - Descriptive and Applied, 36th Ed., 1980, Churchill Livingstone.

2. G.J. TORTORA & N.P ANAGNOSTAKOS: Principles of Anatomy and Physiology. (recent edition)

3. B.D. CHAURASIA: Handbook of General Anatomy, 2nd Ed., CBS Publishers and Distributors, New Delhi - 110 032.

SYLLABUS (1ST SEM)

PAPER/SUBJECT NAME: GENERAL PHYSIOLOGY + GENERAL PHYSIOLOGY LAB **SUBJECT CODE: OPT242M102/OPT242M112**

SCHEME OF EVALUATION: (T+P)

Total credits: 4 **L-T-P-C=3-0-2-4**

Course Objective:

Objective of this subject is to deal with the entire human anatomy with emphasis on different organ systems, their physiological functions with special emphasis on blood and neuro physiology.

Course Outcome: At the end of the course, the student will be able to:

On successful completion of the course, the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**explain** the normal functioning of various organ systems of the body, their interactions.	**BT 1**
CO2	**Understand** the physiological aspects of normal growth and development.	**BT2**

CO 3	**relate** the physiological principles underlying pathogenesis of disease and understand the physiological response and adaptations to environmental stresses.	**BT 3**
CO 4	**Analyze** the relationship between ocular physiology and common visual disorders	**BT 4**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Basic Biological (Biophysical & Biochemical) Principles: Diffusion, surface tension and viscosity – their characteristics, factors influencing and biological applications. Osmosis – osmometers, laws of osmosis, biological applications, relation with depression of freezing points. Acids, bases and pH. Colloids – classification, properties, biological importance of colloids. Dialysis, electrodialysis and ultra-filtration. Chromatography: Principles & applications, Electrophoresis: Principles & applications, Gel electrophoresis. Ultracentrifugation: moving boundary and density gradient ultracentrifugation. Adsorption, absorption.	**11**
2	2. Genetics: Nucleic acid- Structure of DNA- Physical & Chemical properties of DNA & RNA, Ultra structure & types of DNA & RNA(in details), Brief idea about super coiling of DNA Semiconservative mode of replication of DNA, Mechanism of replication of DNA, ,Genetic code. Genetically relation of color blindness and ocular albinism. Chromosome aberration- Structural aberration- Deletion- Duplication- Inversion- translocation. Numerical aberration (Polyploidy & aneuploidy- Hyper & hypo). Gene mutation- classification-spontaneous & Induced- Chemical mutation- Practical Application of mutation.	**11**

3	3. Blood Vascular system Composition and functions of blood. Plasma proteins – normal values, origin and functions. Brief idea on Bone marrow. Formed elements of blood – origin, formation, functions and fate. Hemoglobin – functions, compounds and derivatives. Abnormal hemoglobin-overview. Thalassemia-brief idea. Different types of anemia and their causes-overview. Erythrocyte sedimentation rate (ESR) and its significance. Hematocrit. PCV, MCV, MCH, MCHC. Blood volume – normal values, regulation. Blood coagulation – factors, process, anticoagulants, Prothrombin time. Clotting time. Bleeding time. Blood groups – ABO systems and Rh factors. Blood transfusion. Ultra structure & functions of blood vessels (artery & vein). Structure type and function of capillaries. Differences between artery & vein. 4. Muscular Physiology: Microscopic and electron microscopic structure of skeletal, smooth and cardiac muscles. Difference between skeletal, smooth and cardiac muscles. The sarcotubular system. Red and white striated muscle fibers. Single unit and multi unit smooth muscle. Motor point. Properties of muscle: excitability and contractility, all or none law, summation of stimuli, summation of contractions, effects of repeated stimuli, genesis of tetanus, onset of fatigue, refractory period, tonicity, conductivity, extensibility and elasticity. Electromyography. Muscle contraction – E C Coupling, Muscle fatigue, Rigor mortis, Sliding filament theory, Slow & fast muscle fibers, Isotonic & Isometric contraction. 5. Neuro Physiology Electron microscopic structure of nerve cell or neurons. Neuroglia. Myelinated and unmyelinated nerve fibers. Conduction velocity of nerve impulse in relation to myelination and diameter of nerve fibers. Properties of nerve fibers – excitability, conductivity, all-or-none law, accommodation, adaptation, summation, refractory period, indefatiguability. Concept of chronaxie and rheobase. Synapses – types, structure, synaptic transmission of the impulse, synaptic potentials, neurotransmitters. Motor unit. Injury to peripheral nerves – degeneration and regeneration-brief idea. Automatic nervous system – Introduction, Comparison of autonomic & somatic nervous system, Anatomy of autonomic motor pathways – Pre-ganglionic neurons, autonomic ganglia, sympathetic ganglia, autonomic plexus, post-ganglionic neurons structure of sympathetic and parasympathetic division. ANS- neurotransmitter and receptors- cholinergic neurons & receptors. Receptor agonist & antagonist. Physiological effect of ANSsympathetic & parasympathetic response. Integration & control of autonomic function- autonomic Reflexes, autonomic control by higher centers. Neural Transmission- Introduction, Autonomic Synaptic Transmission-Modes of transmission, sympathetic & parasympathetic response. CNS Synaptic transmission-Electrical synaptic transmission & chemical synaptic transmission. Neuro muscular Junction – The neuromuscular junctions – structure, events in transmission, end-plate potential, post tetanic potential.	**11**

4	6.Cardio Vascular System – Structure & function of Heart & blood vessels (artery, vein and capillary) (Anatomical position, chambers of heart.) Blood circulation through heart. Special junctional tissue of heart.(Myogenic and neurogenic heartconducting system of heart. E.C.G. Cardiac cycle. Heart Sound , Blood vessels – type, Structure & function, Systemic & pulmonary circulation. Blood – composition, Function, blood group, Blood clotting. Cardiac cycle and cardiac output. Blood Pressure-regulation & controlling factors. 7.Renal System- Function of kidney, Anatomy & Histology of Nephron & collecting duet. – Urine formation(Filtration, reabsorbtion and secretion)- Counter – current system of urine concentration, Anomalies in urine concentration.	**11**
	TOTAL	**44**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Identification of fixed histological slides – nerve tissues (cerebellum, cerebral cortex, neurons, spinal cord, nodes of Ranvier, corneal cell space), renal tissues. Blood vessels (artery & vein),skin, Tongue, Liver. Hemoglobin estimation	**7.5**
2	Determination of blood pressure Determination of BT, CT, ESR	**7.5**
3	Blood film making & identification of different blood corpuscle. ECG wave identification	**7.5**
4	Measurement of TC of RBC & WBC & DC of WBC.. Determination of Blood Group (ABO; Rh).	**7.5**
	TOTAL	**30**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOKS:

1. AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition,CBS Publishers, New Delhi, 2006

2. L Prakasam reddy, Fundamentals of Medical Physiology, 4th Edition, Paras medical Publisher, Hyderabad, 2008

3. Sujit K. Chaudhuri, Concise Medical Physiology, 6th edition, New Central Book Agency, Kolkata, 2008

SYLLABUS (1st SEM)

INTERDISCIPLINARY /SUBJECT NAME: Introduction to Indian Knowledge System-I

Course Level: 100

SUBJECT CODE: IKS992K101

SCHEME OF EVALUATION: (T)

Total credits: 3 **L-T-P-C – 3-0-0-3**

SYLLABUS (1ST SEM)

AECC/SUBJECT NAME: Communicative English and Behavioral Science-I

Course Level: 100

SUBJECT CODE: CEN982A101/BHS982A102

SCHEME OF EVALUATION: (T)

Total credits: 2 **L-T-P-C – 2-0-0-2**

SYLLABUS (1ST SEM)

SEC PAPER/SUBJECT NAME: BIOCHEMISTRY **SUBJECT CODE: OPT242S101**

SCHEME OF EVALUATION: (T)

Total credits: 3 **L-T-P-C=3-0-0-3**

Course Objective:

The objective of this subject is to deal 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 Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**identify** each principles of various conventional and specialized laboratory investigations and instrumentation, analysis and interpretation of a given data.	**BT 1**
CO2	**understand** the structure, function and interrelationship of biomolecules and consequences of deviation from normal.	**BT2**
CO 3	**integration** of the various aspects of metabolism, and their regulatory pathways.	**BT 3**
CO 4	**analyze** the metabolic pathways involved in the breakdown and utilization of carbohydrates, proteins, and lipids for energy production.	**BT 4**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	1. Basic concept & metabolism of carbohydrate, protein & fat.Process of glycolysis, glycogenolysis, TCA cyclesignificance. Non Protein Nitrogen, Nitrogen balance, Metabolism of Amino acids, Transamination, Deamination. Process of □-oxidation of unsaturated fatty acid, á & □□oxidation overview. 2. Amino acids, protein structures. a. Amino acids- Function, classification, properties b. Protein - Primary, secondary, tertiary & quaternary structures & the bond involves.	**15**
2	3. Brief outline: Enzyme- General characteristics, classification, Factors affecting enzymatic activity. Kinetics of Enzyme – km. Michaelis Menten equation. Line Weaver Burk plot. Enzyme Inhibition – Reversible & Irreversible. Allosteric enzyme. 4. Oxygen transporting protein Hemoglobin & Myoglobin – Structure & their characteristics. Comparison between hemoglobin & myoglobin. Oxygen transporting Mechanism of Hemoglobin affinity for Oxygen. Bohr's effect 5. Vitamins Water & Fat soluble Vitamins. Vitamins- A,D,E,KP,C B complex-source, daily requirement, Metabolism, Functions, deficiency.	**15**
3	6. Basic outline of hormone action Physical & Chemical Characteristics of hormone. Types of hormone. General mechanism of hormone action via Massenger system. Source & importance of different hormones-STH, ACTH, GTH , T4, parath hormone, Insulin, Glucagon, Glucocorticoid, Mineralocorticoid, Melatonin, Estrogen, Progesteron, Testosterone & HCG 7. Cornea – Biochemical composition of cornea. Sources of Nutrients-Oxygen, Glucose, Amino acid. Metabolic pathway in cornea – Glycolysis, HMP shunt. 8. Tear film- Functions of Tear film. Different layers of Tear film. Chemical composition of tears. Tear film abnormalities. Tests for film Adequacy.	**15**

4	9. Lens – Biochemical composition of lens. Lens protein – their types & characteristics. Lens Metabolism - Carbohydrate metabolism, protein metabolism. Cataract – Due to biochemical defects of lens. Antioxidant mechanism in the lens. 10. Biochemistry of the visual process Photopigments – Rhodopsin & Iodopsin. Chemical nature of Rhodopsin. Visual cycle (Bleaching of Rhodopsin, Transducin cycle, Role of Phosphodiestareses).	**15**
	TOTAL	**60**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
3*20 =60 NCH	0	30NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXT BOOK:

1. Ramakrishnan: Essentials of biochemistry and ocular biochemistry, Annamalai University Publications, Chidambaram, India, 1992

2. S. Ramakrishnan, K G Prasannan and R Rajan: Text book of Medical Biochemistry, Orient Longman, Madras, 1990

3. D.R. Whikehart: Biochemistry of the Eye, 2ndedition, Butterworth Heinemann, Pennsylvania, 2003

SYLLABUS (1ST SEM)

SUBJECT NAME: VAC
Subject Code:

Course Level: 100

SUBJECT CODE:

SCHEME OF EVALUATION: (T)

Total credits: 3 **L-T-P-C – 3-0-0-3**

SYLLABUS (1ST SEM)

SUBJECT NAME: SWAYAM COURSE

Subject Code:

Course Level: 100

SUBJECT CODE:

SCHEME OF EVALUATION: (T)

Total credits: 3

SYLLABUS (2ND SEM)

PAPER /SUBJECT NAME: OCULAR ANATOMY + OCULAR ANATOMY LAB **SUBJECT CODE: OPT242M201/OPT242M211**

SCHEME OF EVALUATION: (T+ P)

Total credits: 4 **L-T-P-C=3-0-2-4**

Course Objective:

The objective of this subject is to deal with detailed anatomy of the orbit, eyeball and cranial nerves associated with ocular functions.

Course Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Identify** the microscopic structures of various tissues in the eye	**BT 1**
CO 2	**Understand** the basic principles of ocular embryology and the neural connections and distribution.	**BT 2**
CO 3	**Relate** the basic structure and connections between the various parts of the central nervous system and the eye	**BT 3**
CO 4	**Analyse** and correlate the structure with the functions.	**BT 4**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Embryology –ocular Formation of optic vesicle & optic stalk, formation of lens vesicle, formation of optic cup, changes in associated mesoderm, development of various structure of eye ball – retina, optic nerve, crystalline lens, cornea, sclera, choroid, cilliary body, iris, viterous. Development of accessory structures of eyeball – eyelids, lacrimal apparatus, extra-ocular muscles, orbit. Milestones in the development of the eye. Orbit Bony orbit Size, shape & relations, walls of the orbit , Base of the orbit, Apex of orbit. Orbital fascia Fascial bulbi , Fascial sheaths of extraocular muscles, intermuscular septa. Spaces of orbit Orbit fat & reticular tissue - Apertures at the base of orbit- Contents of the orbit - Orbital Nerve oculomotor , Trochler, Abducent, Trigeminal, facial nerves - their functional components, course & distribution, clinically applied aspects.	**11**

2	Cornea□□(a)Layers & peculiarities, (b). Blood supply & nerve supply of cornea. .(c) Corneal Transparency. Lens , Zonules □□(a) Structure. of lens □capsule, Ant. Epithelium, lens fibers (structured & zonal arrangement). (b). Ciliary zonules □structure gross appearance,(c). Arrangement of zonules fibers. Uveal Tract & its vascular supply□(a). Iris macroscopic & microscopic appearance . (b) ciliary body – Macroscopic structure.(c). chloride - Macroscopic structure.(d) Blood supply to uveal structure- short & Long Posterior artery & Anterior Artery. (e). Venous drainage. Vitreous- main masses of vitreous. Base of the vitreous. Hyaloidean vitreous. Vitreous cells. Sclera – Anterior, posterior & middle apertures. Episclera. Sclera proper. Lamina fusca. Blood supply of the sclera. Nerve suply of the sclera. Anterior chamber and its angle- angle of the anterior chamber. Trabecular meshwork. Canal of Schlemm. Schwalbe's line. Drainage of aqueous humor.	**11**
3	Retina & its vascular supply □□(a). Gross anatomy,(b). Microscopic structure of fovea centralize, (c). Blood retinal barrier.(d.) Anatomy of optic nerve, (e). Anatomy of optic nerve, (f.) optic chaisma optic tracts, (g) Lateral Geneculate body, (h). optic radicalism (i). visual cortex, (j). Arrangement of nerve fibers.(K). Blood supply of visual pathways (Arterial circle of willis & its branches). The Ocular motor system □□Extraocular muscles, nerve supply, motor nuclei, supra nuclear motor centers. The pupillary & ciliary muscle □Anatomy of sphincter & Dilator muscle. Ciliary muscle – Anatomy, types The nerve supply of the eye ball. The lachrymal appears □□(a) Lachrymal gland, (b) Palpebral part, (c) Duets of lachrymal gland, (d) structure of the lachrymal gland, (e) Blood supply & nerve supply of the lachrymal gland, (f) lachrymal passages.	**11**

4	Anatomy of the Ocular Adnexa & glands; Lids - a. Structures of the lids: - Skin, Subcutaneous Areolar Layer, Layer of Staiated muscle, Submuscular Areolar Tissue, Fibrous Layer, Conjunctiva.Glands of the Lids- Meibomaian Glands, Glands of Zela and Glands of Moll. Blood Supply of the Lids, Lymphatic Drainage of the Lids, Nerve Supply of the Lids. Conjunctiva - Palpebral Conjunctiva, Bulbar Conjunctiva, Conjunctival Fornix, Microscopic Structure of the conjunctiva- Epithelium, Substantia Propria. Conjunctival Glands Krause's Glands, Wofring's Glands, Henley's Glands, Manz Glands. Blood Supply of the Conjunctiva, Nerve Supply of the Conjunctiva, Caruncle, Plica Semilunaris.	**11**
	TOTAL	**44**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Identification of ocular histology slides.	**7.5**
2	Identification of projection slides of Ocular Anatomy.	**7.5**
3	Identification of structure & related viva.	**7.5**
	TOTAL	**30**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK: AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006

SYLLABUS (2ND SEM)

PAPER/SUBJECT NAME: OCULAR PHYSIOLOGY + OCULAR PHYSIOLOGY **LAB**
SUBJECT CODE: OPT242M202/OPT242M212

COURSE LEVEL: 100

SCHEME OF EVALUATION: (T)

Total credits: 4 **L-T-P-C=3-0-2-4**

Course Objective:

The objective of the subject is to deal with the physiological functions of each part of the eye.

Course Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**explain** the phenomenon of vision, understand the physiological principles underlying pathogenesis and treatment of diseases of the eye.	**BT 1**
CO 2	**Summarize** the normal functioning of all structures of the eye and their interactions	**BT 2**
CO 3	**relate** the physiological aspects of normal growth and development of the eye	**BT 3**
CO 4	**Correlate** the physiological mechanisms of the eye with their corresponding diagnostic tests in ophthalmology.	**BT 4**

Credit Distribution		
Lecture/Tutorial	**Practicum**	**Experiential Learning**
3*20 =60 NCH	0	30NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Identification of ocular histology slides.	**7.5**
2	Identification of projection slides of Ocular Physiology .	**7.5**
3	Identification of structure & related viva.	**7.5**
	TOTAL	**30**

TEXTBOOK:

1. AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006
2. RD Ravindran: Physiology of the eye, Arvind eye hospitals, Pondicherry, 2001
3. PL Kaufman, A Alm: Adler's Physiology of the eye clinical application, 10th edition, Mosby, 2002

SYLLABUS (2ND SEM)

INTERDISCIPLINARY /SUBJECT NAME: Introduction to Indian Knowledge System-II

Course Level: 100

SUBJECT CODE: IKS992K201

SCHEME OF EVALUATION: (T)

Total credits: 3 **L-T-P-C – 3-0-0-3**

SYLLABUS (2ND SEM)

AEC/SUBJECT NAME: Communicative English and Behavioral Science-I
Subject Code: CEN982A201/BHS982A202

Course Level: 100

SUBJECT CODE:

SCHEME OF EVALUATION: (T)

Total credits: 2 **L-T-P-C – 2-0-0-2**

SYLLABUS (2ND SEM)

SEC PAPER/SUBJECT NAME: Optometric Optics +Optometric Optics Lab

SUBJECT CODE: OPT242S201/ OPT242S211

COURSE LEVEL: 100

SCHEME OF EVALUATION: (T + P)

Total credits: 3 **L-T-P-C= 2-0-2-3**

Course Objective:

The objective of the subject is to 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 outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**explain** the outcome from this course is to equip the students with thorough **knowledge** of properties of light.	**BT 1**
CO 2	**interpret** the properties of different lens and mirror, image formation at different focal points.	**BT 2**
CO 3	**applying** the knowledge, students will be able to **categorize** the distribution of light under various conditions.	**BT 3**
CO 4	**analyze** and optimize spectacle lens designs based on principles of light propagation and refraction to correct refractive errors.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	What is light- dual nature- particle & wave nature, speed, wave length & frequency of light. Fermats' principle- laws of relation & refraction at a plane surface using Fermats' principle, Snells' law, relative and absolute refractive indices, total internal reflection and Critical angle, refraction by plane parallel slab of glass.	**11**
2	Geometrical path length & optical path length of rays, Concept of wave fronts & rays, concept of Vergence divergence , convergence. Refraction by spherical surfaces- convex & concave, Derivation of vergence equation, focal points, diopter. power, image point, lateral & axial magnification, simple numerical. Thin Lens- shapes, derivation of lens makers' formula, thin lens vergece equation, equivalent focal length of two thin lenses separated by a distance & placed in contact, lateral magnification of thin lenses in contact, simple numerical, concept of reduced systems, symmetrical eye.	**11**
3	Thick Lens- Cardinal points & planes, front & back vertex power, matrix theory in paraxial Optics to locate positions of cardinal planes. Different types of aberrations & their effects. Prism- Dispersion of prism, reflecting prisms, prisms diopters.	**11**
4	Polarization & Crystal Optics: Concept of polarization , linear , circular , elliptical polarization (qualitatively), Plane of polarization & vibration, degree of polarization, polarizes, analyzers, Production of polarized light, birefringence, calculate crystal , veal prism, Wallaston prism , retarders - full, half & quarter wave plates, analysis of light of unknown Polarization. Linear Scattering- Raleigh & Mce Principles of LASERs, uses of Laser in ophthalmology .	**11**
	TOTAL	**44**

SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Determination of the focal length & hence the power of a convex lens by displacement method..To determine the wavelength of a monochromatic light source with the help of Fresnel's Biprism. To determine the radius of curvature of convex surface of a lens by Newton's ring method.	**7.5**
2	Determination of the refractive index of a transparent liquid by using a travelling microscope. Determination of the refractive index of the material of a convex lens measuring its focal length, using the lens & a plane mirror.To determine Planck's constant using photocell. To study the diffraction through a single slit & to determine its width.	**7.5**
3	Determination of the focal length of a concave mirror by graphical method.To determine the slit width & the separation between the slits of a double slit system from its Fraunhoffer diffraction pattern. Determination of the wavelength of monochromatic light using diffraction grating.	**7.5**
4	To calibrate a Polarimeter & hence to determine the unknown concentration of sugar solution. To determine the wavelength of the Laser source by forming diffraction pattern with transmission grating. Determination of refractive index of the material of a prism by minimum deviation method. To draw curve of a prism by a spectrometer & hence to find out the angle of minimum deviation.	**7.5**
	TOTAL	**30**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXT BOOK:

1. Subrahmanyan N, BrijLal, A text book of Optics, S. Chand Co Ltd, New Delhi, India, 2003.

2. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.
3. Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA

SYLLABUS (2ND SEM)

SUBJECT NAME: VAC
Subject Code:

Course Level: 100

SUBJECT CODE:

SCHEME OF EVALUATION: (T)

Total credits: 3 **L-T-P-C – 3-0-0-3**

SYLLABUS (2nd SEM)

SUBJECT NAME: SWAYAM COURSE
Subject Code:

Course Level: 100

SUBJECT CODE:

SCHEME OF EVALUATION: (T)

Total credits: 3

SYLLABUS (3RD SEM)

PAPER/SUBJECT NAME: OPHTHALMIC & OPTICAL INSTRUMENTATION & PROCEDURE + OPHTHALMIC & OPTICAL INSTRUMENTATION & PROCEDURE LAB

SUBJECT CODE: OPT242M301/OPT242M311

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T + P)

Total credits: 4 **L-T-P-C= 3-0-2-4**

Course Objective:

The objective of this course to cover commonly used optometric instruments, its basic principle, description, and usage in clinical practice.

Course outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**identify** basic ophthalmic instruments and their uses.	**BT 1**
CO 2	**describe** the operating principles of common ophthalmic instruments.	**BT 2**
CO 3	**utilize** basic maintenance procedures on ophthalmic instruments.	**BT 3**
CO 4	**examine** the functionality and application of various ophthalmic and optical instruments, assessing their use in diagnostic and therapeutic procedures to improve patient care.	**BT 4**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Detailed study of the Principles of operation, types, optical properties, constructions, adjustments and applications of the following Instruments and Devices: Binoculars, telescopes and projectors. Simple and Compound Microscopes (with Huygens and Ramsden Eye pieces and oil immersion objectives). Spectrometer. Lensometer Trial case lenses-best forms. Trial frame design. Cross cylinder	**16**
2	Radiuscope Retinoscopes Standard Tests Charts. Devices for color vision testing – CS testing / Glare testing. Ultrasonography – (A scan, B scan) – Principles and application. Autorefractometer- subjective and objective types	**16**
3	Opthalmoscopes- direct and indirect types. Refractometers- Auto refractors, Dioptron Slit lamp Biomicroscope Keratometer Tonometer – Principles, types, clinical importance as a routine procedure (application) Pachometer – Principles, types, clinical importance	**17**
4	F.F.A – Principles and demonstration of film. OCT- Principles and demonstration PAM – Principles and importance. Perimeter – Basics of perimetry – Humphray instruments, Automated perimetry – basics, types(names) , interpretation of normal Glaucoma Field of Definition. LASER – Introduction – Einstein co-efficient, population inversion. Different types of LASER (mention) – Excimer, Lasik Nd-yag, Argon, Diode, He-Ne gas LASER, Xenon. LASER safety, Ophthalmic LASER application(Argon, Yag) **New Advancements in instruments**	**17**
	TOTAL	**66**

SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Determination of the focal length & hence the power of a convex lens by displacement method..To determine the wavelength of a monochromatic light source with the help of Fresnel's Biprism. To determine the radius of curvature of convex surface of a lens by Newton's ring method.	**8**
2	Determination of the refractive index of a transparent liquid by using a travelling microscope. Determination of the refractive index of the material of a convex lens measuring its focal length, using the lens & a plane mirror.To determine Planck's constant using photocell. To study the diffraction through a single slit & to determine its width.	**8**
3	Determination of the focal length of a concave mirror by graphical method.To determine the slit width & the separation between the slits of a double slit system from its Fraunhoffer diffraction pattern. Determination of the wavelength of monochromatic light using diffraction grating.	**7**
4	To calibrate a Polarimeter & hence to determine the unknown concentration of sugar solution. To determine the wavelength of the Laser source by forming diffraction pattern with transmission grating. Determination of refractive index of the material of a prism by minimum deviation method. To draw curve of a prism by a spectrometer & hence to find out the angle of minimum deviation.	**7**
	TOTAL	**30**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
3*22 =66 NCH	2*15= 30 NCH	3*8=24NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

1. Subrahmanyan N, BrijLal, A text book of Optics, S. Chand Co Ltd, New Delhi, India, 2003.

2. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.
3. Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA

SYLLABUS (3RD SEM)

PAPER /SUBJECT NAME: VISUAL OPTICS + LAB **SUBJECT CODE:** **OPT242CM302/**OPT242CM312

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T) **L-T-P-C:3-0-2-4**

Total credits: 4

Course Objective:

The objective of the subject is to deal with the concept of the eye as an optical instrument and thereby cover different optical components of the eye, types of refractive errors, and clinical approaches in the diagnosis, and management of various types of refractive errors.

Course Outcome: Upon completion of the course, the student should be able:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Identify** the fundamentals of the optical components of the eye.	**BT 1**
CO 2	**Acquire** and **integrate** theoretical knowledge and practical skills on visual acuity measurement, objective and subjective clinical refraction.	**BT 4**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Review of Geometrical Optics: From Geometrical Optics. Schematic and reduced eyes and their properties.	**22**
2	Optical constants of the eye and their measurement. Purkinje images. Corneal curvature and thickness. Keratometry and pachometry. Indices of aqueous and vitreous. Optical Defects of the Eye- Shape of Cornea, Shape & RI of the lens, Optical axis, Visual axis (angle alpha, Fixation axis (angle gamma), Aberration of the Optical system of eye, Depth of focus, Diffraction & resolving power	**22**
3	Emmetropia and ametropia, Axial versus spherical ametropia, Myopia Hypermetropia(Hyperopial) Astigmatism.	**22**
4	Accommodation- possible mechanism of accommodation- Schiener disc experiment- theories of accommodation- modern theory- changes in the lens during accommodation- the amplitude of accommodation- the measurement of the amplitude n of accommodation- depth of field, luminance and blur tolerance- amplitude of accommodation versus age. Presbiopia-near vision addition- estimate of addition-unequal near vision addition- effect of changing the spectacle distance – hypermetropia and accommodation.	**22**
	TOTAL	**88**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Identification of lens and the mirror	**7.5**
2	Identification of the projection slides of prism.	**7.5**
3	Identification of structure & related viva.	**7.5**
	TOTAL	**30**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
4*22 =88 NCH	0	4*8=32NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXT BOOK:

1. A H Tunnacliffe: Visual optics, The Association of British Optician, 1987

2. AG Bennett & RB Rabbets: Clinical Visual optics, 3rd edition, Butterworth Heinemann, 1998

SYLLABUS (3RD SEM)

PAPER /SUBJECT NAME: HUMAN VISUAL SYSTEM II **SUBJECT CODE: OPT242M303**

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T)

Total credits: 4 **L-T-P-C= 4-0-0-4**

Course Objective:

The objective of the course is to gain a comprehensive understanding of the eye's structure and function as an optical instrument, focusing on the key components involved in forming clear vision.

Course outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Apply** your understanding of the fundamental optical components of the eye to explain the process of vision	**BT 3**
CO 2	**Analyze** the optical components of the eye and their interactions to categorize and differentiate between various types of refractive errors, proposing appropriate management strategies for each	**BT 4**

SYLLABUS: THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Advanced Optics of the Eye: Review of geometrical optics; Refractive power of the eye; Accommodation mechanism; Photoreceptor function and retinal illumination; Visual illusions and their relationship to eye optics	**22**
2	Refractive Errors: Classification and characteristics of refractive errors; Clinical signs and symptoms of refractive errors; Methods for assessing refractive errors (refraction techniques); Correction of refractive errors (eyeglasses, contact lenses, refractive surgery)	**22**
3	Practical Applications and Instrumentation: Introduction to ophthalmic instruments (phoropter, retinoscope); Hands-on practice with clinical instruments; Interpretation of clinical findings through instrumental assessment	**22**
4	Advanced Topics in Vision: Color vision and its anomalies; Binocular vision and depth perception; Vision in special populations (pediatric, geriatric); Recent advancements and future directions in vision science	**22**
	TOTAL	**88**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
4*22 =88 NCH	0	32NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

4. AK Khurana, Indu Khurana: Anatomy and Physiology of Eye, Second edition, CBS Publishers, New Delhi, 2006
5. Principles & Practice of Refraction, Duke Elder

SYLLABUS (3RD SEM)

INTERDISCIPLINARY /SUBJECT NAME: Introduction to Indian Knowledge System-I

Course Level: 100

SUBJECT CODE: IKS992K301

SCHEME OF EVALUATION: (T)

Total credits: 3 **L-T-P-C – 3-0-0-3**

SYLLABUS (3RD SEM)

AECC/SUBJECT NAME: Communicative English and Behavioral Science-I

Course Level: 100

SUBJECT CODE: CEN982A301/BHS982A302

SCHEME OF EVALUATION: (T)

Total credits: 2 **L-T-P-C – 2-0-0-2**

SYLLABUS (3RD SEM)

SEC PAPER/SUBJECT NAME: MEDICAL PATHOLOGY & MICROBIOLOGY

SUBJECT CODE: OPT242S304

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T) **L-T-P-C:3-0-0-3**

Total credits: 3

Course Objective:

The objective of this subject is to deals with basic biological, biochemical and pathogenic characteristics of pathogenic organisms.

Course Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**understand** basic principles of diagnostic ocular Microbiology, the principles of sterilization and disinfection in hospital and ophthalmic practice;	**BT 2**
CO2	**apply** knowledge of pathophysiological processes and relevant microorganisms to formulate differential diagnoses.	**BT 3**
CO 3	**analyze** the pathogenesis of the diseases caused by the organisms in the human body with particular reference to the eye infections and	**BT 4**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS

1	Bacteria: Cell structure, elementary idea about classification and morphological basis. Staining reactions: Gram staining, spore staining, acid fast staining. Bacterial growth: nutritional requirements, physical factor affecting, culture media, and growth curve. Elementary idea about bactericidal agents: Phenol, alcohol. Sterilization(principles, types & methods). Pasteurization. Antibiotics: Bacteriostatic and bactericidal effects. Virus: elementary knowledge of viral-morphology, viral genome and classification, viral replication. Herpes viruses, hepatitis viruses, miscellaneous viruses, human immunodeficiency viruses.	**16**
2	Microbial growth & death, Laboratory culture, host pathogen interactions, antimicrobial chemotherapy, pathogenic mechanisms common to external ocular infections process – clinical pathology. Physiology, pathology, treatment & epidemiology of infectious diseases caused by bacteria, virus, fungi & parasitic organisms with emphasis to disease with ocular manifestations & infectious eye diseases in hot climate as in India. AIDS & eye.	**16**
3	General Pathology Structure & function of immune system – Structure and function of thymus, spleen & red bone narrow- Immunity & its types , plasma proteins & immune reaction, cells involved in immune system. Humoral immunity theories of antibodies formation. Structure & function of lymph nodes. Structure & function of thymus, spleen & red bone narrow. Non specific immunity, Antibody mediated immunity, specific immunity, cell modified immunity, Active immunity, Passive immunity. The acute inflammatory reaction – changes in acute inflammation, changes in the calibre of the blood vessels, changes in blood flow, changes associated with exudation. Local sequelae of acute inflammation. The chemical mediators of acute	**17**
4	Inflammation & Repair: inflammation. Role of the mast cell in inflammation. Role of the platelets in inflammation. Chronic inflammation – cause, classification, general features. Source of infection. Transmission of organisms to the body. wound infections. Wound healing. Immuno-pathogenesis – type I, II, III & IV hypersensitivity. Mechanism of autoimmunity. Organ specific & non organ specific auto immune disease. The HLA system – histocompatibility complex. Pyogenic & bacterial infection.Gralt rejection-basic outline. Disorder of growth – metaplasia, dysplasia, neoplasia. Circulatory disturbances – thrombosis, infarction, ischemia, embolism. Degeneration (calcification).	**17**
	TOTAL	**66**

SYLLABUS (3rd SEM)
SUBJECT NAME: SWAYAM COURSE **Subject Code:** **Course Level: 100** **SUBJECT CODE:** **SCHEME OF EVALUATION: (T)** **Total credits: 3**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
3*22 =66 NCH	0	24NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

SYLLABUS (4TH SEM)

PAPER/SUBJECT NAME: CLINICAL REFRACTION 1 + CLINICAL REFRACTION LAB

SUBJECT CODE: OPT242M401/ OPT242M411

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T+P) **L-T-P-C:3-0-2-4**

Total credits: 4

Course Objective:

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 Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**apply** understanding of the fundamental optical components of the eye to explain the process of vision	**BT 3**
CO 2	**Analyze** objective vs. subjective refraction, justifying the most suitable method for specific scenarios based on optics and patient factors	**BT 4**

SYLLABUS:THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Ophthalmic Case Historian: Demographic data, chief complaints, secondary complaints, ocular history, medical history, drugs and medications, family ocular history, family medical history, social history, review of system, few example of history writing. 2. Recording Visual Acuity: Distance – Snellens and log MAR. near-points/'M'/RS, use of Baily-lovie word reading chart.	**16**
2	Objective Refraction: Streak Retinoscopy – all procedures to use streak retinoscope; static and dynamic retinoscopy, different methods of dynamic retinoscopy – MEM, Nott's, Sheard's, Low and high neutral, Bells, Cross, Taits. Other methods of retinoscopy-Radical, Near(Mahandra), Chromoretinoscopy, String Lensbar, use of objective and autorefractor.	**16**

3	Subjective Refraction: Monocular Distance – Classic fogging, testing of astigmatism under fog fixed astigmatic dial (clock dial), rotary astigmatic dial, combination of fixed and rotary dial (Fan and Block test), J.C.C. Duochrome or Bichrome, Binocular balancing – alternate occlusion, prism dissociation, dissociated duochrome balance, Borish dissociated fogging, equalization	**17**
4	Binocular Distance – T.I.B. (Turville Infinity Balance), Polarized – Target and polarized filter, fogging. Near subjective refraction. Cycloplegic refraction, cycloidemia, sudden unfogging , Borish delayed spherical end point, pinhole estimation of refractive error, stenopaic slit refraction, measurement of vertex distance, distometer, use of subjective autorefractor. Different methods of measuring amplitude of accommodation. Correction of Presbyopia – Different methods of stimulation of tentative presbyopic addition – amplitude of accommodation, J.C.C., NRA-PRA balance, Bichrome, Plus Build-up, based on age, Dynamic retinoscopy. Occupational consideration, finalization of odd for near and intermediatedifferent options of correction. Measurement of IPD and significance. Final discussion with the patient. Writing prescription of power and counseling	**17**
	TOTAL	**66**

SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	History writing Recording VA	**7**
2	Practice of Streak Retinoscopy Direct Opthalmoscopy-Normal Fundus	**7**
3	Subjective refraction – fogging, clockdial, fan, JCC, prism balance, TIB, duochrome, cyclodeimia, Slit refraction Measurement of amplitude of accommodation.	**8**
4	Presbyopic add Writing prescription	**8**
	TOTAL	**30**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
3*22 =66 NCH	2*15=30NCH	3*8=24NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXT BOOK:

1. Theodore Grosvenor: Primary Care Optometry, 5th edition, Butterworth –Heinemann, 2007
2. David B. Elliot: Clinical Procedures in Primary Eye care, 3rd edition, Butterworth Heinemann, 2007
3. WJ Benjamin: Borish's clinical refraction,2nd edition, Butterworth Heinemann, Missouri, USA,2006

SYLLABUS (4TH SEM)

PAPER/SUBJECT NAME: OPHTHALMIC LENS & DISPENSING OPTICS + OPHTHALMIC LENS & DISPENSING OPTICS LAB **SUBJECT CODE: OPT242M402/ OPT242M412**

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T+ P) **L-T-P-C:3-0-2-4**

Total credits: 4

Course Objective:

The objective of the subject is to deal 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 Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**apply** understanding of lenses, their grinding, and prisms to choose corrective lenses or implement prismatic interventions for specific vision needs	**BT 3**
CO 2	**analyze** various facial shapes & dispense various spectacle lenses, frames. Do final checking of finished spectacle with frame adjustments, troubleshooting complaints, delivery and follow up.	**BT 4**

SYLLABUS: THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Ophthalmic lens: Characteristics of lenses: Introduction. Spherical lenses. Plano-cylindrical lenses. Sphero-cylindrical lenses. Designation of lens power. Power of lenses. Transposition. Write the prescription. Base curve of spherical lens. Base curve of cylindrical single vision lens. Aberration of lens. Prism prescription. Prism effects in a lens. Neutralization. Spectacle lenses: Characteristics of lens materials. Specific gravity (weight). Refractive index. Abbe number. Impact resistance. Scratch resistance.Curve variation factor. Current materials: Crownglass. CR-39. High –index glass. High –index plastic. Poly carbonate. Photochromatic materials. Lens types: Single vision lens. Bi-focal lenses. Tri-focal lenses. Vocational & occupational multifocal progressive lenses.	**16**

2	Introduction of bi-focal lenses: History of bi-focal lenses. Modern bi-focal designs. Types of bi-focal designs. Glass tri-focal lenses. Invisible multi-focal Double segment lens. Plastic bi-focal. 6.Opthalmic lens coating: Anti-reflecting coatings. Special notes concerning anti-reflecting coatings. Protective coating, color coating. Absorptive lenses: Classification of lens tints. Chemical that produces color & assist in absorptive characteristics of glass lenses. Effect in prescription on lens color. Availability of tinted lenses. Impact resistant lenses: Types of impact resistant lenses. Plastic lenses. Impact resistant Dress-Eye wear lenses. Tempered glass lenses. Types of impact resistant lenses most beneficial of specific patients. Lens for special uses: Fresnel lenses. Thinlite lenses. Lenses for the Aphakic patient. Aspheric lenses. Lens surfacing & quality. Principles of lens surface generation. Glass assessment. Faults in lens materials & lens surface. Inspection of lens quality.	**16**

3	Basics of dispensing: Spectacle frame Current frame materials: a) Plastics b) Metals Frame types: a) Combination of frames b) Half-eye frames c) Mounts d) Nylon-cord frame e) Special purpose frames. Frame measurements: a) The boxing system b) The datum system c) Comparison of the two systems d) Lens position e) Segment specification Frame Selection: a) Fashion b) Function c) Feel d) Conflicting needs e) Price f) Standard alignment Lens Selection: a) Ground rule for selection b) Selection criteria Facial Measurement: a) The PD b) Visual axes c) Measuring inter papillary distance d) Using PD ruler e) Common difficulties in measuring PDs f) Measuring monocular PD g) Measuring near PD	**17**

4	Measuring heights: a) Single vision b) Multi focal c) Bi-focal d) Progressive Pediatric Dispensing: a) The changing image of spectacle b) Age differences. Frame Selection a) Technical Criteria b) Fashion criteria c) Some tips on selection Lens Selection Technical criteria a) Communicating with kids. b) The kids corner Facial measurement of the kids a) PDs b) Centers c) Bi-focals Dealing with problems: a) Dealing with clients b) Common client problems c) Dealing with professional colleagues d) Dealing with the laboratories Special needs dispensing: a) Occupational dispensing b) Hazards in the work place c) Occupational health safety legislation d) Common hazards. Eye protection: a) Industrial eye protection b) Sport c) Standards covering eye protection d) Lens materials & impact resistance e) Frame & eye protection.	**17**
	TOTAL	**66**

SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Find out the menidean & optical center of ophthalmic lens Neutralization – manual & help of lensometer Identification of lens-spherical, cylindrical & spheno-cylindrical lenses	**7**

2	Lens-surfacing & edging, cutting & marking of single vision bifocal progressive Frame measurement: The boxing system, the datum system. Comparison of the two systems, Lens position, segment specification	**7**
3	Frame selection: Fashion, function & standard alignment Lens selection : Ground rule for selection, selection criteria	**8**
4	Facial measurements: The PD, Visual axes, & measuring inter-pupillary distance using P.D ruler. Common difficulties in measuring P.D , Measuring monocular P.D, measuring near C.D. Measuring heights :- single vision , bifocal, multifocal, progressive Pediatric dispensing	**8**
	TOTAL	**30**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
3*22 =66 NCH	2*15=30NCH	3*8=24NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

1. Jalie MO: Ophthalmic lens and Dispensing, 3rd edition, Butterworth –Heinemann, 2008
2. Troy E. Fannin, Theodore Grosvenor: Clinical Optics, 2nd edition, Butterworth – Heinemann, 1996
3. C W Brooks, IM Borish: System for Ophthalmic Dispensing, 3rdedition, Butterworth - Heinemann, 2007
4. Michael P Keating: Geometric, Physical & Visual Optics, 2nd edition, Butterworth – Heinemann, 200

SYLLABUS (4TH SEM)

PAPER/SUBJECT NAME: OCULAR DISEASE I (ANTERIOR SEGMENT DISEASE) **SUBJECT CODE: OPT242M403**

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T) **L-T-P-C:4-0-0-4**

Total credits: 4

Course Objective:

The objective of the course is to deal with various ocular diseases affecting various parts of the eyes. It covers clinical signs and symptoms, cause, pathophysiological mechanism, diagnostic approach, differential diagnosis and management aspects of the ocular diseases.

Course Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**apply** knowledge of the different aspects of ocular diseases to interpret clinical signs and symptoms, suggesting potential diagnoses	**BT 3**
CO 2	**analyze** disease conditions and plan proper treatment/management for the patient.	**BT 4**

SYLLABUS:

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Anterior segment ocular diseases involving orbit, eyelids, adnexa, conjunctiva, cornea, urea, sclera, anterior chamber, iris and lens. Symptomatology, clinical signs, diagnosis, pathogenesis, pathophysiology , systemic disease relationships and treatment of degenerative, infections and inflammatory conditions affecting these structures. Disease of the Lids – Congenital Deformities of the Lids .Oedema of the Lids. Inflammatory Conditions of the Lids. Deformities of the Lid Margins. Deranged Movement of the Eyelids. Neoplasm's of the Lids. Injuries of the Lids. Diseases of the Lachrymal Apparatus-. Dry Eye. Disease of the Lachrymal Gland. Disease of the Lachrymal Passages. Operations for Chronic Dacryocystitis.	**22**
2	Disease of the Conjunctiva- Subconjunctival Haemorrhage Infective Conjunctivitis. Follicular Conjunctivitis. Granulomatous Conjunctivitis. Allergic Conjunctivitis. Conjunctivitis Associated with Skin conditions. Degenerative conditions of the Conjunctiva. Vitamin- A Deficiency. Cysts and Tumours of the Conjunctiva. Conjunctival Pigmentation . Injuries of the Conjunctiva. Disease of the Cornea –Congenital Anomalies. Inflammation of the Cornea (Keratitis). Superficial Keratitis. Deep Keratitis. Vascularisation of Cornea. Opacities of the Cornea. Keratoplasty. Corneal Degenerations. Corneal Dystrophy's. Corneal Pigmentation. Corneal Injuries. Refractive Corneal Surgery. Corneal Ulcer (Bacterial , Viral , Fungal)	**22**
3	Disease of the Sclera- Episcleritis. Scleritis. Staphyloma of the Sclera. Blue Sclerotic Scleromalacia Performs. Nanophthalmos. Injuries of the Sclera. Disease of the Iris.-. Congenital Anomalies. Inflammations (Anterior Uveitis) . Specific Types of Iriodocyclitis . Degenerations of the Iris. Cysts and Tumours of the Iris. Injuries of the Iris. Disease of the Celery Body- Inflammations of the Celery Body. Purulent Iriodocyclitis (Panophthalmitis) . Evisceration . Sympathetic Opthalmia. Vogt-Koyanagi – Harada Syndrome. Tumours of the Celery body. Injuries of the Celery body.	**22**

4	Glaucoma- .Formation of Aqueous Humor. Drainage of Aqueous. Intraocular Pressure(IOP) . Ocular Rigidity. Tonography. .Developmental Glaucoma (Buphthalmos) . Primary Narrow Angle Glaucoma. Primary Open Angle Glaucoma. Normotensive Glaucoma . Ocular Hypertension . Secondary Glaucoma. Surgical Procedures for Glaucoma(Steps Only) ,YOGPI ,trabeculectomy.Laser Procedure in Glaucoma . Artificial Drainage Devices in Glaucoma Surgery(Molteno). Disease of the Lens- Congenital Malformations. Cataract . Congenital and Developmental Cataract . Senile Cataract. Traumatic Cataract. Complicated Cataract. Secondary Cataract. After Cataract. Dislocation of the Lens. SurgicalProcedures for Removal of the Lens(Operative Steps Only). Phacoemulsification(ICCE,ECCE,IOL) . Small Incision Cataract Surgery (Manual Phaco).Intraocular Lens Implantation-AC+PC, IOL.	**22**
	TOTAL	**88**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
4*22 =88 NCH	0	4*8=32NCH (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXT BOOK:

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

2. Stephen J. Miller : Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990

3. Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth-Heinemann, 2007

SYLLABUS (4TH SEM)

PAPER/SUBJECT NAME: CLINICAL POSTING **SUBJECT CODE: OPT242M413**

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T) **L-T-P-C:0-0-8-4**

Total credits: 4

SYLLABUS (4TH SEM)

PAPER/SUBJECT NAME: COMMUNICATIVE ENGLISH/BEHAVIOURAL SCIENCE
SUBJECT CODE: CEN982A401/BHS982A402

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T) **L-T-P-C:2-0-0-2**

Total credits: 2

SYLLABUS (4TH SEM)

SUBJECT NAME: SWAYAM COURSE **Subject Code:**

Course Level: 100

SUBJECT CODE:

SCHEME OF EVALUATION: (T)

Total credits: 3

SYLLABUS (5TH SEM)

PAPER /SUBJECT NAME: INTRODUCTION TO CONTACT LENS
SUBJECT CODE: OPT242M501
SCHEME OF EVALUATION: (T)
Total Credits: 04 **L-T-P-C = 4-0-0-4**

Course Objective:

The objective of the subject is to study the concept of contact lens, its benefits, manufacturing and understand briefly about soft contact lens and RGP contact lens.

Course outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**To understand** the history, development, benefits and manufacturing of contact lens.	**BT 1**
CO 2	**To interpret** the optics, classification, vertex distance and FDA classification of contact lens and its materials.	**BT 2**
CO 3	**To determine** the indications and contraindications of contact lens and soft contact lens fitting and assessment.	**BT 3**
CO 4	**To explain** RGP contact lens fitting, assessment, care and maintenance.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Contact lens history & development. Benefits of contact lens over spectacle. Manufacturing methods-spin cast, Lethe cut, Cast modeling. Slit lamp Examination technique Corncal topography- Keratometry & Extended Keratometry	16
2	Contact lens optics-Contact lens & spectacle lens. Back vertex calculation. Contact lens & Tear	16

	lens system. Classification of contact lens & its material (soft & RGP); Material property. Contact lens terminology. RGP & soft lens design. FDA classification of contact lens material.	
3	Patient selection & prescreening. Indications & contra indications of contact lens. Soft spherical contact lens fitting & Assesment. Soft contact lens case & maintenance.	17
4	Spherical RGP contact lens fitting & assessment. RGP contact lens care & maintenance.	17

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

Agarwal S, 2005, Dr. Agarwals' Textbook on Contact Lenses, Jaypee Brothers Medical Publishers.
Sinha R, 2017, Textbook of Contact Lenses, Jaypee Brothers Medical Publishers.

SYLLABUS (5TH SEM)

PAPER /SUBJECT NAME: BINOCULAR VISION & OCULAR MOTILITY
SUBJECT CODE: OPT242M502
SCHEME OF EVALUATION: (T)
Total Credits: 04 **L-T-P-C = 4-0-0-4**

Course Objective:

The objective of the subject is to study the concept of contact lens, its benefits, manufacturing and understand briefly about soft contact lens and RGP contact lens.

Course outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**To understand** the concept of binocular vision, its grades, advantages, theories of binocular vision.	**BT 1**
CO 2	**To interpret** dichoptic stimulation, depth perception and stereopsis.	**BT 2**
CO 3	**To determine** binocular defects, binocular muscular anomalies and binocular muscular coordination.	**BT 3**
CO 4	**To explain** binocular vision tests, eye movements, extra ocular muscles, ocular movements and vergences.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Grades of binocular vision-simultaneous perception (first grade of binocular vision), fusion, stereopsis (third grade of binocular single vision). Advantages of binocular vision. Visual direction and the horopter visual direction, corresponding point and normal retinal correspondence, horopter, physiologic diplopia. Binocular fusion-panum's area, fixation disparity, theories of binocular fusion, synergy hypothesis of panum, local sign hypothesis of hering, eye movement hypothesis of helmholts, suppression hypothesis of du tour and verhoeff, physiologic basis of fusion.	22
2	Dichoptic stimulation-depth with fusion and depth with diplopia, diplopia without depth, retinal rivalry and suppretion, binocular lusure. Stropsis-physiological basis of	22

	stereopsis,local and global stereopsis and fusion, stereopsis acuity neurophysiology of stereopsis. Depth perception-stereopsis, non-stereoscopic clues to the perception of depth under binocular condition, monocular clues (non-stereoscopic clues to spatial orientation)-parallactic movements, linear perspective overiay of contours, size distance from horizon, distribution of highlights, shadow, shades and light, aerial perspective , influence of accommodation and convergence on depth perception, conclusion. Integration of the motor and sensory system into binocular vision.	
3	Binocular defects: Binocular optical defects-anisometropia-vision in anisometropia, treatment, Binocular optical defects-aniseikonia symptoms, clinical investigation, treatment. Binocular muscular co-ordination-orthophoria-binocular vision. Binocular muscular anomalies-heterophoria-the causes of imbalance ,exophoria, esophoria, hyperphoria, cyclophoria, symptoms of heterophoria, treatment. Binocular muscular anomalies-heterotropia—the vision in concomitant strabismus, treatment. Binocular muscular co-ordination-convergence-voluntary and reflex convergence, reflex convergence, the measurement of convergence, the relation between accommodation and convergence, binocular accommodation, fatigue of convergence. Binocular muscular anomalies-anomalies of convergence and other reading difficulties—insufficiency of convergence, convergence excess, the ophthalmologist and the reading ability of children.	22
4	BINOCULAR VISION TEST: Test for simultaneous macular perception, test for fusion, test for stereopsis-synoptophore or stereoscope test, vectograph test, titmus stereo test, random dot stereogram test, simple motor task test based on stereopsis. Eye movements: the orbit anatomy of the extraocular muscles. Interactive dynamics of orbital mechanisms & brain stem neurophysiology – out line of extra ocular muscle control. Extra ocular muscles-their function & nerve supply. Mechanics of actions of extra ocular muscles -cross sectional area of muscle, length of muscle. Arc of contact, muscle plane, Muscle axis of rotation. Physiology of ocular movement – Basic Kinematics, (position of gaze, Fick's axes) Ocular movements - Monocular Movements (Adduction, Abduction, supraduction, Infraduction, Incycloduction, excycloduction). Binocular Movements –VERSIONS- (saccadic & pursuit movement, position maintenance movements, stabilization movements & their characteristics). VERGENCES – (Convergence, divergence, vertical vengeance), Supra nuclear control of eye movements. (the	22

	superior colliculi, the occipital cortex, the psycho optical reflexes & fixation. Oculomotor system: vestibular – ocular reflexes, optokinetic reflexes. Diagnosis & clinical aspects of ocular anomalies & disorders. Converge through a spectacle lens. Prismatic effects in spectacle lenses.	

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

Scheiman M, Wick B, 2013, Clinical Management of Binocular Vision, Lippincott Williams and Wilkins.

SYLLABUS (5TH SEM)

PAPER /SUBJECT NAME: OCULAR DISEASE II **SUBJECT CODE: OPT242M503**
SCHEME OF EVALUATION: (T)
Total Credits: 04 **L-T-P-C =4-0-0-4**

Course Objective:

The objective of the subject is to study the diseases of posterior segment of the eye and understand the clinical features, classification and causes.

Course outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**To understand** the diseases of vitreous humour, retina and optic nerve.	**BT 1**
CO 2	**To interpret** the different optic nerve diseases, its classification, clinical features and causes.	**BT 2**
CO 3	**To determine** the various congenital optic nerve anomalies, nystagmus and subnuclear disorders of eye movements.	**BT 3**
CO 4	**To explain** third nerve palsy, fourth nerve palsy, sixth nerve palsy, neurofibromatosis, ocular myopathies and related disorders.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Diseases of the Vitreous Humor- Congenital Anomalies. Vitreous Opacities. Hereditary Vitreo – Retinal Degeneration's. Vitreous Haemorrhage .Detachment of Vitreous Humor . Vitreous Surgery . Methods of clinically assessing the posterior segment (direct & indirect opthalmoscopy) Disease of the Retina- Congenital & Dev. Defects. Inflammation of the Retina(Retinitis) . Retinal Vasculitis . Oedema of the Retina. Haemorrhage of the Retina. Vascular Occlusion . Retinal Arteriosclerosis. Retinopathies . Retinal Telangiectasis. Degeneration's of the Retina. Detachment of the Retina. Surgical	22

	Procedures for Retinal Detachment .Tumours of the Retina. Phakomatoses,. Injuries of the Retina. Disease of the Optic Nerve- Congenital Anomalies. Papilloedema. Inflammation of the Optic Nerve(Optic-Neuritis). Ischaemic Optic Neuropathy . Optic Atrophy. Tumours of the Optic Nerve. Injuries of the Optic Nerve. Symptomatic Disturbances of Visual Function – Visual Field Defects . Amblyopia. Amaurosis. Night Blindness. Day Blindness. Defects in Color Vision. Congenital Word Blindness. Malingering.	
2	Neuro –eye disease: Evaluation of optic nerve disease Clinical features of optic nerve dysfunction., Optic disc changes. Optic atrophy. Special investigation. Classification of optic neuritis Optic neuritis and demyelination Systemic features of multiple sclerosis, Special investigation. Optic neuritis. Other causes of optic neuritis Parainfectious optic neuritis. Infectious optic neuritis. Non-arteritic anterior ischaemic optic neuropathy Arteritic anterior ischaemic optic neuropathy Clinical features of giant cell arteritis. Special investigation. Arteritic anterior ischaemic optic neuropathy. Leber hereditary optic neuropathy Hereditary optic atrophies Kjer syndrome. Behr syndrome. Wolfram syndrome. Alcohol-tobacco amblyopia Drug-induced optic neuropathies PAPILLOEDEMA Raised intracranial pressure - Causes.Hydrocephalus. Systemic features. Clinical features of papilloedema Differential diagnosis.	22
3	CONGENITAL OPTIC NERVE ANOMALIES Without neurological associations Tilted disc. Optic disc drusen. Optic disc pit. Myelinated nerve fibers. With neurological associations Optic disc coloboma. Morning glory anomaly. Optic nerve hypoplasia. Aicardi syndrome. Miscellaneous anomalies. PUPILLARY REACTION Applied anatomy. Abnormal pupillary reactions Afferent pupillary conduction defects	22

	Argyll robertson pupils Differential dignosis of light-near dissociation Adie pupil oculosympathetic palsy (horner syndrome) NYSTAGMUS Classifications Causes Physiological nystagmus. Motor imbalance nystagmus. Ocular nystagmus. nystagmoid movements. SUPRANUCLEAR DISORDER OF EYE MOVEMENTS Conjugate eye movements Saccadic movements. Smooth pursuit movements. Non-optical reflexes. Supranuclear gaze palsies Horizontal gaze palsies. Vertical gazepalsies.	
4	THIRD NERVE DISEASE Applied anatomy Clinical aspects Clinical features. Aberrant regeneration. Causes isolated third nerve palsy. FOURTH NERVE DISEASE Applied anatomy Clinical aspects Clinical features. Causes of isolated fourth nerve palsy. SIXTH NERVE DISEASE Applied anatomy Clinical aspects Clinical features. Causes. DISORDERS OF CHIASM Classification Applied anatomy Applied physiology Hyperpituitarism. Hypopituitarism. Pituitary adenoma Clinical features. Special investigation. Treatment. Craniopharyngioma Meningioma DISORDERS OF RETROCHIASMAL PATHWAYS AND CORTEX Clinical features of optic tract lesion	22

	Lesions of optic radiations Applied anatomy. clinlcal features. Lesions of striate calcarine cortex Migraine Clinical features Management OCULAR MYOPATHIES AND RELATED DISORDERS Myasthienia gravis Clinical features. Special investigations. Treatment. Ocular myopathies Myotonic dystrophy Systemic features. Ocular features. Essential blepharospasm Clinical features. Treatment. NEUROFIBROMATOSIS Neurofibromatosis type-1(NF-1) Systemic features. Ocular features. Neurofibromatosis type-2(NF-2)	

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

S John, 2019, Kanski's Clinical Ophthalmology, Elsevier.

SYLLABUS (5TH SEM)

PAPER /SUBJECT NAME: BASICS OF LOW VISION
SUBJECT CODE: OPT242M504
SCHEME OF EVALUATION: (T)
Total Credits: 04 **L-T-P-C =4-0-0-4**

Course Objective:

The objective of the subject is to study the definition of low vision, its magnification, grades, assessments, refraction, and low vision prescription.

Course outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**To understand** the definition of low vision, its grades and the relationship between disorder, impairment and handicapped.	**BT 1**
CO 2	**To interpret** the assessment of low vision, contrast sensitivity testing, comprehensive eye examination and medical management of low vision.	**BT 2**
CO 3	**To determine** the optical aids and non-optical aids of low vision.	**BT 3**
CO 4	**To explain** the impact of low vision on mobility, reading, driving, and social interaction.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	**Introduction to Low Vision:** Definition of low vision, Epidemiology and prevalence, Difference between low vision and blindness, Impact on daily living and quality of life . **Causes and Classification of Low Vision:** Common causes of low vision (e.g., age-related macular degeneration, diabetic retinopathy, glaucoma), Classification systems (e.g., WHO classification, ICD-10 coding).	22

2	**Low Vision Assessment:** Visual acuity testing, Visual field assessment, Contrast sensitivity testing, Assessment of visual function and activities of daily living (ADLs), Referral for comprehensive eye examination and medical management.	22
3	**Optical Aids for Low Vision:** Magnification devices (e.g., magnifiers, telescopes), Spectacle-mounted magnifiers, Handheld and stand magnifiers, Electronic magnification aids (e.g., CCTVs) **Non-Optical Aids for Low Vision:** Lighting and contrast enhancement, Environmental modifications, Adaptive techniques and strategies, Orientation and mobility training.	22
4	**Impact of Low Vision:** Effects on mobility, reading, driving, and social interaction, Psychological and emotional impact, Rehabilitation potential and goal setting, Low vision rehabilitation process, Community resources and support groups.	22

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

Textbook:

"Low Vision Rehabilitation: A Practical Guide for Occupational Therapists" by Mitchell Scheiman and Bruce Rosenthal.

SYLLABUS (5TH SEM)

PAPER/SUBJECT NAME: CLINICAL POSTING **SUBJECT CODE: OPT242M511**

COURSE LEVEL: 200

SCHEME OF EVALUATION: (T) **L-T-P-C:0-0-8-4**

Total credits: 4

SYLLABUS (6TH SEM)

PAPER /SUBJECT NAME: SYSTEMIC CONDITION & THE EYE
SUBJECT CODE: OPT242M601
SCHEME OF EVALUATION: (T)
Total Credits: 04 **L-T-P-C = 4-0-0-4**

Course Objective:

The objective of the subject is to study the different systemic diseases, its classification, clinical features, diagnosis, complications, and management.

Course outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**To understand** Diabetes mellitus, Hypertension, Acquired Heart Disease and its pathophysiology, classification, clinical features, diagnosis, complications and management.	**BT 1**
CO 2	**To interpret** the definition, classification and clinical features of malignancy, connective tissue disorder and thyroid disease.	**BT 2**
CO 3	**To determine** the etiology, pathology, clinical features of tuberculosis, tropical diseases, vitamin deficiency and the eye.	**BT 3**
CO 4	**To explain** the neurological disorders and the eye, genetic disorders and phacomatosis.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Arterial Hypertension i) Pathophysiology, classification, clinical examination, diagnosis, complications, management. ii) Hypertension and the eye. Diabetes mellitus i) Pathophysiology, classification, clinical features, diagnosis, complications, management. ii) Diabetes mellitus and the eye. Acquired Heart Disease – Embolism i) Rheumatic heart disease ii) Subacute bacterial endocarditis. iii) Heart disease & the eye	22
2	Malignancy i) Definitions, nomenclature, characteristics of benign & malignant	22

	neoplasms. ii) Grading and staging of cancer, diagnosis, priniples of treatment. iii) Neoplasia and the eye. Connective Tissue Disease i) Anatomy and pathophysiology: Arthritis. ii) Eye and connective tissue disease. Thyroid Disease i) Anatomy and physiology of the thyroid gland. ii) Classification of thyroid disease iii) Diagnosis, complications, clinical features, management of thyroid disease involving eye.	
3	Tuberculosis i) Etiology, pathology, clinical features, pulmonary TB, diagnosis, complications, treatment of tuberculosis involving the eye. Tropical Disease and the Eye i) Leprosy. ii) Syphilis. iii) Malaria. Vitamin deficiency and the eye	22
4	Neurological disease and the eye i) Classification of neurological diseases. ii) Demyelinating diseases iii) Visual pathway lesions iv) Papiloedema. Genetic disorders and the eye. Phacomatoses & the eye	22

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

S Pramod, 2017, Medical Surgical Nursing Systemic Disease, Jaypee Brothers Medical Publishers.

SYLLABUS (6TH SEM)

PAPER /SUBJECT NAME: LAW & OPTOMETRY+OCCUPATIONAL OPTOMETRY
SUBJECT CODE: OPT242M602
SCHEME OF EVALUATION: (T)
Total Credits: 04 **L-T-P-C = 4-0-0-4**

Course Objective:

The objective of the subject is to study the concepts of occupational health and safety, occupational eye diseases and injuries, laws governing medical and paramedical professionals, optometry code of conduct and ethics.

Course outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**To understand** the concept of occupational health and safety, its objectives, ILO convention on occupational safety and health.	**BT 1**
CO 2	**To interpret** occupational eye diseases and injuries, causes, clinical features, treatment, and management.	**BT 2**
CO 3	**To determine** the laws governing medical and paramedical professions and consumer act.	**BT 3**
CO 4	**To explain** the concept of optometry code of conduct, ethics and ethical issues in optometry practice.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	**Introduction to Occupational Health:** Definition, Concept of occupational health, Safety, Hazard, Objectives of occupational health, ILO convention on occupational safety and health.	22
2	**Occupational eye diseases:** Occupational eye diseases and injuries, causes, clinical features, treatment, and management.	22
3	**Introduction to Law & Optometry:** Laws governing medical and paramedical professions, consumer act with respect to optometry and dispensing of optical aids, partnership and alternatives.	22
4	**Optometry Code of Conduct:** Definition, Concept, Ethics, Negligence, ethical issues in optometry practice.	22

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

SK Haldar, 2023, Industrial and Occupational Health, CBS Publishers & Distributors Pvt Ltd.

SYLLABUS (6TH SEM)

PAPER /SUBJECT NAME: APPLIED OPTOMETRY & ORTHOPTICS + LAB
SUBJECT CODE: OPT242M603/OPT242M611
SCHEME OF EVALUATION: (T+P)
Total Credits: 04 **L-T-P-C = 3-0-2-4**

Course Objective:

The objective of the subject is to study the different orthoptic instruments, procedures, management and treatment.

Course outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**To understand** the different orthoptic instruments.	**BT 1**
CO 2	**To interpret** the procedures, Assessment of degree of squint, ocular motality status, binocular single vision and types of squint.	**BT 2**
CO 3	**To determine** the orthoptic treatment procedure and management.	**BT 3**
CO 4	**To explain** the definition, neuropathology, classification, clinical features, treatment of Amblyopia.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	ORTHOPTIC INSTRUMENTS Prism Bar Synoptophore Maddox Wing Maddox Rod Red Green Goggles Hess Screen Risley Prisms	**11**
2	Investigative procedures Motor signs in squint A) Head position: Face turn, chin position, Head tilt. B) Cover test & cover-uncover tests C) Maddox wing to assess heterophoria.	**11**

	Assessment of degree of squint a) Hirschbag test. b) Prism bar test. c) Krimskey test d) Synoptophore test Assessment of ocular motality status a) Hess chart b) Diplopia testing c) Bielschowskys Head tilting test Assessment of visual sensory status in squint. Amblyopia Suppression Binocular single vision – SMP, Fusion, Stereopsis. Mechanisms leading to squint Types of squint – a) latent / manifest b) horizontal / vertical c) paralytic / concomitant	
3	Orthoptic Treatment Procedures Management of – Convergence insufficiency Amblyopia Suppresion ARC Use of prism - For Exercise & correction	**11**
4	AMBLYOPIA Definition. Neuropathology. Classification. Clinical Features. Treatment. a) Occlusion. b) Penalisation. c) Role of drugs	**11**
	TOTAL	**44**
PRACTICAL		
MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Demonstration of following Orthoptic instruments/methods and their uses – Prism Bar Synoptophore Maddox Wing Maddox Rod Red Green Goggles RAF Gauge	**7.5**
2	Cover test Hirschberg test Krimsky test	**7.5**

	Diplopia charting Visuoscopy Accommodative flipper	
3	Orthoptic Investigative & Therapeutic Procedure	**7.5**
4	Case records AND Case Handling	**7.5**
	TOTAL	**30**

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

TEXTBOOK:

AK Khurana, 2018, Theory and Practice of Squint and Orthoptics, CBS Publishers and Distributors.

SYLLABUS (6TH SEM)

PAPER /SUBJECT NAME: CONTACT LENS II + LAB
SUBJECT CODE: OPT242M604/OPT242M612

SCHEME OF EVALUATION: (T+P) **L-T-P-C: 3-0-2-4**
Total credits: 4

Course Objective: The subject provides the student with suitable knowledge both in theoretical and practical aspects of Contact Lenses.

Course Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	Understand the basics of contact lenses & finalise the CL design for various kinds patients Recognize various types of fitting & explain all the procedures to patient	**BT 2**
CO2	Identify and manage the adverse effects of contact lens	**BT 3**
CO 3	List the important properties of contact lenses	**BT 4**

DETAILED SYLLABUS: THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Contact lens fitting in astigmatism. Contact lens fitting in keratokonus. Contact lens fitting in children. RGP lenses – low D.K. and high D.K. lenses.	**9**
2	Instructions regarding handling and care of lenses. Cosmetic and prosthetic contact lenses. Extended wear lenses versus Daily wear Disposable lenses	**9**
3	Contact lens – Toric, Bifocal, Multifocal. Therapeutic lenses / Bandage lenses. Contact lens solutions – principle of action, compositions Ordering contact lenses – writing prescription to the lab.	**9**
4	Contact lens – modifications of finished lenses (RGP). Checking the parameters. Recent advances in contact lenses.	**9**

	Follow up examinations Contact lens complications and their management. Prosthetic eye fitting procedures & conformers.	
	TOTAL	**36**

DETAILED SYLLABUS: PRACTICAL

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Fitting and assessment of contact lenses – steep, flat, optimum on spherical cornea	**3**
2	Fitting and assessment of contact lenses – steep, flat, optimum on toric cornea with spherical lenses.	**3**
3	Fitting and assessment of contact lenses – steep, flat, optimum on toric cornea with toric lenses.	**3**
4	Teaching the patient to insert and remove contact lenses. Writing Contact Lens prescriptions	**3**
	TOTAL	**12**

TEXTBOOK:

Agarwal S, 2005, Dr. Agarwals' Textbook on Contact Lenses, Jaypee Brothers Medical Publishers.

Sinha R, 2017, Textbook of Contact Lenses, Jaypee Brothers Medical Publishers.

SYLLABUS (6TH SEM)

PAPER /SUBJECT NAME: LOW VISION AIDS & VISUAL REHABILITATION + LOW VISION AIDS & VISUAL REHABILITATION LAB
SUBJECT CODE: OPT242M605/OPT242M613
SCHEME OF EVALUATION: (T)
Total Credits: 04 **L-T-P-C =3-0-2-4**

Course Objective:

The objective of the subject is to study the definition of low vision, its magnification, grades, assessments, refraction, and low vision prescription.

Course outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**To understand** the Components of low vision evaluation, Contrast sensitivity and color vision assessment, Importance of patient history and counseling.	**BT 1**
CO 2	**To interpret** the Principles and goals of visual rehabilitation and training in using low vision aids.	**BT 2**
CO 3	**To determine** the resources and support services of low vision.	**BT 3**
CO 4	**To explain** the prescription and fitting of low vision aids.	**BT 4**

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	**Low Vision Assessment:** Components of a low vision evaluation, Visual acuity and visual field testing, Contrast sensitivity and color vision assessment, Importance of patient history and counseling.	16
2	**Visual Rehabilitation:** Principles and goals of visual rehabilitation, Training in using low vision aids, Strategies for improving visual skills: Scanning and visual search techniques, Eccentric viewing, Lighting and glare management; Importance of self-advocacy and independent living skills	16
3	**Resources and Support Services:** Government programs and community resources for individuals with low vision, Support groups and peer counseling, Assistive technology training and support centers, Ethical considerations	17

	in low vision care, Role of optometrists, ophthalmologists, occupational therapists, and orientation and mobility specialists, Team-based approach to assessment and intervention planning, Communication and coordination among healthcare professionals.	
4	**Prescribing and Fitting Low Vision Aids:** Prescription guidelines and calculations, Demonstration and trial of aids, Adjustment and customization of aids, Follow-up and troubleshooting, Aids prescription based on different anomalies. **Visual Rehabilitation Training:** Techniques for using optical aids effectively, Developing compensatory strategies for specific tasks, Orientation and mobility training, Psychosocial support and adjustment counseling, Counseling of low vision patient/ parents/ guardians/relatives.	17

Credit Distribution		
Lecture/ Tutorial	**Practicum**	**Experiential Learning**
2*22 =44 NCH	2*15= 30 NCH	2*8=16nch (Assignments, Quizzes, Seminar, Case Study, Discussion)

Textbook:

"Low Vision Rehabilitation: A Practical Guide for Occupational Therapists" by Mitchell Scheiman and Bruce Rosenthal.

SYLLABUS (7TH SEM)	
PAPER /SUBJECT NAME: PEDIATRIC CLINIC SPECIALITY AND GERIATRIC CLINIC SPECIALITY **SUBJECT CODE: OPT242M711** **SCHEME OF EVALUATION: (P)**	
Total Credits: 4	**L-T-P-C=0-0-8-4**

Course Objective:

To provide hands-on clinical exposure to students in core optometric departments, enabling them to apply theoretical knowledge and diagnostic skills in real patient care environments.

Course Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO1	Demonstrate effective communication skills for counseling patients and caregivers	BT 3
CO2	Evaluate ocular disorders in pediatric and geriatric patients using age-appropriate diagnostic tools.	BT 4
CO3	Design individualized treatment plans for refractive errors, amblyopia, and age-related eye diseases	BT 5

SYLLABUS: THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Pediatric Optometry: Vision development, amblyopia, strabismus, and learning-related vision issues	**15**

2	Geriatric Optometry: Cataracts, ARMD, glaucoma, diabetic retinopathy, and low vision rehabilitation	**15**
3	Clinical Skills: Case history taking, specialized tests (e.g., retinoscopy for children, Amsler grid for elderly)	**15**
4	Ethical & Communication Skills: Counseling patients/caregivers, interdisciplinary referrals	**15**
	TOTAL	**60**

SYLLABUS (7TH SEM)	
PAPER /SUBJECT NAME: LOW VISION SPECIALITY **SUBJECT CODE: OPT242M712** **SCHEME OF EVALUATION: (P)**	
Total Credits: 4	**L-T-P-C=0-0-8-4**

Course Objective:

To provide hands-on clinical exposure to students in core optometric departments, enabling them to apply theoretical knowledge and diagnostic skills in real patient care environments.

Course Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO1	Analyze visual function data to classify low vision severity.	BT 4
CO2	Appraise patient outcomes post-rehabilitation	BT 5
CO3	Create rehabilitation plans using optical/non-optical aids.	BT 6

SYLLABUS: THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Introduction to Low Vision: Causes, classifications, and impact on daily life	**15**
2	Assessment Techniques: Visual acuity, visual fields, and contrast sensitivity testing	**15**
3	Low Vision Aids: Optical/non-optical devices, assistive technologies	**15**
4	Rehabilitation Strategies: Orientation/mobility training, patient counseling	**15**
	TOTAL	**60**

SYLLABUS (7TH SEM)	
PAPER/SUBJECT NAME: CONTACT LENS SPECIALITY **SUBJECT CODE: OPT242M713** **SCHEME OF EVALUATION: (P)**	
Total Credits: 4	**L-T-P-C=0-0-8-4**

Course Objective:

To provide hands-on clinical exposure to students in core optometric departments, enabling them to apply theoretical knowledge and diagnostic skills in real patient care environments.

Course Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO1	Apply fitting principles for soft, rigid, and specialty lenses.	BT 3
CO2	Diagnose contact lens-related complications (e.g., dry eye,	BT 4

	infections).	
CO3	Design patient education protocols for lens hygiene.	BT 6

SYLLABUS: THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Basics of Contact Lenses: Materials, designs, and indications/contraindications	**15**
2	Clinical Fitting: Corneal topography, tear film assessment, trial lens fitting	**15**
3	Complications & Management: GPC, microbial keratitis, and solution allergies	**15**
4	Specialty Lenses: Scleral, hybrid, and ortho-k lenses	**15**
	TOTAL	**60**

SYLLABUS (7TH SEM)	
PAPER/SUBJECT NAME: BINOCULAR VISION SPECIALITY **SUBJECT CODE: OPT242M714** **SCHEME OF EVALUATION: (P)**	
Total Credits: 4	**L-T-P-C=0-0-8-4**

Course Objective:

To provide hands-on clinical exposure to students in core optometric departments, enabling them to apply theoretical knowledge and diagnostic skills in real patient care environments.

Course Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO1	Interpret diagnostic tests (cover test, AC/A ratio) for binocular vision disorders.	BT 4
CO2	Assess therapy outcomes using evidence-based criteria.	BT 5
CO3	Develop vision therapy programs for strabismus/amblyopia.	BT 6

SYLLABUS: THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Binocular Vision Basics: Fusion, stereopsis, and suppression	**15**
2	Assessment: NPC, vergence testing, accommodative facility	**15**
3	Disorders & Management: Strabismus, amblyopia, and diplopia	**15**
4	Vision Therapy: Exercises, prism adaptation, and patient compliance	**15**
	TOTAL	**60**

SYLLABUS (8TH SEM)	
PAPER/SUBJECT NAME: CLINICAL EVALUATION **SUBJECT CODE: OPT242M811** **SCHEME OF EVALUATION: (P)**	
Total Credits: 6	**L-T-P-C=0-0-6-12**

Course Objective:

To deepen the student's clinical expertise by involving them in advanced optometric care including specialty clinics and interdisciplinary eye care approaches.

Course Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO1	Correlate ocular findings with systemic diseases (e.g., diabetes).	BT 4
CO2	Integrate advanced diagnostic tools (OCT, visual fields) into clinical practice.	BT 5
CO3	Formulate comprehensive management plans	BT 6

SYLLABUS: THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Advanced Diagnostics: Electrophysiology, advanced imaging techniques	**30**
2	Systemic & Ocular Disease Correlation	**30**
3	Case Presentation & Documentation	**30**

	TOTAL	**90**

SYLLABUS (8TH SEM)	
PAPER/SUBJECT NAME: COMPREHENSIVE CLINICAL OPTOMETRY **SUBJECT CODE: OPT242M812** **SCHEME OF EVALUATION: (P)** **Total Credits: 6**	**L-T-P-C=0-0-6-12**

Course Objective:

To deepen the student's clinical expertise by involving them in advanced optometric care including specialty clinics and interdisciplinary eye care approaches.

Course Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO1	Respond to ocular emergencies (trauma, infections).	BT 3
CO2	Collaborate with healthcare teams for patient-centered care.	BT 5
CO3	Synthesize knowledge to manage complex multi-specialty cases.	BT 6

SYLLABUS: THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Integrated Case Management	**30**
2	Emergency Optometry	**30**

3	Interprofessional Collaboration	**30**
	TOTAL	**90**

SYLLABUS (8TH SEM)	
PAPER/SUBJECT NAME: PROJECT DISSERTATION **SUBJECT CODE: OPT242M813** **SCHEME OF EVALUATION: (P)**	
Total Credits: 12	**L-T-P-C=0-0-12-24**

Course Objective:

To deepen the student's clinical expertise by involving them in advanced optometric care including specialty clinics and interdisciplinary eye care approaches.

Course Outcome:

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO1	Respond to ocular emergencies (trauma, infections).	BT 3
CO2	Collaborate with healthcare teams for patient-centered care.	BT 5
CO3	Synthesize knowledge to manage complex multi-specialty cases.	BT 6

SYLLABUS: THEORY

MODULE	TOPICS & COURSE CONTENT	PERIODS
1	Research Methodology & Proposal Writing	**60**

2	Data Collection & Analysis	**60**
3	Dissertation Submission & Viva	**60**
	TOTAL	**180**