RAMAIAH UNIVERSITY OF APPLIED SCIENCES

M.S. Ramaiah University of Applied Sciences

Programme Structure and Course Details

Of

MS Ophthalmology 2022 onwards

M.S. Ramaiah University of Applied Sciences

Ramaiah Medical College

Registrar
M.S.Ramaiah University of Applied Sciences
Bangalore - 560 054

Dean - Academics
M.S. Ramaiah University of Applied Sciences

Shalini

Principal and Dean
M.S. Ramaiah Medical College and Hospital
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RAMAIAH UNIVERSITY OF APPLIED SCIENCES

M.S. Ramaiah University of Applied Sciences

Programme Specifications

MS Ophthalmology Programme 2022 onwards

Programme Code: MD147

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Ramaiah Medical College

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University's Vision, Mission and Objectives

The M. S. Ramaiah University of Applied Sciences (MSRUAS) will focus on student-centric professional education and motivates its staff and students to contribute significantly to the growth of technology, science, economy and society through their imaginative, creative and innovative pursuits. Hence, the University has articulated the following vision and objectives.

Vision

MSRUAS aspires to be the premier university of choice in Asia for student centric professional education and services with a strong focus on applied research whilst maintaining the highest academic and ethical standards in a creative and innovative environment

Mission

Our purpose is the creation and dissemination of knowledge. We are committed to creativity, innovation and excellence in our teaching and research. We value integrity, quality and teamwork in all our endeavors. We inspire critical thinking, personal development and a passion for lifelonglearning. We serve the technical, scientific and economic needs of our Society.

Objectives

1. To disseminate knowledge and skills through instructions, teaching, training, seminars,workshops and symposia in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and SocialSciences to equip students and scholars to meet the needs of industries, business and society
2. To generate knowledge through research in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences to meet the challenges that arise in industry, business and society
3. To promote health, human well-being and provide holistic healthcare
4. To provide technical and scientific solutions to real life problems posed by industry, business and society in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences
5. To instill the spirit of entrepreneurship in our youth to help create more career opportunitiesin the society by incubating and nurturing technology product ideas and supporting technology backed business
6. To identify and nurture leadership skills in students and help in the development of our future leaders to enrich the society we live in
7. To develop partnership with universities, industries, businesses, research establishments, NGOs, international organizations, governmental organizations in India and abroad to enrichthe experiences of faculties and students through research and developmental programmes

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9/20

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Programme Specifications: MS Ophthalmology

Faculty	Ramaiah Medical College
Department	Ophthalmology
Programme	MS Ophthalmology
Programme Code	MS147
Dean of Faculty	Dr Shalini C Nooyi
Head of the Department	Dr. S. Ananth Bhandary

1. **Title of the Award:** MS in Ophthalmology
2. **Mode of Study:** Full-Time
3. **Awarding Institution /Body:** M. S. Ramaiah University of Applied Sciences, Bengaluru
4. **Joint Award:** Not Applicable
5. **Teaching Institution:** Ramaiah Medical College
6. **Date of Programme Specifications:** September 2022
7. **Date of Programme approval by the academic Council of MSRUAS :** 27th September 2022
8. **Programme Approving Regulating Body and Date of Approval:** National Medical Council of India
9. **Rationale for the Programme**

The purpose of PG education is to create specialists who would provide high quality healthcare and advance the cause of science of oncology through research & training. Oncology is a highly specialized and technical discipline in clinical medicine comprising treatment with ionizing radiations and cytotoxic agents as major arms in non-surgical management and treatment of cancer. With a view to update, by inclusion of newer topics, and to provide a uniform syllabus and course contents in Indian universities and teaching medical institutions, the proposed guidelines provide course outlines based on recent developments in clinical medicine and other disciplines related to oncology.

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Programme objectives (PO) for MS Ophthalmology Postgraduate students

At the end of the program the postgraduate students should

PO1. Develop the knowledge, skills and attitude to be a competent Ophthalmologist (C, P).

PO2. Demonstrate a commitment to excellence and continuous professional development with integrity, compassion and sensitivity to patient care. (A)

PO3. Acquire and develop the knowledge, skills and attitude required to be a competent and ethical researcher and teacher. (A, C, P)

PO4. Be able to independently diagnose common ophthalmological disorders, perform refraction and common ophthalmological procedures with a reasonable degree of professionalism and competence. (C,P)

10.Programme specific outcome (PSO) for MS Ophthalmology Postgraduate students

PSO1 -Demonstrate the ability to diagnose and treat all common ophthalmological disorders. (C, A, P)

PSO2- Demonstrate the ability to perform common ophthalmological procedures with appropriate counselling of patients (C, A,P)

PSO3 - Organise proper promotive and preventive care strategies in the community aimed at reducing the burden of preventive and treatable blindness (C, A, P).

PSO4 - Plan and conduct research related to the topic(C)

PSO5 - Demonstrate the ability to organise teaching / training sessions for students and health workers in topics related to prevention and treatment of common ocular disorders.. (P)

Note: A- Affective Domain, C- Cognitive Domain & P- Psychomotor Domain

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Course-PO-PSO Mapping

Course Code and name	Program Objectives				Program Specific Outcomes				
	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5
MSC509A Basic Sciences related to Ophthalmology, Refraction and Optics	3	3	2	3	3	3	2	3	1
MSC510A Clinical Ophthalmology	3	3	2	3	3	3	3	3	1
MSC511A Systemic Diseases in Relation to Ophthalmology	3	3	2	2	3	3	3	3	1
MSC512A Recent Advances in Ophthalmology and Community Ophthalmology	2	2	3	2	1	3	3	2	2
MSP503A Thesis – Ophthalmology			3					3	

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Approved by the Academic Council at its 27th meeting held on 27 September 2022

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10. Regulations:

(A) Attendance, Progress and Conduct

1. A candidate pursuing degree course should work in the concerned department of the institution for the full period as a full time student. No candidate is permitted to run or work in clinic/laboratory/nursing home while studying postgraduate course. No candidate shall join any other course of study or appear for any other examination conducted by this university or any other university in India or abroad during the period of study.
2. Each year shall be taken as a unit for the purpose of calculating attendance. Attendance of 80% every term is mandatory for appearing in the final university examination.
3. Every student shall attend symposia, seminars, conferences, journal review meetings, grand rounds, CPC, case presentation, clinics and lectures during each year as prescribed by the department and not absent himself / herself from work without valid reasons.
4. Every candidate is required to attend a minimum of 80% of the training during each academic term of the post graduate course. Provided further, leave of any kind shall not be counted as part of academic term without prejudice to minimum 80% attendance of training period every term.
5. Any student who fails to complete the course in the manner stated above shall not be permitted to appear for the University Examinations.

(B) Monitoring of progress of Studies

1. Work diary / Log Book - Every candidate shall maintain a work diary and record of his/her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. as per the model checklists and logbook specimen copy.
2. Special mention may be made of the presentations by the candidate as well as details of clinical or planning procedures, if any conducted by the candidate. The work diary shall be scrutinized and certified by the Head of the Department and Head of the Institution, and presented in the university practical/clinical examination.
3. Procedure for defaulters: There will be a committee constituted by all teachers to review such situations. The defaulting candidate is counselled by the guide and head of the department. In extreme cases of default, the departmental committee may recommend that defaulting candidate will be withheld from appearing the examination, if she/he fails to fulfil the requirements in spite of being given adequate chances to set himself or herself right.
4. Each student has 3 months DRP postings as per NMC.

11. <u>Teaching Learning Methods:</u>

This being a highly dedicated PG specialty introducing several new concepts/subjects in the course, it is recommended to divide the entire course into two components consisting of First Year of BASIC CONCEPTS OF THE SPECIALTY and the next two years of INTENSIVE CLINICAL TRAINING IN THE SPECIALTY.

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Didactic lectures are of least importance; seminars, journal clubs, symposia, reviews, and guest lectures should get priority for acquiring theoretical knowledge. Bedside teaching, grand rounds, interactive group discussions and clinical demonstrations should be the hallmark of clinical/practical learning. Students should have hands-on training in performing various procedures and ability to interpret results of various tests/investigations.

Exposure to newer specialized diagnostic/therapeutic procedures should be given. Importance should be attached to ward rounds especially in conjunction with emergency admissions. Supervision of work in outpatient department should cover the whole range of work in the unit. It is particularly necessary to attend sub-specialty and symptom specific clinics. The development of independent skills is an important facet of postgraduate training. Joint meetings with physician colleagues, e.g. radiologists and pathologists play a valuable part in training.

The training techniques and approach should be based on principles of adult learning. It should provide opportunities initially for practicing skills in controlled or simulated situations. Repetitions would be necessary to become competent or proficient in a particular skill. The mo realistic the learning situation, the more effective will be the learning.

Clinical training should include measures for assessing competence in skills being taught and providing feedback on progress towards a satisfactory standard of performance. Time must be available for academic work and audit. The following is a rough guideline to various teaching/learning activities that may be employed:

1. Skills training
2. Conferences, Seminars, Continuing Medical Education (CME) Programmes.
3. Journal Club
4. Research Presentation and review of research work.
5. A postgraduate student of a postgraduate degree course in broad specialties would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.
6. Participation in workshops, conferences and presentation of papers etc.
7. Maintenance of records. Log books should be maintained to record the work done which shal be checked and assessed periodically by the faculty members imparting the training.
8. Postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
9. Department should encourage e-learning activities.

12. Innovative teaching learning practices

1. Theme based teaching learning activities eg..Cervical cancer for a full month.

2. Focused discussion during journal club inculcates culture in the areas of research and publication

4. FacultyLectureduring4th week: Helps in bridging the gap between what is presented during the month and what is not about particular topic. Also it reinforces learning

13. Assessment:

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only also helps teachers to evaluate students, but also students to evaluate themselves. The monitoring will be done by the staff of the department based on

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participation of students in various teaching/learning activities.

1. Formative assessment during 4th week of every month to include methods like pedagogy, chart analysis, histopathology report analysis, Viva, standardized patients, MCQs, Open book exams, OSCE will be done. Impact: SWOT analysis can be done and timely counselling can be done.

2. Theory paper covering Radiation physics and Radiobiology at the end of 1st year. FA at the end of second year will be on common cancers such as Head and neck, breast and cervical cancer. Mock SA will be conducted in the same pattern as university exams one month before the final exams.

3. Teaching skills: Candidates are encouraged to teach undergraduate medical students and paramedical students, if any. In addition, the second year student acts as a mentor for the immediate junior in all aspects of the course.

4. Pedagogy as a tool in formative assessment helps the student to be a better teacher.

Scheme of Examination:

A. Theory (Written Paper) 400 marks

There shall be four question papers, each of three hours' duration. Each paper shall consist of 10 short essay questions each carrying 10 marks. Total marks for each paper will be 100. Questions on recent advances may be asked in any or all the papers. Details of distribution of topics for each paper will be as follows.

Name of the course	Course Code	Topics	Marks
Basic Sciences related to Ophthalmology, Refraction and Optics	MSC509A	Basic Sciences Anatomy of the eye & orbit Ocular Physiology Ophthalmic pathology, Microbiology & Immunology Biochemistry Relevant Ophthalmology Ocular Pharmacology Geometric and ophthalmic opticsDisorders of Refraction Ophthalmic genetics Investigative ophthalmology	100
Clinical Ophthalmology-anterior segment and adnexae	MSC510A	Disorders of the Orbit, Disorders of the Lids, Disorders of the Lacrimal system Disorders of the Sclera and episclera Disorders of the Cornea and ocular surface disordersDisorders of the Conjunctiva Disorders of the Lens, Glaucoma	100
Clinical Ophthalmology-posterior segment, strabismus and neuro-ophthalmology Systemic Ophthalmology	MSC511A	Disorders of the Retina Disorders of the Uvea and Immune ocular Disorders Intraocular tumours Strabismus and Amblyopia Neuroophthalmology Paediatric ophthalmology Systemic ophthalmology	100

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Recent Advances in Ophthalmology and Community Ophthalmology	MSC512A	Community ophthalmology Surgical Ophthalmology Injuries of eye and orbit Recent advances	100
Thesis – Ophthalmology	MSP503A	Approval six months before examination	

A. Clinical:200marks

One long case of 80 and three short cases of 40 each.

B. Viva Voce:100 marks

1) Viva-Voce Examination:(80Marks)

All examiners will conduct viva-voce conjointly on candidate's comprehension, analytical approach, expression and interpretation of data. It includes all components of course contents. In addition, candidates may be also be given case reports, OCT reports, gross specimens, pathology slide, Instruments, Perimetery reports X-rays, ultrasound, CT scan images for interpretation. It includes discussion on dissertation also.

2) Pedagogy Exercise:(20Marks)

A topic be given to each candidate in the beginning of clinical examination. He/she is asked to make a presentation on the topic for 8-10 minutes.

C. Total Marks Distribution:

Maximum marks for M.D degree course	Theory	Practical	Viva	Grand Total
	400	200	100	700

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Annexures

Annexure 1_ Competency list
Annexure 2_Overall course plan year-wise
Annexure 3_Sample of monthly schedules
Annexure 4_PG outside posting policy
Annexure 5_Logbook entry
Annexure 6_Students appraisal form

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Annexure 1

Basic Sciences Competencies			
Sl.No	Competencies	Level of competency K- Knows KH-Knows HowS-Shows P- Performs	Assessment
1	Attain understanding of the structure and function of the eye and its parts inhealth and disease.	K	Essay, MCQ
2	Attain understanding and application of knowledge of the structure and function of the parts of Central Nervous System and other parts of the body with influence or control on the structure and function of the eye.	K	Essay, SAQ
3	Attain understanding of and develop competence in executing common general laboratory procedures of Pathology, Biochemistry and microbiologyemployed in diagnosis and research in Ophthalmology	KH, S, P	Demonstration, WPBA, DOPS
4	Be able to Interpret the diagnosis in correlation with the clinical data and routine materials received in such case	KH, P	Mini CEX
5	To demonstrate the knowledge of the pharmacological (includingtoxic) aspects of drugs used in ophthalmic practice and drugs commonly used in general diseases affecting the eyes	KH	Essay, SAQ,MCQ
6	Describe Immunology with particular reference to ocular immunology	K	Essay, SAQ,MCQ
7	Describe the Pattern of inheritance and Genetic Variation of oculardisorders. And apply the knowledge of Gene testing, genetic counselling and gene therapy in cases required.	K, KH	SAQ, MCQ, Viva Voce.

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Optics and Refraction

Optics and Refraction Competencies			
Sl No	**Competencies**	**Level of competency** K-Knows KH-Knows How S- Shows P- Performs	**Assessment**
1	Describe the principles and concepts of Physical optics and apply them in the clinical practice. 1. Properties of light a. Electromagnetic spectrum b. Wave theory c. Photon-particle theory 2. Diffraction 3. Interference and coherence 4. Resolution 5. Polarization 6. Scattering 7. Transmission and absorption 8. Photometry 9. Lasers 10. Illumination 11. Image quality 12. Brightness and radiance 13. Light propagation – Optical media and refractive index.	K,KH	Essay, SAQ, Viva Voce.
2	Describe the principles and concepts of Geometric optics and apply them in the clinical practice. 1. Reflection 2. Refraction 3. Spherical Lenses 4. Astigmatic Lenses(Sphero-cylinder lenses, Cross-cylinders-Jacksoncross-cylinder, Maddoxrod, Toriclenses, Conoid of Sturm) 5. Prisms 6. Notation of lenses(Spectacleprescribing,Transposition) 7. Identification of unknown lenses(Neutralization,Focimeter,Geneva lensmeasure) 8. Aberrations of lenses(Correction of aberrations, Duochrome test) 9. Lens materials	K,KH	Essay, SAQ, Viva Voce.

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3	Describe the principles and concepts of clinical optics of eye and apply them in theclinical practice. 1. Optics of the eye 2. Transmittance of light by the optic media 3. Schematic and reduced eye 4. Pupillary response and its effect on the resolution of the optical system(Styles–Crawford effect) 5. Visual acuity a. Distance- and near-acuity measurement b. Minimal (visible, perceptible, separable, legible) c. Vernier acuity 6. Contrast sensitivity 7. Catoptric images 8. Emmetropia 9. Accommodation 10. Purkinje shift 11. Pinhole	KH,SH,P	Essay, SAQ, Viva Voce.
4	Describe the principle and concepts of instruments and tests in clinical refraction.	KH,SH,P	DOPS,WPBA
5	Identify the principles and indications for retinoscopy, Demonstrate the technique of retinoscopy and perform an integrated refraction based upon retinoscopic results. 1. Retinoscopy 2. Subjective refraction 3. Measurement of BVD 4. Muscle balance tests 5. Accommodative power 6. Measurement of interpupillary distance (IPD) 7. Decentration of lenses and prismatic effect 8. Best form lens 9. Prescribing multifocal lenses 10. Prescribing for children 11. Cycloplegic refraction.	KH,SH,P	DOPS,WPBA
6	Acquire competence in assessment of refractive errors and prescription ofSpectacles and Contact lenses for all types of refraction problems 1. Ametropia a. Myopia b. Hypermetropia (hyperopia) c. Astigmatism d. Anisometropia e. Aniseikonia (Knapp's rule) f. Aphakia g. Optical parameters affecting retinal image size	KH,SH,P	Essay,SAQ,Viva Voce, Mini CEX,CaseDiscussion,WPBA

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	2. Refractive errors a. Prevalence b. Inheritance c. Changes with age 3. Correction of ametropia Spectacle lenses a. CLs b. IOLs c. Principles of refractive surgery 4. Accommodative problems Insufficiency-Presbyopia		
7	Acquire basic knowledge of manufacture and fitting of glasses and competence ofjudging the accuracy and defects of the dispensed glasses	KH,SH	DOPS,WPBA

Cornea,Conjuctiva& Sclera Competencies			
Sl. No.	Competency	Level of competency K-Knows KH- Knows howSH-Shows how P- Performs	Assessment
(1)	ANATOMY		
1	Describe the basic anatomy, embryology, physiology, pathology, microbiology, immunology,genetics, epidemiology, and pharmacology of the cornea, conjunctiva, sclera	KH	Theory/ written assessment MCQ
2	Describe congenital abnormalities of the cornea, sclera, and globe (e.g., Peter"s anomaly,microphthalmos, birth trauma, and buphthalmos)	KH	Theory/ written assessment MCQ
3	Describe the more complex congenital abnormalities of the cornea, sclera, and globe (e.g., hamartomas and choristomas)	KH	Theory/ written assessment MCQ
(2)	CORNEA		
1	Describe characteristic corneal and conjunctival degenerations (e.g., pterygium, pinguecula,senile plaques of the sclera, keratoconus)	KH	Theory/ written assessment MCQ
2	Recognize the common corneal dystrophies and degenerations (e.g., map-dot-fingerprint dystrophy, Meesmann dystrophy, Reis-Bucklers dystrophy, Francois syndrome, Schnyder"s crystalline dystrophy, congenital hereditary stromal dystrophy, lattice dystrophy, granular dystrophy, macular dystrophy, congenital hereditary endothelial dystrophy, Fuchs" dystrophy, posterior polymorphous dystrophy, Salzmann"s degeneration)	KH	Theory/written assessment MCQ Clinical testing by supervision With logbook

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3	Recognize the common corneal inflammations and infections (e.g., herpes simplex, herpes zoster, syphilis, interstitial keratitis	KH	Clinical testing by supervision With logbook
4	Understand the fundamentals of corneal optics and refraction (e.g., keratoconus)	KH	Theory/written assessment MCQ Clinical testing by supervision With logbook
5	Know eye banking procedures, donor selection, corneal storage	KH, S	Demonstration
6	Perform basic nonlaser refractive surgery techniques (e.g., relaxing keratotomy)	KH	Theory/written assessment MCQ Clinical testing by supervision With logbook
7	Describe, recognize, evaluate, and treat peripheral corneal thinning (e.g., inflammatory,degenerative, Dellen related, infectious, immunologic)	KH, S	Clinical testing by supervision With logbook
8	Recognize and treat less common corneal or conjunctival presentations of degenerations (e.g.,inflamed, atypical, or recurrent pterygium, band keratopathy)	KH	Theory/written assessment MCQ Clinical testing by supervision With logbook
9	Describe the differential diagnosis, evaluation, and management of Thygeson"s superficialpunctuate keratopathy	KH	Theory/written assessment MCQ Clinical testing by supervision With logbook
10	Understand more complex corneal optics and refraction (e.g., irregular astigmatism)	KH, S	Clinical testing by supervision With logbook
11	Describe more complex ocular microbiology and describe the differential diagnosis of more complicated corneal and conjunctival infections (e.g., complex, mixed, or atypical bacterial, fungal, Acanthamoeba, viral, or parasitic keratitis)	KH	Theory/written assessment MCQ Seminar
12	Describe differential diagnosis, evaluation, and treatment of interstitial keratitis (e.g., syphilis,viral diseases, non-infectious, immunologic, inflammation)	KH, S	Theory/written assessment MCQ Clinical testing by supervision With logbook
13	Perform more advanced techniques, including keratometry, keratoscopy, endothelial cell countand evaluation, specular microscopy, and pachymetry Perform more complex lid laceration repair	KH, S	Theory/written assessment MCQ Demonstration
14	Perform stromal micro puncture		Clinical testing by supervision With logbook

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15	Perform application of corneal glue	P	Clinical testing by supervision With logbook
16	Assist in more complex corneal surgery (e.g., penetrating keratoplasty and phototherapeutickeratectomy)	KH, P	Theory/written assessment MCQ Clinical testing by supervision With logbook
17	Recognize and treat corneal lacerations (perforating and nonperforating)	KH, S	Clinical testing bysupervision With logbook
18	Describe and treat corneal and conjunctival FBs	KH, P	Clinical testing bysupervision With logbook
19	Diagnose and treat severe corneal exposure (e.g., lubrication, temporary tarsorrhaphy)	KH, P	Clinical testing bysupervision With logbook
20	Perform and interpret the most advanced corneal techniques (e.g., pachymetry, endothelialmicroscopy, computerized corneal topography)	KH, S	Theory/writtenassessment MCQ Seminar Clinical testing bysupervision With logbook
21	Understand and perform specialized and complicated CL fitting (e.g., postkeratoplasty)	KH, S	Theory/writtenassessment MCQ Demonstration
22	Perform more complex corneal surgery (e.g., penetrating or lamellar keratoplasty,keratorefractive procedures, and phototherapeutic keratectomy)	KH	Theory/writtenassessment MCQ Clinical testing bysupervision With logbook
23	Recognize and treat recurrent corneal erosions	KH, S	Theory/writtenassessment MCQ
24	Recognize and treat complex corneal lacerations (e.g., lacerations extending beyond the limbus)	KH	Clinical testing bysupervision With logbook
25	Diagnose and treat the most severe corneal exposure cases (e.g., conjunctival flap)	KH	Clinical testing bysupervision With logbook
26	Understand ocular surface transplantation, including conjunctival autograft/flap, amnioticmembrane transplantation, and limbal stem cell transplantation	KH	Clinical testing bysupervision With logbook
27	Understand the surgical indications (e.g., Fuchs" dystrophy, aphakic/pseudophakic bullous keratopathy), surgical techniques, and recognition and management of postoperative complications (especially immunologically mediated rejection) of corneal transplantation (e.g., penetrating, lamellar)	KH	Theory/written assessment MCQ
28	Evalaute and manage a patient with Dry eyes.	KH.P	Theory/writtenassessment MC Seminar

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29	Describe the clinical features, pathology, evaluation, and treatment of ocular cicatricial pemphigoid	KH	Theory/writtenassessment MCQ
30	Recognize, evaluate, and treat the ocular complications of severe diseases, such as chronicexposure keratopathy, contact dermatitis, and Stevens–Johnson syndrome	KH, S	Theory/writtenassessment MCQ Clinical testing bysupervision With logbook
31	Describe the epidemiology, clinical features, pathology, evaluation, and treatment of peripheralcorneal thinning or ulceration (e.g., Terrien"s marginal degeneration, Mooren"s ulcer, rheumatoid arthritis related corneal melt).	KH, S	Theory/writtenassessment MCQ Clinical testing bysupervision With logbook
32	Describe the features, diagnose and treat (or refer) Vitamin A deficiency (e.g., Bitot"s spot, dryeye, slowed dark adaptation) and neurotrophic corneal diseases	KH	Theory/writtenassessment MCQ
33	Perform techniques of sampling for viral, bacterial, fungal, and protozoal ocular infections (e.g.,corneal scraping and appropriate culture techniques)	KH, P	Theory/writtenassessment MCQ
34	Perform and interpret simple stains of the cornea and conjunctiva (e.g., culture techniques,culture media, Gram stain, Giemsa stain, calcofluor –white, acid fast)	KH, P	Theory/writtenassessment MCQ
35	Manage corneal epithelial defects (e.g., pressure patching and bandage CLs)	P	Theory/writtenassessment MCQ Demonstration
36	Recognize corneal lacerations (perforating and nonperforating), pterygium that may requiresurgery, and corneal and conjunctival FBs	KH, S	Theory/writtenassessment MCQ Clinical testing bysupervision With logbook
37	Diagnose and treat corneal exposure (e.g., lubrication, temporary tarsorrhaphy)	KH, P	Theory/writtenassessment MCQ
38	Perform manual superficial or lamellar keratectomy	KH	Clinical testing bysupervision With logbook
39	Perform more complex corneal laceration repair (e.g., stellate –perforating laceration)	KH	Clinical testing bysupervision With logbook
40	Assist lamellar corneal procedures	KH, P	Theory/writtenassessment MCQ
41	Assist collagen cross linking. Describe the most complex and less common congenital abnormalities of the cornea, sclera, and globe (e.g., cornea plana, keratoglobus)	KH, S	Theory/written assessment
42	Recognize common and uncommon corneal and conjunctival neoplasms, dystrophies, anddegenerations (e.g., lattice dystrophy)	KH	Theory/writtenassessment MCQ
43	Understand the most complex corneal optics and refraction (e.g., postkeratoplasty	KH, S	Theory/writtenassessment MCQ

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44	Perform an isolated corneal laceration repair (e.g., linear laceration not extending to limbus)	KH, S	Clinical testing bysupervision With logbook
45	Describe the etiologies and treatment of superficial punctuate keratitis (e.g., dry eye, Thygeson"ssuperficial punctuate keratopathy), blepharitis, toxicity, ultraviolet photokeratopathy, contact lens[CL] related)	KH	Theory/writtenassessment MCQ
46	Describe the symptoms and signs, testing and evaluation for, and treatment of exposurekeratopathy and dry eye (e.g., Schirmer test)	KH, S	Theory/writtenassessment MCQ Demonstration
47	Administer topical anaesthesia, as well as special topical stains of the cornea (e.g., fluoresceindye and rose Bengal	KH, P	Theory/writtenassessment MCQ Demonstration
(3)	CONJUCTIVA		
1	Recognize the basic presentations of ocular allergy (e.g., phlyctenules, seasonal hay fever, vernalconjunctivitis, allergic and atopic conjunctivitis, giant papillary conjunctivitis)	KH	Clinical testing bysupervision With logbook
2	Recognize common conjunctival neoplasms (e.g., benign, malignant tumours)	KH	Clinical testing by supervision With logbook
3	Describe the epidemiology, differential diagnosis, evaluation, and management of Bitot"s spots	KH	Theory/written assessment MCQ
4	Describe more complex differential diagnosis of the "red eye" (e.g., autoimmune andinflammatory disorders causing scleritis, episcleritis, conjunctivitis, orbital cellulitis)	KH	Theory/written assessment MCQ
5	Recognize and treat large, recurrent, or atypical pterygium that may require surgery	KH, P	Clinical testing by supervision With logbook
6	Recognize, evaluate, and treat chronic conjunctivitis (e.g., Chlamydia, trachoma, molluscumcontagiosum, Parinaud"s oculoglandular syndrome, ocular rosacea)	KH, S	Theory/written assessment MCQ
7	Describe the basic differential diagnosis of acute and chronic conjunctivitis or "red eye" (e.g.,scleritis, episcleritis, conjunctivitis, orbital cellulitis, and gonococcal and chlamydial conjunctivitis)	KH	Theory/written assessment MCQ
8	Perform more complex pterygium excision, including conjunctival grafting	P	Clinical testing by supervision With logbook
9	Describe the most complex differential diagnosis of the "red eye" (e.g., pemphigoid, pemphigus,Stevens–Johnson syndrome)	KH	Theory/written assessment MCQ
10	Perform other complex conjunctival surgery (e.g., autograft, stem cell transplant)	KH	Theory/writtenassessme MCQ

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11	Manage and treat more complex neoplasms of the conjunctiva (e.g., carcinoma, melanoma).	KH	Theory/written assessment MCQ Semin Clinical testing bysuper vision With logbook
12	Perform removal of a conjunctival or corneal FB (e.g., rust ring)	P	Demonstration
13	Perform primary pterygium excision	P	Clinical testing by supervision With logbook
14	Describe less common and rare ocular infections and describe the differential diagnosis of the most complicated corneal and conjunctival infections (e.g., amoebas, leishmaniasis, nematodes)	KH	Theory/written assessment MCQ
15	Perform a thin conjunctival flap (e.g., Gunderson flap)	P	Clinical testing by supervision With logbook
4)	**Sclera**		
1	Evaluate and manage a patient with Episcleritis and Scleritis	KH,P	Theory/written assessment MCQ ,Clinicaltesting by supervision With logbook
2	Describe the etiopathogenesis and management of Staphylomas	KH	Theory/written assessment MCQ
3	Evaluate and Manage a patient of scleral melt	KH, S	Clinical testing by supervision With logbook

(5)	**ANTERIOR SEGMENT**		
1	Describe the differential diagnosis and the external manifestations of more complex anteriorsegment inflammation (e.g., acute and chronic iritis with and without systemic disease)	KH	Theory/writtenassessment MCQ
2	Recognize and treat FB, animal, and plant substance injuries	KH, S	Theory/writtenassessment MCQ Clinical testing bysupervision With logbook
3	Recognize and treat more complex hyphemas (e.g., surgical indications)	KH, S	Clinical testing bysupervision With logbook
4	Describe the basic mechanisms of traumatic and toxic injury to the anterior segment (e.g., alkaliburn, lid laceration, orbital fracture)	KH	Theory/writtenassessment MCQ

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5	Understand the mechanisms of ocular immunology and recognize the external manifestations ofanterior segment inflammation (e.g., red eye associated with acute and chronic iritis)	KH	Theory/writtenassessment MCQ
6	Recognize and describe the treatment for a chemical burn (e.g., types of agents, medicaltherapy)	KH, S	Theory/writtenassessment MCQ
7	Recognize and describe the etiologies of hyphema and microhyphema	KH	Theory/writtenassessment MCQ
8	Recognize the anterior segment manifestations of systemic diseases (e.g., Wilson"s disease) and pharmacologic effects (e.g., amiodarone vortex keratopathy)	KH	assessment MCQ
9	Recognize, list the differential diagnosis, and evaluate aniridia and other developmental anteriorsegment abnormalities (e.g., Axenfeld–Rieger and Peter"s anomalies and related syndromes)	KH	Theory/writtenassessment MCQ
10	Recognize and treat pyogenic granuloma.	KH, S	Clinical testing bysupervision With logbook
11	Perform external examination (illuminated and magnified) and slit lamp biomicroscopy,including drawing of anterior segment findings	KH, P	Theory/writtenassessment MCQ Demonstration
12	Treat hyphema and microhyphema (e.g., the complications of increased intraocular pressure andrebleeding).	KH, S	Clinical testing bysupervision With logbook
13	Diagnose and treat the most complex traumatic and toxic injuries to the anterior segment (e.g.,total lid avulsion, severe alkali burn)	KH, S	Clinical testing bysupervision With logbook
14	Describe the differential diagnosis and the external manifestations of the most complex oruncommon anterior segment inflammations (e.g., syphilitic keratouveitis)	KH, S	Theory/writtenassessment MCQ

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Contact lenses and its application Competencies

Sl.No.	Competency	Level of competency KH- Knows HowS- Shows P- Performs	Assessment
1	Perform a basic CL history and examination and be aware of additional basic tests and questions that are required for CL patients with more complex needs 3 4.	P	Theory/written assessmentMCQ
2	Perform the techniques of retinoscopy, refraction, andover refraction in the routine CL patient	P	Clinical testing bysupervision With logbook Demonstrat
3	Describe the optics of the soft CL (SCL) and hard CL (e.g., rigid gas permeable [RGP] CL), base curve changes,the lacrimal lens, and the optic zone	KH	Theory/written assessment MCQ
4	Describe conversion of a spectacle prescription (Rx) to aCL Rx, including method of converting from plus to minus cylinder	KH, S	Theory/written assessment MCQ Seminar
5	Describe basic CL design, using appropriate terminology	KH	Theory/written assessment MCQ
6	Describe techniques for and perform basic CL fitting	KH, P	Theory/written assessment MCQ Seminar
7	Describe selection of CL candidates with noncomplexneeds	KH	Theory/written assessment MCQ
8	Use auxiliary CL instruments and tests (e.g., trial set, fluoresce in testing)	KH, S	Theory/written assessment MCQ Demonstration
9	Perform CL verification for vision correction, fit, and comfort	KH, S	Theory/written assessment MCQ Demonstration
10	Describe contraindications for CL use	KH	Theory/written assessment MCQ
11	Describe fundamentals of ophthalmic optics in CL management (e.g., CL choices, techniques for fitting individuals)	KH, S	Theory/written assessment MCQ
12	List the indications for CLs in noncomplex cases and Describe CL choices and techniques for fitting individuals with noncomplex CL needs.	KH	Theory/written assessment MCQ

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13	Perform techniques to verify and inspect CLs	P	Theory/written assessment MCQ Demonstration
14	Utilize appropriate teaching skills to instruct patients in the safe insertion, removal, and care of CLs	KH, S	Demonstration
15	Technical skills 1. Perform advanced retinoscopy techniques in a CL patient	KH, P	Theory/written assessment MCQ Demonstration
16	2. Perform advanced refraction techniques in a CLpatient, including diagnostic fitting	KH, P	Theory/written assessment MCQ Demonstration
17	Perform techniques to verify and inspect CLs	KH, P	Theory/written assessment MCQ Demonstration
18	Utilize appropriate teaching skills to instruct patients in the safe insertion, removal, and care of CLs	KH, S	Demonstration
19	Perform a more advanced CL history and examination, employing additional tests and questions appropriate for patients with more complex CL needs (e.g., keratoconus, difficult CL fittings)	KH, P	Clinical testing bysupervision With logbook
20	Describe the more advanced optics of the SCLs and hard CLs (e.g., RGP CL), base curve changes, the lacrimal lens, and the optic zone)	KH, S	Clinical testing bysupervision With logbook

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21	Describe more advanced CL design (e.g., special lensesand special CL shapes or materials	KH	Theory/written assessment MCQ
22	Describe and perform more advanced CL fitting (e.g., postkeratoplasty)	KH, P	Theory/written assessment MCQ Demonstration
23	Use auxiliary CL instruments in patients with more complex needs (e.g., postsurgical topography)	KH, S	Theory/written assessment MCQ Demonstration
24	Perform CL verification for vision, fit, and comfort in therapeutic CL cases	KH, S	Theory/written assessment MCQ Demonstration
25	Describe more advanced concepts of ophthalmic optics inCL and indications for more advanced CL(e.g., therapeutic lenses)	KH, S	Theory/written assessment MCQ Seminar
26	Perform more advanced retinoscopy and refraction techniques in a CL patient including diagnostic fitting 3.	KH, P	Theory/written assessment MCQ Demonstration
27	Perform advanced techniques to verify and inspect CLs in patients with complex CL needs (e.g., keratoconus, CL in children, active corneal disease)	KH, P	Theory/written assessment MCQ Demonstration
28	Perform appropriate CL selection (e.g., material selection,CL modification)	P	Theory/written assessment MCQ
29	Perform corneal topography to fit CLs	P	Demonstration
30	1. Perform the most advanced techniques in CL history and examination and understand what additional tests and questions are needed during the most complex CL examination (e.g., postkeratoplasty, multiple surgery, post refractive, complex keratoconus fitting, active corneal disease)	KH, P	Theory/written assessment MCQ Demonstration
31	Perform retinoscopy and refraction in the CL patient withthe most complex needs (e.g., keratoglobus, keratoconus, following open globe repair [e.g., corneal laceration] ormultiple keratoplasty)	KH, P	Theory/written assessment MCQ Demonstration
32	Describe the most advanced optics and applications of SCLs and hard CLs (e.g., piggyback CL)	KH, S	Theory/written assessmentMCQ Seminar
33	Describe the most advanced CL design, using appropriateterminology (e.g., special fittings, special lenses for difficult-to-fit patients	KH, S	Theory/written assessmentMCQ Seminar

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34	Describe indications for and perform the most advancedCL fitting (e.g., post multiple keratoplasty or traumatic corneal repair)	KH	Theory/written assessmentMCQ
35	Describe indications for and apply the most complex CL in special circumstances or for candidates presenting increased level of difficulty (e.g., postsurgical patients, children)	KH	Theory/written assessment MCQ
36	Use the auxiliary CL instruments in patients with the most complex needs (e.g., topography, fluorescein testing, diagnostic lenses).	KH, S	Theory/written assessment MCQ Demonstration
37	Describe the differences among CL material choices	KH	Theory/written assessmentMCQ
38	Describe methods of modifying a CL to improve comfort,vision, or physiological response.	KH	Theory/written assessmentMCQ
39	Evaluate and manage CL -induced complications	KH, S	Theory/written assessmentMCQ Clinical testing bysupervision With logbook
40	Perform and interpret corneal topography in CL fitting	P	Theory/written assessmentMCQ Demonstration
41	Perform CL modification in complex cases and Select the appropriate CL in more complex cases	KH, P	Theory/written assessmentMCQ

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Cataract and Lens

Disorders of the Lens

Sl. no.	Competencies: At the end of three years of residence, thepost-graduate student should be able to	Level of competer K- Knows KH- Knows how SH- Show P- Perforr	Assessment
1.	Elicit detailed and relevant clinical history in a patient with abnormalities of the lens including lens opacities, subluxation/dislocations or abnormalities of lens shape and size	P	Mini-CEX Case-based discussions OSCE
2.	Perform a detailed and relevant ocular examination and record the findings in a patient with abnormalities of the lens including lens opacities, subluxation/dislocations or abnormalities of lens shape andsize	P	DOPS
3.	Prescribe optical correction to obtain best-corrected vision in a case of cataract before considering surgery	P	DOPS
4.	Counsel a patient with cataract to choose the appropriate type ofintraocular lens (IOL)	P	Mini-CEX
5.	Estimate the IOL power in a case of cataract in an emmetropic eye and in special situations (too long eyes, too short eyes, paediatric eyes, post-LASIK eyes, aphakic eyes, and others)	P	DOPS
6.	Evaluate preoperatively and interpret relevant systemic diseases in a caseof cataract or other lens disorders	P	DOPS
7.	Perform and interpret preoperative evaluation for relevant extraocular conditions in a case of cataract (blepharitis, dacryocystitis, dry eyes and others)	P	DOPS
8.	Perform and interpret preoperative evaluation of relevant ocular conditions in a case of cataract (astigmatism, glaucoma, uveitis, retinaldisorders and others)	P	DOPS
9.	Perform preoperative systemic evaluation/investigations of syndromic cataracts with associated ocular (as in Peter"s syndrome) and systemic abnormalities (as in congenital rubella syndrome)	P	DOPS

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10.	Counsel a patient with cataract undergoing surgery about visual prognosis including guarded/poor visual prognosis	P	Mini-CEX
11.	Counsel a patient with cataract regarding different types of cataract surgeries	P	Mini-CEX
12.	Perform various techniques of anesthesia for cataract surgery (e.g.,topical, peribulbar, retrobulbar, sub-Tenon"s)	P	DOPS
13.	Perform patient preparation for cataract surgery (Small incision cataract surgery and phacoemulsification) including dilatation of pupils, systemic workup, ocular workup, biometry, physician and anesthetist referrals whenever applicable.	P	DOPS
14.	Perform surgical steps of extracapsular cataract extraction- Small Incision Cataract Surgery including wound construction, anterior capsulotomy, use of and removal of viscoelastics, nucleus delivery, cortical cleanup, IOL implantation and wound closure	P	DOPS
15.	Perform surgical steps of extracapsular cataract extraction-Phacoemulsification including wound construction, anterior capsulorrhexis, instillation of and removal of viscoelastics, phacoemulsification techniques (e.g., sculpting, divide and conquer, phaco chop), irrigation and aspiration, cortical cleanup, foldable IOLimplantation.	SH/P	DOPS
16.	Perform the surgical steps of IOL implantation including rigid andfoldable	P	DOPS
17.	Evaluate a child with cataract and prepare for pediatric cataract surgery including timing of surgery, evaluation, choice of IOL, additional steps like primary posterior capsulotomy and primary anterior vitrectomy and amblyopia management	SH	OSCE Case-based discussion
18.	Perform Nd:YAG laser posterior capsulotomy	SH/P	DOPSOSCE
19.	Evaluate and prepare a case for clear lens extraction	SH	OSCE Case-based discussion
20.	Recognise, evaluate and manage per-operative complications like posterior capsular tears, vitreous prolapse, intravitreal dislocation of cataractous fragments, choroidal effusions, iris prolapse, hyphema, Descemet"s membrane detachment, wound-related problems and others	SH	OSCE Case-based discussion
21.	Perform post-operative management of a case of cataract including post-operative general instructions, medications, follow-up, refraction, glass prescription, visual rehabilitation, etc.	P	DOPSOSCE Case-based discussion
22.	Recognise, evaluate and manage per-operative complications (intraocular pressure elevation, corneal edema, wound leak, hyphema, endophthalmitis, cystoid macular edema, retinal detachment, IOL dislocation, posterior capsular opacification, and others)	SH	OSCE Case-based discussion

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23.	Recognize and refer or treat postoperative complications of cataract surgery (e.g. endophthalmitis, elevated intraocular pressure, cystoid macular edema, wound leak, uveitis).	SH	OSCE Case-based discussion
24.	Communicate with the patient about per-operative complications and the impact on vision/eye and counsel.		Mini-CEX
25.	Evaluate and manage a case for combined surgeries (cataract withglaucoma, keratoplasty, etc)	SH	OSCE Case-based discussion
26.	Evaluate and manage a case of cataract for astigmatic correction through appropriate choice of incisions	SH	OSCE Case-based discussion
27.	Assist a case of cataract surgery by preparing the cataract set, sterilization of instruments, preparation of OT table and laying of instruments including priming of phacoemulsification unit and managing the parameters		DOPSOSCE
28.	Perform basic steps of cataract surgery (e.g., incision, wound closure) in the practice laboratory		DOPS
29.	Administer and document informed consent for cataract surgery		Mini-CEX
30.	Perform the aseptic steps, gloving and gowning, preparation and draping, and other preoperative preparation including donning and doffing in bio-hazardous situations)		DOPS Mini-CEX
31.	Perform repositioning, removal, or exchange of IOLs	SH	OSCE Case-based discussion
32.	Assist in the teaching and supervision of junior residents	P	DOPS
33.	Perform tasks as per government and hospital regulations that apply to cataract surgery OT list preparation, OT checklists, case sheet and OT procedure documentation, billing and others.	P	DOPS

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Refractive surgeries Competencies

Sl.	Competency	Level of competencyK- Knows KH- Knows how SH- Shows how Performs	Assessment
1.	Elicit detailed and relevant clinical history in a patientposted for corneal refractive surgery	P	Mini-CEX Case-based discussions OSCE
2.	Perform a detailed and relevant ocular examination and record the findings in a patient posted for cornealrefractive surgery		DOPS
3.	Counsel a patient posted for corneal refractive surgery including the choice of procedure, alternative options, indications, contraindications, postoperative care, etc.		Mini-CEX
4.	Perform preoperative evaluation, interpret and recordthe results of investigations in a case posted for corneal refractive surgery.		DOPSOSCE Case-baseddiscussion
5.	Perform preoperative ocular evaluation and interpret the investigations in a case of keratoconus posted for collagen cross linkage/ intracorneal ring segments		DOPSOSCE Case-baseddiscussion
6.	Perform, interpret and record the findings of relevant investigations in a case posted for corneal refractive surgery including corneal topography, AS-OCT, pachymetry, orbscan, keratometry, aberrometry and others		DOPSOSCE Case-baseddiscussion
7.	Perform steps of surgical management of a case posted for refractive surgical techniques, including keratotomy (radial, astigmatic, limbal relaxing incisions), photoablation (photorefractive, phototherapeutic, LASIK), corneal wedge resection, thermokeratoplasty, intracorneal rings, and others.	SH	OSCE Case-baseddiscussion
8.	Perform preoperative assessment and interpret the findings of the investigations in a patient posted forlens-based refractive surgical techniques like phakicintraocular lens (IOL) and clear lens extraction.		DOPS
9	Demonstrate the process of consent and counselling of patients undergoing refractive procedures (corneal and lens-based)		Min-CEX

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10.	Identify, evaluate and manage intraoperative complications in corneal refractive surgery	SH	OSCE
11.	Identify, evaluate and manage postoperative complications in case of corneal refractive surgery	SH	OSCE
12.	Identify and manage intraoperative complications inlens-based refractive surgery	SH	OSCE
13.	Identify and manage postoperative complications inlens-based refractive surgery	SH	OSCE

Glaucoma

Sl No	Competencies	Level of competency KH= Knows HowS= Shows P= Performs	Assessment
1	Describe the anatomy of the anterior chamber,angle and ciliary body.	KH	SAQ
2	Describe the anatomy of the optic nerve head (ONH) and Retinal nerve fiber layer(RNFL).	KH	SAQ
3	Describe the mechanism and dynamics of aqueous humour inflow and outflow and factors influencingIOP.	KH	SAQ
4	Describe the pathogenesis of glaucoma	KH	SAQ
5	Describe the apoptotic mechanism of retinalganglion cell death in glaucoma	KH	SAQ
6	Elicit relevant history and identify the clinical signs and symptoms of glaucoma.	S	Mini-CEX OSCE
7	Perform basic slit lamp bio microscopy for a glaucoma patient	P	OSCE Mini-CEX
8	Describe tonometry, types, principles, devicesavailable, their strengths & limitations and clinical applications.	KH	Mini-CEXOSCE
9	Perform basic tonometry (Goldman Application tonometer, NCT, Ton open, Perkin"s, Schiotz, RBT) and recognize thepitfalls and artefacts of testing. Know the disinfection and calibration of tonometers.	P	Mini-CEXOSCE
10	Describe the diurnal fluctuation of IOP and Ocular Perfusion Pressure and their application in approachto glaucoma therapy.	KH	SAQ
11	Describe the principles and techniques of gonioscopy, indications, different gonioscopes available.	KH	SAQ
12	Describe the gonioscopic features of normal angle, POAG,PACG, Congenital glaucoma, Secondary glaucomas and other ocular pathologies.	KH	SAQ

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13	Perform gonioscopy, identify normal angle structures anddescribe the gonioscopic features ofPOAG, PACG, Congenital glaucoma, Secondary glaucomas and other ocular pathologies.	P	Mini-CEXOSCE
14	Perform a stereoscopic examination of the ONH and RNFLand describe the appearance of normal optic nerve head.	P	Mini-CEXOSCE
15	Describe and document the findings of glaucomatous opticnerve and differentiate it fromnon-glaucomatous optic neuropathies.	KH/S	SAQ Mini-CEX
16	Describe the fundamental principles of staticand kineticperimetry	KH	SAQ
17	Choose the appropriate testing strategy of Static perimetry based on the stage of glaucoma. Counsel apatient for static perimetry and perform static perimetry in glaucoma patients.	P	OSCE
18	Describe the most common types of visual fielddefects inglaucoma	KH	SAQ
19	Interpret visual field results for Goldmann kineticperimetryand Humphrey or Octopus standard automated perimetry.	P	OSCEDOPS
20	Demonstrate a knowledge of newer and advanced static perimetry techniques.	KH/S	SAQ
21	Describe the effects of corneal biomechanics on IOP	KH	SAQ
22	Perform corneal pachymetry and apply the findings of CCTto IOP interpretation.	P	OSCE
23	Describe the epidemiology and genetics of congenital glaucoma,infantile and developmental glaucomas, POAG and PACG,	KH	SAQ
24	Describe the pathogenesis, features, evaluation, treatment and referral of congenital anddevelopmental glaucoma.	KH	Essay/SAQCase
25	Describe the pathogenesis, risk factors, natural course, types, features, prognosis and management of POAG.	KH	Essay/SAQCase

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26	Describe the risk factors, pathogenesis, classification,features and management of PACG	KH	Essay/SAQCase
27	Describe the pathogenesis, features, evaluation and management of Secondary glaucomas (e.g., angle recession,inflammatory, steroid-induced, pigmentary, pseudoexfoliative,neovascular, postoperative, malignant, lens induced glaucomas; plateau iris; glaucomatocyclitic crisis; iridocorneal endothelial syndromes; aqueous misdirection)	KH	Essay/SAQCase
28	Describe the slit lamp findings of Secondary glaucomas(e.g., angle recession, inflammatory, steroid-induced, pigmentary, pseudoexfoliative,neovascular, postoperative, malignant, lens induced glaucomas; plateau iris; glaucomatocyclitic crisis; iridocorneal endothelial syndromes; aqueous misdirection)	KH	DOPSOSCE
29	Describe the results of landmark clinical trials in glaucoma(OHTS,CNTGS,CIGTS,GLT,AGIS,EGPS, EMGT, NTGS,TVT) and apply their conclusions to routineclinical practice.	KH	SAQ
30	Describe basic principles and tools to analyze the ONH andRNFL such as OCT, HRT and GDX.	KH	SAQ
31	Interpret OCT, HRT and GDX scans	P	OSCE
32	Describe the tools and techniques of anterior segment imaging such as anterior segment OCT and UBM	KH	SAQ
33	Describe the concept of target IOP and its application in glaucoma management	KH/S	SAQ Case
34	Describe the various drugs available for medical managementof glaucoma-mechanism of action, indications,contraindications, dosage, schedule, adverse effects, fixeddrug combinations	KH	SAQ
35	Describe the principles of medical management of glaucoma	KH	SAQ
36	Describe the drawbacks of medical management of glaucoma, compliance and adherence to therapy	KH	SAQ

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37	Outline the newer drugs used in glaucoma management and neuroprotection	KH	SAQ
38	Describe the interactions between systemic drugs and glaucoma medications	KH	SAQ
39	Select appropriate drugs and be able to customize or modifymedical treatment for open angle,secondary, and angle-closure glaucomas		Case
40	Describe the principles, indications, techniques(laser used,wavelength, energy,spot size, duration, number of shots)of commonly used laser procedures in glaucoma (Laser peripheral iridotomy, laser trabeculoplasty, iridoplasty, suture lysis, cyclophotocoagulation)	KH	SAQ
41	Perform laser peripheral iridotomy for angle closure glaucoma	P	DOPS
42	Perform argon and selective laser trabeculoplasty for open-angle glaucoma	P	DOPS
43	Describe the indications, techniques, complications of surgical therapies of glaucoma including trabeculectomy (with and without antimetabolites), combined cataract surgery and trabeculectomy, surgical peripheral iridectomy,glaucoma drainage devices, cyclodestructive procedures.	KH	SAQ
44	Describe use of antimetabolites and antiangiogenic agents and potential complications from their use	KH	SAQ
45	Recognize glaucoma surgical complications, their etiologies, and options for treatment	S/KH	SAQ OSCE
46	Assist with trabeculectomy and glaucoma drainage device surgery		DOPS
47	Perform routine trabeculectomy (with/withoutantimetabolites)		DOPS
48	Describe new nonpenetrating glaucoma surgery techniques:principles, techniques, advantages, limitations, and complications	KH	SAQ
49	Describe new microsurgical devices (eg, EX-PRESS, iStent,gold shunt, Trabectome) used in glaucoma surgery	KH	SAQ
50	Test for leaking filtering bleb using the Seidel method Recognize ocular emergencies of acute angle closure, and blebitis/endophthalmitis Perform paracentesis to lower acute IOP.		Mini-CEXOSCE Case Mini-CEX
51	Perform cyclophotocoagulation and cyclocryotherapy for advanced glaucoma	DOPS	Mini-CEXOSCE
52	Perform postoperative procedures to facilitate the success offiltering blebs (bleb massage, laser suture lysis, releasable suture, antimetabolites)	P/KHDOPS	Mini-CEXOSCE
53	Recognize and treat the postoperative complications offiltering surgery	KH/P	Mini-CEXOSCE

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54	Identify, evaluate and treat surgically if necessary a postoperative shallow anterior chamber.	P/S	
55	Identify ocular hypo tony and describe the causes, clinicalfeatures and treatment.	S/KH	Mini-CEXOSCE
56	Describe the principles involved in determining glaucomaprogression both clinically and parametrically	KH	
57	Describe the steps in evaluating primary open-angle glaucoma, angle-closure glaucoma and glaucoma suspects	KH	Mini-CEXOSCE
58	Describe the role of intraocular pressure (IOP) in thedevelopment and progression of glaucoma	KH	
59	Describe the risk factors other than IOP for primary open- angle glaucoma.	KH	Mini-CEXOSCE
60	Describe the subtypes of angle-closure glaucoma (eg,	KH	Mini-CEXOSCE
61	Perform cyclophotocoagulation and cyclocryotherapy for advanced glaucoma	DOPS	Mini-CEXOSCE

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Neuro-Ophthalmology Competencies

Sl No	Competencies	Level of competecy KH-KnowsHow S- Shows P- Performs	Assessment
1	Elicit a detailed and focused history in a patient presenting with neuroophthalmic symptoms including loss of vision, transient blurring of vision, unexplained loss of vision, diplopia, ptosis, proptosis or enophthalmos, ansicoria, facial weakness, facial spasm, oribital pain, headache and nystagmus	P	Mini-CEXOSCE
2	Perform a detailed and relevant examination in a patient with suspected neuroopthalmic disorder including BCVA, color vision, confrontation field of vision, contrast sensitivity, photo stress test, pupillary evaluation, fundoscopy, assess extraocular motility to detect and differentiate incomitant squint from comitant squint	P	Mini-CEXOSCE
3	Perform and interpret a detailed neurological examination including Higher mental function, cranial nerves, motor and sensory systems and cerebellar and vestibular function.	P	Mini-CEXOSCE
4	Perform and interpret Ice test and Tensilon test when indicated	P	DOPS
5	Select and perform appropriate investigations including automated perimetry to detect neurological visual field loss, B- scan ultrasonography to evaluate retinochoroidal complex, optic disc and retrobulbar optic nerve, Optical coherence tomography to evaluate retina and optic disc in a patient with suspected neuroophthalmic disease	P	Mini-CEXOSCE
6	Appropriately select and obtain visual evoked potential (VEP), electro-oculogram (EOG), electro-retinogram (ERG) and electro-myogram (EMG)and interpret the results	KH & S	OSCE
7	Obtain appropriate blood tests including haematology, biochemical, microbiology and Immunology and interpret the results	P	OSCE
8	Obtain appropriate orbital and neurological imaging including computed tomography, CT angiography, MRI, MRA, MRV and Carotid doppler and interpret the findings	P	OSCE/ Spotters
9	Identify the indications for and interpretation of results from a lumbar puncture	P	DOPS
10	Develop an understanding of the anatomy of the visual pathway, pupillary pathway, supranuclear gaze pathway, ocular motor nerves and their applied aspects in the various disorders thataffect them.	KH	Essay/SAQ
11	Develop an understanding of the physiology, pathology and microbiological aspects of neuroophthalmology	KH	Essay/SAQ

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12	Develop and demonstrate a clinical approach to and generate differential diagnosis of common neuro-ophthalmologic complaints, including decrease in visual acuity (painful/painless), diplopia, dysconjugate gaze, pupillary abnormalities, visual field defects, proptosis, papilledema, nystagmus, retinal pigmentary changes, coloboma, cherry red spot, retinopathy, and retinal hemorrhage.	S	Mini-CEXOSCE
13	Demonstrate an understanding of pathophysiology, diagnostic approach, management and complications of optic nerve disorders including optic neuritis, papilledema, optic atrophy, anterior ischemic optic neuropathy, traumatic optic neuropathy and hereditary optic nerve disorders.	S	Mini-CEXOSCE
14	Demonstrate an understanding of pathophysiology, diagnostic approach, management and complications of Idiopathic intracranial hypertension, optic chiasmal lesions including pituitary gland tumors, intracranial vascular and neoplastic lesions involving the visual pathway	S	Case Viva EssaySAQ
15	Demonstrate an understanding of pathophysiology, diagnostic approach, management and complications of disorders ocular motor nerves (3rd, 4th and 6th nerves) and other cranial nerves related to the eyes (5th and 7th nerves).	KH	Mini-CEXOSCE Essay Longcase
16	Demonstrate an understanding of pathophysiology, diagnostic approach and management of nystagmus.	KH	Essay
17	Understand the indications, complications of and appropriately initiate systemic steroids to treat neuro-ophthalmic disorders. Initiate appropriate measures to prevent complications of steroid therapy.	S	Mini-CEX
18	Understand the indications and appropriately initiate othermedical treatment options to treat neuro-ophthalmic disorders.	S	Mini-CEX
19	Knowledge of Neurological disorders with neuro-ophthalmic manifestations including multiple sclerosis, neuromyelitis optic, cerebrovascular disease with involvement of visual pathway, CNS tumors, infections and autoimmune diseases. Manage such patientswho present primarily with ophthalmic manifestations by obtaining appropriate referral /consultation and order investigations	KH	EssaySAQ
20	Understand the indications, surgical steps and appropriately counsel the patients for surgical interventions for neuro-ophthalmic disorders including optic nerve sheath fenestration, temporal artery biopsy, CSF shunting procedures and strabismus surgeries.	KH	EssaySAQ
21	Provide follow-up care to patients who have received medical and surgical treatment for neuro-ophthalmic disorders, including monitoring of efficacy of treatment,deteriorations andcomplications of treatment	S	Mini-CEX

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Orbit and Oculoplasty

Sl No.	COMPETENCY	DOMAIN K – KNOWSHOW S- SHOWS P- PERFORMS	ASSESSMENT
	Eyelid		
1	Describe basic anatomy and physiology (eg, orbicularis, meibomian glands, Zeis glands, orbital septum, levator muscle, Müller muscle, Whitnall ligament, Lockwood ligament, preaponeurotic fat, scalp, face)	K	Theory/writte nassessment MCQ Seminar
2	Describe basic mechanisms and indications for treatmentof eyelid trauma (lid margin sparing, lid margin involving, canaliculus involving)	K	
3	Describe mechanisms and indications for treatment of ptosis, perform the basic office examination techniques for the most common eyelid abnormalities (eg, margin reflex distance, palpebral fissure height, levator function,lagophthalmos, lid crease, lid laxity assessment, brow height, dermatochalasis, eversion, double eversion).	K	
4	Describe mechanisms and indications for treatment ofupper and lower eyelid retraction	K	
5	Describe mechanisms and indications for treatment of entropion	K	
6	Describe mechanisms and indications for treatment of ectropion	K	
	Identify floppy eyelid syndrome and its systemicassociations	K	
7	Identify blepharospasm and hemifacial spasm anddescribe the treatment	K	Theory/writte nassessment MCQ Seminar Clinical testing by supervision With logbook Demonstratio n
8	Perform minor lid and conjunctival procedures (eg, repairof small eyelid laceration including marginal, removal ofbenign eyelid lesions, chalazion curettage or excision, conjunctival biopsy), Identify and treat trichiasis (eg, epilation, cryotherapy, surgical therapy)	K,S,P	
9	Describe indications for and perform a temporary tarsorrhaphy	K,S,P	
10	Describe indications for and perform everting sutures (Quickert sutures)	K,S,P	
11	Describe indications for and perform a lateral canthotomy/cantholysis	K,S,P	
12	Describe the mechanisms of and indications for eyelid reconstruction Described the genetics (where known), clinical features, evaluation, and treatment of congenital eyelid deformities(eg, coloboma, distichiasis, epicanthus, telecanthus, blepharophimosis, ankyloblepharon, epiblepharon, euryblepharon, cryptophthalmia, Goldenhar syndrome, Treacher-Collins syndrome, Waardenburg syndrome	K	

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13	Describe clinical features, evaluation, syndromic association and management of congenital ptosis (eg, simple, blepharophimosis-ptosis-epicanthus inversus syndrome [BPES], jaw wink, congenital fibrosis)	K	Theory/written assessment MCQ Seminar
14	Describe the genetics (when applicable), clinical features, evaluation, and treatment of acquired myogenic ptosis (eg, oculopharyngeal muscular dystrophy, mitochondrial	K	Theory/written assessment MCQ
15	myopathies, myotonic dystrophy, myasthenia gravis).		Seminar
16	Describe the mechanisms and indications for treatment of more advanced eyelid trauma (eg, chemical burns, thermalburns, canthal avulsions, eyelid avulsions)	K	Theory/written assessment MCQ Seminar
17	Describe indications for and complications of, and perform more complicated eyelid surgery (eg, upper blepharoplasty, lower lid tightening)	K,S,P	Theory/written assessment MCQ Seminar Clinical testing by supervision With logbook Demonstration
	Identify histopathological features of common eyelid conditions	K,S,P	Theory/written assessment MCQ Seminar

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18	Describe the etiology, evaluation, and medical and surgical treatment of Benign, pre-malignant, or malignanteyelid tumors (eg, papilloma, seborrheic keratosis, epidermal inclusion cyst, molluscumcontagiosum, verrucavulgaris, keratoacanthoma, actinic keratosis, basal cell carcinoma, squamous cell carcinoma, sebaceous cell carcinoma, melanoma)	K	Theory/writtenassessment MCQ Seminar
	Lacrimal		
19	Describe basic anatomy and physiology (eg, puncta, canaliculi, lacrimal sac, nasolacrimal duct, endonasal	K	Theory/writtenassessment
20	Anatomy, lacrimal glands)lacrimal pump theories		MCQ Seminar
21	Describe mechanisms and indications for treatment of congenital and acquired nasolacrimal duct obstruction,complicated cases of nasolacrimal duct obstruction, canaliculitis, dacryocystitis, and acute and chronic dacryoadenitis	K	Theory/writtenassessment MCQ Seminar
22	Recite the differential diagnosis of lacrimal gland mass (eg, inflammatory, neoplastic, congenital, infectious)	K	Theory/writtenassessment MCQ Seminar
23	Describe indications for and perform the basic office examination techniques for the most common lacrimal abnormalities (eg, Schirmer test, dye disappearance test,punctal position, punctal dilation, canalicular probing, lacrimal probing and irrigation)more advanced lacrimal assessment (eg, interpretation of dye testing, canalicular probing in trauma).(eg, lacrimal drainage testing [irrigation, Jones Dye Tests 1 and 2], lacrimal probing, lacrimal intubation, incision and drainage of lacrimal sacabscess)	K	Theory/writtenassessment MCQ Seminar Clinical testing by supervision With logbook Demonstration
24	Describe indications for and perform an incision and drainage of the lacrimal sac, management of and treat lacrimal system abnormalities, including surgeries (eg, lacrimal probing, dacryocystectomy, dacryocystorhinostomy).	K,S,P	Theory/writtenassessment MCQ Seminar Clinical testing by supervision With logbook Demonstration
25	Identify indications for and interpret lacrimal imaging (eg,scintigraphy, cystography)	K,S,P	Theory/writtenassessment MCQ Seminar
26	Describe the etiology, evaluation, and medical and surgical treatment of the following lacrimal diseases: a. Punctal stenosis b. Canalicular stenosis c. Common canalicular stenosis	K	Theory/writtenassessment MCQ Seminar Clinical testing by supervision With logbook Demonstration

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	Orbital		
27	Describe basic anatomy (eg, orbital bones, orbital foramina, paranasal sinuses, annulus of Zinn, arterial and venous vascular supply, nerves, extraocular muscles)	K	Theory/writtenassessment MCQ Seminar
28	Identify normal orbital and relevant nasal and paranasal sinus anatomy on imaging studies (eg, computed tomography, magnetic resonance imaging) and Identify common orbital pathology (eg, orbital fractures, orbital tumors) on imaging studies (eg, magnetic resonance imaging, computed tomography, ultrasound)	K	Theory/writtenassessment MCQ Seminar
29	Describe basic mechanisms and indications for treatment of common orbital trauma (eg, medial wall and floor fractures, retrobulbarhemorrhage)advanced orbital trauma (eg, zygomaticomaxillary complex fractures, naso-orbitalethmoid fractures, Le Fort fractures).	K	Theory/writtenassessment MCQ Seminar
30	Recite the differential diagnosis of common orbital tumors in children and adults	K	Theory/writtenassessment MCQ seminar

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31	Describe indications for and perform the basic office examination techniques for the most common orbital abnormalities (eg, Hertel measurement, inspection, palpation, auscultation)	K	Theory/written assessment MCQ Seminar Clinical testing by supervision With logbook Demonstration
32	Identify indications for and perform the basic anophthalmic socket assessment (eg, types of implants, implant movement, socket health, socket surface, socketvolume, fornices, prosthesis type and fit).	K,S,P	Theory/written assessment MCQ Seminar Clinical testing by supervision With logbook Demonstration
33	Describe the clinical features, evaluation, and management of congenital orbital deformities (eg, anophthalmia, microphthalmia, hypotelorism, hypertelorism versus telecanthus)	K	Theory/written assessment MCQ Seminar
34	Describe the genetics, clinical features, evaluation, and management of common craniosynostoses and other congenital malformations (eg, Crouzon syndrome, Apert syndrome)	K	Theory/written assessment MCQ Seminar
35	Identify, evaluate, and treat thyroid ophthalmopathy (eg, epidemiology, symptoms and signs, associated systemic diseases, orbital imaging, differential diagnosis, surgical, medical, and radiation indications, side effects of treatment)	K	Theory/written assessment MCQ Seminar Clinical testing by supervision With logbook
36	Identify, evaluate, and treat orbital cellulitis, nonspecific orbital inflammation (eg, symptoms and signs, orbital imaging, differential diagnosis, biopsy indications, choiceof treatments)	K,S,P	Theory/writtenassessr MCQ Seminar Clinical testing bysupe With logbook
37	Describe indications for and complications of, andperform enucleation and evisceration	K,S,P	Theory/written assessment MCQ Seminar Clinical testing by supervision With logbook Demonstration

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38	Describe the etiology, evaluation, and medical andsurgica treatment of the following orbital diseases: a. Orbital trauma i. All orbital fractures ii. Retrobulbar haemorrhage iii. Orbital foreign bodies b. Orbital neoplasms i. All benign ii. All malignant c. Orbital inflammation i. Infectious 1. Bacterial 2. Fungal 3. Mycoplasma ii. Noninfectious 1. Thyroid eye disease 2. Sarcoidosis 3. Wegener granulomatosis iii. Nonspecific orbital inflammation	K	Theory/written assessment MCQ Seminar Clinical testing by supervision With logbook
39	Describe indications for and complications of basicorbita skills and procedures, including: a. Anterior orbitotomy for tumor biopsy/excision ,different orbital approaches and incisions b. Orbital floor fracture repair	K,S,P	Theory/written assessment MCQ Seminar Clinical testing by supervision With logbook Demonstration

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Paediatric Ophthalmology and Strabismus

Paediatric ophthalmology and Strabismus competencies			
Sl.N	Competency	Level of competency knows how P- performs S-shows	Assessment
1.	Describe basic examination techniques for strabismus (eg, ductions and versions, cover and uncover testing, alternate cover testing, prism cover testing).	P	Mini-CEXOSCE
2	Describe basic visual development and visual assessment of the child (eg, central, steady, maintained fixation), including any one matching card, resolution and recognition acuity, and crowding using standard vision testing (eg: tumbling E eye chart, Allen cards, Landolt "C" Broken Ring vision chart).	P	Mini-CEX OSCE
3.	Describe the basic anatomy and physiology of strabismus: a. Innervation of extraocular muscles b. Primary, secondary, and tertiary actions c. Laws governing the muscle actions d. Comitant and incomitant deviations e. Overaction and underaction f. Restrictive and paretic saccades g. Vergence h. Pursuit movements	KH	Essay/SAQ
4.	Describe basic sensory adaptations for binocular vision, including: Normal and anomalous retinal correspondence,Suppression,Horopter,Panum area,Fusion, Stereopsis. Describe basics of binocular sensory testing (eg, Titmus stereo testing, Randot stereo testing, Worth 4-dot test, Bagolini lenses).	KH	Essay/SAQ
5.	Describe and recognize pseudostrabismus.	KH	Mini-CEX
6.	Describe the different causes of amblyopia, including: Deprivation,Ametropic,Strabismic,Anisometropic,Organic.	KH	Essay/SAQ

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7.	Describe various forms of esotropia, such as: Congenital,Comitant and incomitant, Accommodative and nonaccommodative,Decompensated,Sensory, Neurogenic,Myogenic,Restrictive,Nystagmus and esotropia,Accomodative spasm,Microtropia,Consecutive	KH	Essay/SAQ
8.	Describe various forms of exotropia, such as: Congenital,Comitant and incomitant, Decompensated,Sensory,Neurogenic,Myogen ic,Restrictive,Basic divergence excess,Exophoria,Convergence insufficiency	KH	Essay/SAQ
9.	Describe the nonsurgical treatment of strabismus and amblyopia, such as: a. Patching b. Atropine penalization c. Fresnel and grind-in prism therapy d. Convergence exercises	S	DOPS
10.	Describe different forms of childhood nystagmus. Describe and recognize the different forms of childhood nystagmus (eg, infantile nystagmus syndrome [INS], fixation maldevelopment nystagmus syndrome [FMNS], spasmus nutans syndrome [SNS]), and appropriate work up for different time ofonset and age groups.	P	Mini-CEX
11.	Describe features, classification, and treatment indications for retinopathy of prematurity. Describe and recognize ROP (eg,stages, treatment indications).	KH	Mini-CEX
12.	Describe etiologies and types of paediatriccataract with consideration of: a. Age of onset b. When do you treat and types of treatment c. Postoperative rehabilitation	KH	Essay/SAQ
13.	Describe and recognize ocular findings in child abuse (eg, retinal hemorrhages) and appropriately refer to authorities.	KH	MINI CEX
14.	Describe basic evaluation of decreased vision in infants and children, such as: Delayed maturation of vision/cerebral visual impairment,Leber congenital amaurosis,Other hereditary retinal disorders,Congenitalglaucoma,Congenital rubella syndrome,Retinopathy of prematurity (ROP),Various ocular anomalies	KH	Essay/SAQ

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15.	Describe the symptoms, associations, findings, and treatment of childhood glaucoma.	KH	Essay/SAQ
16.	Summarize ocular embryology development(ie, lens development, fetal vasculature, anterior segment development, closure of embryonic fissure).	KH	Essay/SAQ
17.	Describe common causes of conjunctivitis ininfants and children in terms of symptoms, diagnosis, and treatment.	P	DOPS
18.	Assess subluxated and dislocated lenses and know the systemic associations (eg, Marfan syndrome, homocystinuria, Weill-Marchesanisyndrome).	KH	MINI CEX
19.	Describe management of epiphora in children, including congenital nasolacrimal duct obstruction.	KH	Mini-CEX
20.	Describe refractive errors and spectacle correction in childhood (recognizing that it isarguably the most common cause of preventable visual impairment in children worldwide),Describe accommodation and dosage and use of mydriatics in children,Describe indications and uses of contact lenses in childhood.	P	DOPS
21.	Describe normal visual development milestones. Describe basic and more advanced visual development and visual assessment of the pediatric ophthalmology patient (eg, blink to light or threat, measures of fixation and following behavior, objective measures of visual acuity) using the optokinetic nystagmus (OKN) drum to assessfixation and electrophysiological techniques such as sweep visual evoked potential (VEP)evaluation.	P	DOPS
22.	Describe the basic principles of genetics. Evaluate a child with congenital blindness, including VEP and interpretation of an electroretinogram (ERG).	KH	Essay/SAQ
23.	Describe basic and more advanced strabismus examination techniques (eg, combined verticaland horizontal prism cover testing, double Maddox rod testing	KH	Mini-CEX
24.	Describe common hereditary or congenital ocular motility or lid syndromes (eg, Duane syndrome, Marcus Gunn jaw-winking syndrome, Brown syndrome).	S	DOPS
25.	Describe and recognize typical features of retinoblastoma (eg, differential diagnosis, evaluation, treatment indications, and types).	KH	Essay/SAQ
26.	Describe cortical visual impairment and periventricular leukomalacia	KH	Essay/SAQ

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27.	Describe more advanced anatomy (including pulleys) and physiology of strabismus (eg, torsion, tertiary actions, consecutive deviations). Interpret diplopia charts (eg, Hesscharts, Lees chart, Harms screen)	KH	Essay/SAQ
28.	List treatment options and indications of low birth weight children ,and describe long term ocular and systemic problems. Describe etiology, evaluation, and management of congenital infections (eg, TORCHES sequence: TOxoplasmosis, Rubella, Cytomegalovirus, HErpes simplex,Syphilis)	KH	Essay/SAQ
29.	Describe and recognize the common causes of pediatric uveitis with natural history, indicated work up, and treatment.	KH	Essay/SAQ
30.	Describe identifiable congenital ocular anomalies (eg, microphthalmia, persistent fetalvasculature), and describe appropriate work up for etiology, criteria for intervention,and genetic counseling for parents.	P	Mini-CEX
31.	Describe indications for botulinum toxin use in strabismus.	Written examinations, seminar presentation	Cognitive
32.	Diagnose phoria/tropia, perform cover tests.Assess ocular motility using duction and version testing. Apply Herings law and Sherrington law, and apply the most advanced knowledge of strabismus anatomy and physiology (eg, spiral of Tillaux, secondary and tertiary actions, spread of comitance) in evaluation ofpatients. Perform basic measurement of strabismus (eg, Hirschberg test, Krimsky method, cover testing, prism cover testing, simultaneous prism cover testing, alternate cover testing).	P	DOPS
33.	Perform assessment of vision in the neonate,infant, and child, including: a. Dazzle/menace reflex, preferential fixationtests b. Standard subjective visual acuity tests. c. Induced tropia test. Perform assessment of vision in more difficult strabismus patients (eg, uncooperative child, mentally impaired, nonverbal, or preverbal).	P	DOPS
34.	Perform cycloplegic retinoscopy in children using loose lenses, lens stick, or phoropter, depending on the age of the child and availability of the devices in the clinic. Measure the refractive condition of a patient"seyes using a retinoscope.	P	DOPS

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35.	Recognize and apply in a clinical setting thefollowing skills in the ocular motility examination: a. Stereoacuity testing . Accommodative convergence/accommodation ratio (eg,heterophoria method, gradient method) . Tests of binocularity and retinalcorrespondence . Anterior and posterior segmentexamination e.Basic and advanced measurement ofstrabismus f.Perfom measurement of vision using Telleracuity cards	P	DOPS
36.	Assist a primary surgeon in performingextraocular muscle surgery, including: a. Recession b. Resection . Muscle weakening (eg, tenotomy) and strengthening (eg, tuck) procedures d. Transposition e. Use of adjustable sutures f. Intraoperative forced duction test (FDT)	S	MINI CEX
37.	Perform more advanced strabismus testing,such as Parks-Bielschowsky 3-step test,Lancaster red-green test, Maddox rod testing, double Maddox rod testing, andmeasurement of dissociated vertical deviation (DVD). Perform more advanced measurements of strabismus (eg, use of synoptophore or amblyoscope, when available). Perform forced duction test (FDT) and force generation test (FGT) in the clinic.	P	DOPS
38.	Exercise surgical judgment for the indications and contraindications for strabismus surgery and be able to chalk out a surgical plan .	S	Mini CEX

Uveitis and Ocular inflammation

Uvea and ocular inflammation Competencies			
Sl no	**Competencies**	**Level of competency KH- Knows HowS- Shows P- Performs**	**Assessment**
1	Describe and Elicit the basic principles of history taking in patients with uveitis and related diseases in terms of onset, duration, clinical course and correlate the ocular history with possible anatomical diagnosis (eg-floaters with posterior uveitis	KHP	Written assessments Seminars DOPS Case discussionsOSCE Mini- CEXOCEX

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2	Obtain relevant systemic history of known diseases in detail including investigations doneand treatment given, symptoms of recent onset if any and review the medications being taken by the patient	KH	Written assessments Seminars DOPS Case discussionsOSCE Mini- CEXOCEX
3	Demonstrate correlation between ocular features and systemic disease if any after history taking so as to proceed in thedirection of appropriate diagnosis	S	Theoretical assessments
4	Outline the methodology ofexamination of uveitis and related diseases covering allrelated aspects.	KH	Case scenariosMiniCEX OCEX OSCEDOPS
5	List the signs and symptoms of anterior and posterior uveitisin order starting from the commononesto the not so common ones	KH	Written tests
6	Describe the different types ofuveitis (acute and chronic/ granulomatous and non- granulomatous, anterior, intermediate and posterior), typical features and their differential diagnosis	KH	Written tests Case presentations Case scenarios
7	Describe the typical features and differential diagnosis of anterioruveitis including infectious, inflammatory, neoplastic, post- surgical, posttraumatic and specific entities	KH	Written tests
8	Describe the typical features and differential diagnosis of posterior segment uveitis including toxoplasmosis, sarcoidosis, pars planitis, Vogt Koyanagi Harada disease, post-operative uveitisandvarious endophthalmitis	KH	Written tests
9	List the less common signs and symptoms of anterior and posterior uveitis	KH	Written tests
10	List the differentiating signs and differential diagnosis of lesscommon forms of uveitis	KH	Written tests
11	Describe, recognize and evaluate uveitis associated with immunocompromised individuals	KH	Written tests Case scenarios Case presentations
12	Evaluate and treat commoncauses of anterior and posterior uveitis	P	Written tests
13	Describe the indications and contraindications of corticosteroid treatment in uveitis including the various routes of administration. The student should also be able todescribe the benefits, risks and appropriate duration of treatment required in differenttypes of uveitidis	KH	Written tests
14	Recognize, evaluate and treat specific etiologies of uveitislike congenital and acquiredsyphilis, CMV retinitis, Multiple sclerosis	P	Written tests

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15	Describe indications and contraindications for immunosuppressive therapy in uveitis, use of antimetabolites, cyclosporineand alkylating agents	KH	Written tests
16	Describe the indications, technique , pre requisites andsideeffects of intravitreal injections ifany given in uveitis	KH	Written tests Case scenarios
17	Perform an examination of anterior segment to detect andevaluate clinical features like pattern of keratic precipitates,iris changes, anterior chambercells and flare. The student should be able to identify the stage of uveitis, whether acute, chronic or active,quiescent	P	OSCEO CEX Mini-CEX DOPS
18	Perform dilated examination of the posterior segment with slitlamp bio microscopy using contact and non- contact lenses, indirect ophthalmoscopy to evaluate vitreous for flare and cells, retinal and choroidal vasculature and inflammationandoptic disc abnormalities	P	DOPS Mini CEX CEX Video assistedassessments OSCE
19	Describe the indications for ancillary testing in uveitis and perform the same. (Fluorescein testing, B Scan, OCT where indicated, laboratory testing and radiological testing). The student should also be able to reasonably interpret the results of such testsperformed	KHP	DOPS Mini CEX
20	Administer steroids for patients with uveitis by various routes including posterior sub tenon"s	P	DOPS Video assistedassessments
21	Evaluate and treat the complications of uveitis therapy (like cataract andglaucoma)	S	Case scenariosDOPS
22	Refer to concerned specialists for administration of immunosuppressive therapy and tobe able to manage the complications of immunosuppressive therapy	S	Case scenariosDOPS
23	Perform an anterior chamber andvitreous tap for diagnostic purposes and administer intravitreal injections, be it anti VEGFs for inflammationor antibiotics for bacterial endophthalmitis	P	DOPS Video baseddiscussions
24	Explain and counsel the patient about the condition and the need to take oral steroids wherever necessary, with anemphasis on the side effectsof the medication	P	DOPS OSCE
25	Explain in detail about the need for intravitreal injections when necessary with an emphasis on the advantagesand side effects ofthe medication	P	DOPS OSCE
26	Explain in detail about the need for long term follow up and treatment in patients with chronic and recurrent uveitis	P	OSCE

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Vitreoretinal Diseases

Sl No.	Competency	Level of competency KH-Knows HowS-Shows P- Performs	Assessment
1	Describe retinal anatomy and physiology.	KH	ESSAY
2.	Know the symptoms suggestiveof retinal disorders: a. flashes b. floaters c. abrupt or gradual blurring, distortion and loss of centralvision d. abrupt or gradual loss ofperipheral vision.	KH	ESSAY
3.	Perform slit-lamp biomicroscopy with the Hruby, +78-D, +90-D lenses, three-mirror CL,or other CLs.	P	MINI CEX
4.	To perform Tonometry a. Applanation b. Indentation (Schiotz)	P	MINI CEX
5.	Perform direct ophthalmoscopy: a. Distant direct b. Media assessment c. Use of filters provided . Examination of normal eye: Red reflex,optic disc, retinal arterioles and venules, retinaandchoroid. . Recognition of abnormal fundus features of Direct Ophthalmoscopy: loss of normal redreflex, abnormal colors of red reflex, fundus features of important systemic diseases: Diabetes Mellitus, Systemic hypertension, CRVO, BRVO, CRAO, BRAO	P	MINI CEX
6.	Perform indirect ophthalmoscopy along with: a. Fundus drawing capability b. Use of filters provided Perform indirect ophthalmoscopy with scleralindentation.	P	MINI CEX
7.	To perform Gonioscopy: a. Single mirror gonioscope b. Gonioprism c. Grading of the angle d. Testing for occludability c. Indentation gonioscopy	P	MINI CEX
8.	Describe fundamentals and Interpret basic fluorescein angiography and ICG, apply inclinical practice (e.g., diabetic retinopathy, cystoid macular edema, CNVM etc.).	KH, S	ESSAYOSCE

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9.	Describe the indications for and interpret retinal imaging technology (e.g., ocular coherence tomography, retinal thicknessanalysis) Interpret basic ocular imaging techniques(e.g., B-scan echography, nerve fiber layer analysis)	KH, S	ESSAYOSCE
10.	Describe the indications for and interpret basic electrophysiological tests (e.g., electroretinogram [ERG], electrooculogram [EOG], visual-evoked potential [VEP], dark adaptation)	KH, S	ESSAYOSCE
11.	Describe the findings of major studies in retinal diseases including the following: A.Diabetic Retinopathy Study(DRS) B.Diabetic Vitrectomy Study(DVS) c.Early Treatment of DRS(ETDRS)	KH	ESSAY
12.	Describe retinal vasculardiseases. Diagnose, evaluate, and treatthe retinal vascular diseases a. Arterial and venousobstructions b. Diabetic retinopathy c. Hypertensive retinopathy d. Peripheral retinal vascularocclusive disease e. Acquired retinal vasculardiseases f. Ocular ischemic syndrome g. Sickle cell retinopathy h. Retinal pigment epithelialdetachment	KH, S	ESSAYOSCE
13	Describe principles of retinaldetachment, various types of retinal detachment and their evaluation. Describe the techniques for retinal detachment repair (e.g., pneumatic retinopexy, scleral buckling, vitrectomy)	KH	ESSAY
14	Describe macular anatomy, function and recognize macular disorders like: a. ARMD b. Choroidal neovascularization c. High myopia d. Macular dystrophies e. epiretinal membrane. f. Macular holes g. Cystoid macular edema h. Central serous choroidopathy (retinopathy) i. Retinal pigment epithelialdetachment.	KH, S	ESSAYOSCE
15.	Describe, recognize, and evaluate hereditary retinal and choroidal diseases (e.g., gyrate atrophy, choroideremia, retinitis pigmentosa, cone dystrophies, Stargardt"s disease, Best"s disease,congenital stationary night blindness)	KH	ESSAY
16.	Describe the fundamentals of,evaluate, and treat (or refer) peripheral retinal diseases and vitreous pathology (e.g., vitreous hemorrhage, PVD, retinalbreaks)	KH	ESSAY
17.	Describe, evaluate, and treat posterior uveitissyndromes and endophthalmitis.	KH	ESSAY

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18.	Describe basic principles, indications and complications of laser photocoagulation. Perform basic laser treatment for diabetic retinopathy (e.g., panretinal photocoagulation, macular grid) Perform diabetic focal/grid macular lasertreatment Perform laser retinopexy (demarcation) forisolated retinal breaks Evaluate and treat complications of retinal photocoagulation (e.g., vitreous hemorrhage, chorioretinal anastomoses)	KH PP KH	ESSAY MCEXMCEX ESSAY
19.	Describe the basics of surgical vitrectomy (e.g., indications, mechanics, instruments, technique and complications) Assist in a retinal surgery or perform theprocedure under supervision. Describe the fundamentals of special vitreoretinal techniques a. Macular hole repair b. Epiretinal membrane peeling Complex vitrectomy for proliferative vitreoretinopathy d. Use of heavy liquids and intraocular gases (e.g., perfluorocarbons) Apply in clinical practice the more complex principles of surgical management of diabetic retinopathy (e.g., vitrectomy, membrane release)	KH P KH P	ESSAY DOPS ESSAY DOPS
20.	Perform cryotherapy of retinal holes and other pathology	P	DOPS
21	Perform scleral buckling	P	DOPS

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22	Residents must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, patients" families, and professional associates. Residents are expected to: a. Create and sustain a therapeutic and ethically sound relationship with patients b. Use effective listening skills and elicitand provide information using effective nonverbal, explanatory, questioning, and writing skills c. Work effectively with others as a member or leader of a health-careteam orother professional groups	KH, S	ESSAY
23	Teaching: The ability to pass on skillsacquired to one"s juniors which are theoretical, procedural and surgical.	KH S	ESSAY

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Ocular Oncology

Sl No.	COMPETENCY	DOMAIN	ASSESSMENT
	Basic Level Goals	K – KNOWSHOW S- SHOWS P- PERFORMS	
1	Describe the basic categorization ofocular tumors and their clinical features a. Nonneoplastic tumors (eg,hamartomas) b. Neoplastic tumors I. Benign (eg, nevus, hemangioma) II. Malignant (eg, melanoma,carcinoma, metastasis) Traumatic lesions (eg, implantation cysts, hemorrhages) Degenerative lesions (eg, disciforms, sclerochoroidal calcification) Idiopathic disease (eg, juvenile xanthogranuloma, vasoproliferativetumor) Paraneoplastic disease (eg, Bilateral diffuse uveal melanocyticproliferation) Iatrogenic disease (eg, radiation-induced disease)	K	Theory/written assessment MCQ Seminar
2	Describe the differential diagnosisof the major tumors	K	Theory/written assessment MCQ Seminar
3	Describe the etiology of ocular tumors, such as: . Environmental factors (eg,conjunctival squamous cell carcinoma) . Genetic factors (eg,retinoblastoma) . Syndromes (eg, von Hippel-Lindau disease) . Malformations (eg, choroidalosteoma)	K	Theory/written assessment MCQ Seminar
4	Describe relevant genetic abnormalities and techniques: . Germinal and somatic mutationsrelevant to oncology (eg, retinoblastoma) . Important genetic techniques (eg, fluorescence in situ hybridization)	K	Theory/written assessment MCQ Seminar

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5	Describe the examinations and testsby which ocular tumors are diagnosed a. Inspection b. Transillumination c. Color photography d. Optical coherence tomography e. Autofluorescence Angiography (indocyanine green and fluorescein) g. Ultrasonography h. Magnetic resonance imaging i. Computerized tomography j. Positron emission tomography k. Biopsy i. Aspiration ii. Incisional iii. Excisional iv. Impression cytology l. Systemic investigation accordingto ocular tumor diagnosis i. History ii. Clinical examination iii. Hematology and biochemistry iv. Radiography v. Ultrasonography vi. Computerized tomography vii. Magnetic resonance imaging viii. Genetic testing	K	Theory/written assessment MCQ Seminar
6	Perform slit-lamp examination, gonioscopy, and indirect ophthalmoscopy to diagnose andlocalize ocular tumors.	K,P	DOPS Mini CEX Clinical testing by supervision With logbook Demonstration
7	Perform B-scan ultrasonography todetect and measure intraocular tumors.	K,P	DOPS Mini CEX Clinical testing by supervision With logbook Demonstration
8	Perform palpation of cervical lymphnodes	K,P	DOPS Mini CEX Clinical testing by supervision With logbook Demonstration

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9	Describe the systemic features ofocular tu and how these features are detected	K	Theory/writtenassessment MC Seminar
10	Describe the relevance of staging tumors (TNM [Tumor, lymph Nodes, Metastasis] Classification ofMalignant Tumors).	K	Theory/writtenassessment MC Seminar
11	Describe the management options for ocular tumors with indications and contraindications for each form of management Radiotherapy (eg, brachytherapy, external beam radiotherapy, proton beam) b. Chemotherapy (eg, topical, intraocular, systemic) c. Phototherapy (eg, photocoagulation, photodynamictherapy) d. Cryotherapy (eg, liquid nitrogen, carbon dioxide) e. Surgical resection (eg, localresection, enucleation)	K	Theory/writtenassessment MC Seminar
12	Describe the complications of ocular therapy and their management	K	Theory/writtenassessment MCQ Seminar
13	Describe basic histopathology oftumors, including immunohistochemistry	K	Theory/writtenassessment MCQ Seminar
14	Describe the applied surgical anatomy, histology, and physiology of the eye and ocular adnexa with relevance to ocular oncology.	K	Theory/writtenassessment MCQ Seminar
15	Perform excision of conjunctival tumors, avoiding seeding, or refer to an ocular oncology subspecialist forsuch surgery if possible	K,P	Clinical testing bysupervisio With logbook Demonstration
16	Perform sequential examination to assess the tumor over time (eg, atypical nevus)	K,P	Clinical testing bysupervision With logbook Demonstration
17	Collaborate with subspecialist in the preoperative care and referral of selected patients with an ocular tumor, avoiding potential pitfalls	K,P	Interdepartmentalseminar
18	Provide short-term and long-term postoperative care to patients with	K,S,P	Clinical testing by supervision
	an ocular tumor, collaborating with a subspecialist and other health care workers as appropriate		With logbook Demonstration Interdepartmentalseminar

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19	Discuss prognosis and various management options with patients and their families in a detailed, ethical, and compassionate manner	K, S,P	Clinical testing bysupervision With logbook Demonstration
20	Communicate prognosis with patients, relatives, and health care workers; and adjust patient management accordingly in collaboration, if necessary, with a subspecialist	K, S,P	Clinical testing bysupervision With logbook Demonstration
21	Assist patients with selecting the most appropriate management in collaboration, if necessary, with a subspecialist in ocular oncology.	K, S,P	Clinical testing bysupervision With logbook Demonstration
22	Provide or organize appropriate psychological support, demonstrating empathy and an adequate awareness of the principlesof this aspect of care (eg, giving badnews)	K, S,P	Clinical testing bysupervision With logbook Demonstration
23	Collaborate with subspecialists and other health care professionals to provide patient focused care.	K, S,P	Clinical testing bysupervision With logbook Demonstration

Systemic ophthalmology & Immune Ocular Disorders

Systemic ophthalmology & Immune Ocular Disorders Competencies			
Sl no	**Competencies**	**Level of competency KH- Knows HowS- Shows P- Performs**	**Assessments**
1	Describe and list the common systemic diseasesaffecting the eye including infectious and non- infectious etiology	KH	Written tests Essay questionsMCQs
2	Obtain a detailed history of the symptomatology in patients with systemic diseases and also to emphasize on the details of the course, duration andtreatment of the parent disease	P	DOPSOSCE Written assessme Essays
3	Describe the different signs and symptoms of ocular manifestations of systemic viral infections (herpes, varicella, infectious mononucleosis, CMV, HIV), bacterial infections(Tuberculosis, Syphilis, Leprosy),Malaria, fungal infections like candidiasis, histoplasmosis, cryptococcosis, worm infestations like cysticercosis, toxocariasis and Onchocerciasis	KH	Written tests Essays

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4	List the ocular features of non - infectious inflammatory systemic diseases like collagen vascular disorders (Rheumatoid arthritis, polyarteritis nodosa, ankylosing spondylitis, dermatomyositis, sarcoidosis, systemic lupus erythematosus etc), metabolic disorders, chromosomal and endocrine disorders	KH	Written tests Essa MCQs Case scenari
5	Describe the ocular metastatic lesions in systemic neoplasms involving blood (leukemia), breast, colon, kidney, lung and others	KH	Written tests Essays
6	List the ocular manifestations of vitamin deficiencies including A, B and C with specialemphasis on vitamin A disease, its differentialdiagnosis and treatment	KH	Written assessment Essays MCQS
7	Describe the ocular signs and symptoms of autoimmune disorders, including immune relateduveitis	KH	Written tests Essays
8	List the indications of ocular treatment in various systemic diseases, theirside effects and their effect on the course of systemic diseases	KH	Written tests Essays
9	Perform a detailed slit lamp examination of the anterior segment including tear film tests and evaluation of the anterior chamber for evidence ofuveitis	P	DOPSOSCE Mini Cex Case presentations
10	Perform a detailed posterior segment examination including anterior vitreous for inflammation and dilated fundus examination to look for optic disc changes, retina for vasculature and infiltrates/lesions and macular abnormalities	P	DOPSOSCE Mini Cex Case presentations
11	Interpret and order relevant systemic investigations wherever necessary like P ANCA, C ANCA, Bloodcounts, ANA, specific viral markers and antibodies, radiological imaging (X rays, CT Scans, MRI andothers)	P	Case scenariosOSCE Case presentations
12	Perform ocular investigations like FFA, OCT and B Scan wherever required and interpret them	P	DOPS Video assisted assessments
13	Treat the various ocular manifestations withdifferent drugs and routes of administration	P	OSCEDOPS Case presentations
14	Counsel the patients about the occurrence of ocular manifestations in systemic disease and the need for the treatment of such conditions	P	DOPSOSCE
15	Counsel the patients for regular follow up in order to note the progression of ocular condition and the adequacy of treatment.	P	DOPSOSCE

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Essential diagnostic Skill

Diagnostics tests in Ophthalmology – Competencies			
Sl No	**Competencies**	**Level of Competency** **K - Knows** **KH-Knows HowS- Shows** **P- Performs**	**Assessment**
1.	Perform and interpret, a detailed clinical examination using various investigative tools including • Slit lamp Examination: Diffuse Examination / Focal Examination / Retrollumination-direct & indirect /Sclerotic scatter / Specular reflection / Staining modalities • Fundus evaluation: Direct & Indirect ophthalmoscopy with fundus Drawing • Slit lamp biomicroscopic examination of Fundus: 3-mirror, 78-D/90-D/60-D Examination • Amsler"s grid charting	P	Mini-CEX
2.	Perform Basic Investigations along with their interpretation of • Tonometry: Applanation / Indentation / Non contact tonometry • Gonioscopy- grading of the angle • Tear/ Lacrimal function tests: Staining-fluorescein, Rose Bengal / Schirmer"s tests/ Break up time / Syringing / • Dacrocystography • Corneal Evaluation: Corneal scraping and cauterization, Smear preparation and interpretation (Gram"s stain/KOH), Media inoculation, Keratometry- performance & interpretation, Corneal topography- if available, Pachymetry • Colour Vision Evaluation: Ishihara pseudoisochromatic plates, Farnsworth Munsell 100hue test • Refraction: Retinoscopy- streak/ Priestley Smith, Use of Jackson"s cross-cylinder, Subjective and objective refraction, Prescription of glasses • Diagnosis & Assessment of squint including:	P	DOPS

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	Ocular position and motility examination, Synotophore usage, Lees screen usage(if available), Diplopia charting Assessment of strabismus - cover tests/prismbars/ synoptophore Amblyopic diagnosis and treatment Assessmentof convergence, accommodation, stereopsis, suppression • Exophthalmometry: Usage of Hertel"s Exophthalmometry- proptosis 0measurement • Contact lenses: Hand-on training whereverpossible Fitting and assessment of RGP and softlenses Subjective verification of over refraction Common complications arising from contact lensuse Educating the patient regarding CL usage,and of complications • Low Vision Aids Knowledge of basic optical devices available and relative advantages anddisadvantages of each. The basics of fitting, with knowledge ofavailability		
3.	Perform and interpret the following Essential Ocular imaging and investigative skills including • Fluoroscein in angiography • Ophthalmic ultrasound: A-scan /B-scan • Automated perimetry for glaucoma and neurological lesions • OCT and basic knowledge of UBM • ERG, EOG, VER • Specular Microscopy • New modalities of glaucoma investigation • Radiological tests: • X rays – Antero Posterior/ Lateral View, PNS (Water"s view) / Optic canal views, Localization of ocular and intra orbital Foreign Bodies • Interpretation of – CT scan / MRI	P	DOPS/Mini-CEX
4.	Perform independently and provide follow-upcare the following laser • Yag Capsulotomy • Laser iridotomy • Focal and panretinal photocoagulation	P	DOPS

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Surgical Procedures

Competencies for Surgeries in Ophthalmology			
Sl No	Competencies	Level OfCompetencey K- Knows KH-Knows HowS- Shows P- Performs	Assessment
1.	Perform the following minor surgical procedures independently, provide post-op follow-up care, recognize and treat complications that arise • Conjunctival and corneal foreign body removal on the slit lamp • Conjunctival cyst excision • Conjunctival flap/ peritomy • Suture removal- skin / conjunctival/ corneal / corneoscleral • Subconjunctival injection • Posterior Sub-Tenon"s injections • Chalazion incision and curettage • Biopsy of small lid tumors • Tarsorrhaphy • Artificial eye fitting	P	DOPS
2.	Perform the following ocular anesthesia independently, identify and treat complications • Retro bulbar anesthesia • Facial nerve blocks- O"Brien / Atkinson/ Van lint & modifications • Frontal nerve blocks • Infra orbital nerve blocks • Blocks for sac surgery	P	DOPS

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3.	Perform independently / under supervision /assist and deal with complications arising from the following surgeries • Lid Surgery ○ Tasorrhaphy ○ Ectropion & entropion (simple procedures) ○ Lid repair following trauma – including lid margin tears ○ Epilation, electroepilation • Destructive procedures ○ Evisceration with or without implant ○ Enucleation with or without implant ○ Enucleation for eye donation ○ Cyclocryotherapy • Sac surgery ○ Dacryocystectomy ○ Dacryocystorhinostomy ○ Probing for congenital obstruction of nasolacrimalduct • Pterygium excision with modifications, conjunctival autograft and amniotic membrane transplant • Repair of corneal / corneo – scleral perforations • Strabismus surgery • Recession and resection procedureson the horizontal recti • Orbital surgery Incision and drainage via anterior orbitotomy for abscess	P	DOPS/OSCAR

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4.	Perform independently / under supervision / assist and deal with complications arising from the following microsurgical procedures • Cataract surgery o Standard ECCE with or without IOL implantation o Small incision ECCE with orwithout IOL implantation o Secondary AC or PC IOL implantation o Phacoemulsification- underguidance /assisted	P	OSCAR
5.	Perform independently / under supervision /assist and deal with complications arising from the following surgeries • Vitreous Surgery Intra-vitreal and intra-cameral(anterior chamber) injection techniques and dosages, particularly for endopthalmitismanagement. The student should know the basis ofopen sky vitrectomy (anterior segment) in the management of cataract surgery complications.	S	DOPS
6.	Have Knowledge of the steps and complications and preferably assisted in the following microsurgical procedures • Keratoplasty - Therapeutic and optical • Glaucoma surgery • Trabeculectomy- including Pharmacological modulation of trabeculectomy	KH	Essay
7.	Have Knowledge of the steps and complications and preferably assisted in thefollowing retinal surgeries • Retinal Detachment surgery • 3-port vitrectomy with variousadditional steps like membrane • peeling, silicone oil injectionandendolaser	KH	Essay

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Community Ophthalmology Competencies			
Sl No	Competencies	Level of competency K- Knows KH-Knows HowS-Shows P- Performs	Assessment
1	Ability to organize institutional screening	KH,P	WPBA,Role play
2	Ability to organize peripheral eye screening camps, schoolscreening camps	KH,P	WPBA,360 Feed back
3	Knowledge and ability to execute guidelines of National Program for Prevention of Blindness, National Rural Health Mission policies and Vision 2020	K,SH	Essay,MCQ,Viva Voce
4	To be aware of national and international agencies involvedin theprevention of blindness	K	Essay,MCQ,Viva Voce
5	Calculate Cataract surgical rate and cataract incidence inIndia	KH,SH,P	SAQ,Viva Voce
6	Awareness and exposure to Master of Public Healthprograms	K	Essay,MCQ,Viva Voce
7	Impart public health education in campsites	SH,P	WPBA,Role play
8	Understand the Functioning of Eye banking	KH,SH	Essay,MCQ, Viva Voce, WPBA

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Community Eye Health • Low Vision Rehabilitation

Low vision rehabilitation Competencies

Sl No.	Competency	Level of competency KH-Knows HowS-Shows P- Performs	Assessmen
1	Describe the definition, types and degrees of Low vision.	KH	SAQ
2	Describe the most common causes of low vision in different agegroups.	KH	SAQ
3	Describe the special aspects of vision assessment for children andadults with low vision.	KH/S	SAQ
4	Describe the tests for determination of visual disability	S/P	SAQ
5	Describe the evaluation of and rationale for licensing automobile drivers who are visually impaired and understandthe local licensing regulations.	KH	SAQ
6	Describe the challenges encountered by individuals withvision impairments.	KH	SAQ
7	Describe the effects of low vision on the general health andpsychological well-being of the patient.	KH	SAQ
8	Describe the goals of therapy in patients with low vision	KH	SAQ
9	Describe the optics of low vision aids	KH	SAQ
10	Describe the clinical applications and limitationsof low vision aids (e.g Closed circuit television, magnification, Braille, Computer with artificial speech etc)	KH	SAQ
11	Describe the significant co-morbidities that caninterfere withlow vision rehabilitation.	KH	SAQ
12	Describe the vision related quality of lifemeasurements.	KH	SAQ
13	Describe the medical and/or surgical interventions necessary to achieve best possiblevisual outcomes in patients with lowvision.	KH	SAQ
14	Describe the concept of artificial vision and implantation of microchips for the treatment ofpatients with low vision	KH	SAQ
15	Perform evaluation of visual function in patientswith low vision.	P	Mini-CEX
16	Perform visual acuity and visual field assessmentin licensingdrivers who are visually impaired	P	Mini-CEX
17	Prescribe rehabilitative therapies and opticaldevices topatients with low vision	P	DOPS

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18	Demonstrate low vision devices and educatepatients on theuses and limitations of these devices.	P	DOPS
19	Prescribe the visual field enhancing techniques for patients withhemianopia field loss.	P	DOPS
20	Inform patients with low vision of the rehabilitative resourcesavailable in the region and provide contact details.	S/P	DOPS

Ethics and Professionalism in Ophthalmology

Ethics and professionalism Competencies			
Professionalism			
Sl. No.	**Competencies: At the end of three yearsof residence, the post-graduate student should be able to**	**Level of competency K- Knows KH- Knows how SH- Shows how P- Performs**	**Assessment**
1.	Demonstrate the personal etiquettes expected of a healthcare professional with respect to time management.	P	DOPS Viva voce
2.	Demonstrate the personal etiquettes expected of a healthcare professional with respect to personal care and hygiene	P	DOPS Viva voce
3.	Demonstrate the personal etiquettes expected of a healthcare professional with respect to social and gender boundaries and behaviors	P	Case scenarioMini-CEX DOPS OSCE
4.	Demonstrate respect for colleagues on issues that breach respect (gossiping, pointing faults, contradicting)	SH	DOPS Mini-CEXOSCE
5.	Demonstrate respect for patient privacy and confidentiality	P	Case scenarioMini-CEX DOPS OSCE
6.	Demonstrate good communication skills such as maintaining an open posture, making eye contact and paying attention	P	DOPS Mini-CEX Case scenario OSCE
7.	Demonstrate an understanding of collaboration and teamwork	SH/P	DOP Critical appraisal ofmovie
8.	Demonstrate an understanding of patient safety atthe core of healthcare quality	SH/P	DOPS Reflectivenarrative
9	Demonstrate complete and comprehensive documentation in a case sheet from admissionrecords to discharge.	SH/P	DOPS
10	Conduct an audit of ophthalmic services andprepare a report	SH/P	Mini-CEX

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Ethics			
Sl.No.	Competencies: At the end of three years of residence, the post-graduate student should be able to	Level of competency K- Knows KH- Knows howSH- Shows how P- Performs	Assessment
1.	Demonstrate how an effective informed consent process in ophthalmic healthcare is carried out (including routine ophthalmic surgery, destructive ophthalmic procedures, etc)	P	DOPS Mini-CEX Standardized patient (or role play)
2.	Demonstrate respect for autonomyof the patient and avoidance of paternalism in the context of ophthalmology healthcare	P	DOPS Standardized patient (or role play)
3.	Demonstrate the application of care in the context of ophthalmic healthcare (show empathy to patient who is aged, progressively blind and requires support)	P	DOPS Mini-CEX Standardized patient (or role play)
4.	Demonstrate methods of fair allocation of donor eyes in an eyebank.	SH	Mini-CEX
5.	Demonstrate maintenance of privacy and confidentiality of patients in the context of case sheetdocumentation and reporting of HIV positive status	SH	Mini-CEX
6.	Demonstrate truth-telling and breaking of bad news in the contextof healthcare (as in diagnosis of ocular cancers, intraoperative complications, poor visual prognosis, destructive surgeries like enucleation/evisceration, etc)	SH	Mini-CEX
7.	Report a medical error to the concerned authority in the context of healthcare (wrong medication, wrong eye, wrong patient, wrong drug, wrong dosage, etc)	SH	Mini-CEX
8.	Demonstrate the process of shared clinical decision-making in the context of ophthalmologic healthcare (referral, second opinion,patient involvement, etc)	SH	Mini-CEX
9.	Demonstrate an ethical medical profession-industry relationship inthe context of prescription of medicines, accepting of gifts and disclosure of conflict of interest	SH	Mini-CEX
10.	Demonstrate informed consent in health care (surgery, laser procedures, diagnostic procedures, eye donation, etc)	P	DOPS
11.	Demonstrate informed consent inhealth care in difficult situations (children, mentally-challenged, pregnant women,terminally ill)	P	DOPS

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12.	Demonstrate methods to avoid stigma and discrimination in the context of HIV infection, disabilities, gender and LGBTQ, socioeconomic vulnerabilities, and in the context of COVID-19 infection	SH	Mini-CEX
13.	Demonstrate the steps in counseling for an HIV patient in an ophthalmic care setting	SH	Mini-CEXDOPS
14.	Demonstrate the steps in genetic counseling in an ophthalmic care setting	SH	Mini-CEXDOPS

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Research Ethics			
1	Develop a research participant informationsheet in simple language (English version)for an adult patient undergoing an ophthalmologic clinical trial	P	DOPS
2	Develop an informed consent document in simple language (English version) for an adult patient undergoing an ophthalmologicclinical trial	P	DOPS
3	Demonstrate responsible conduct of research by conducting the dissertationproject with honesty, responsibility, accountability and transparency	P	Dissertation review and audit by the gui external agency
4	Report an adverse event to the concerned authority (Guide, ethics committee) in thecontext of research.	SH	Dissertation review and audit by the gui external agency
5	Demonstrate ethical choice of authorship during publication in accordance with the guidelines as laid down by the InternationalCouncil of Medical Journal Editors (ICMJE)	SH	Mini-CEX
6	Prepare manuscript for publication avoidingany form of plagiarism	P	DOPS Continuous assessment
7	Demonstrate methods adopted during dissertation to protect privacy of research participants and confidentiality of data (in the enrollment process, during the informedconsent process, during data collection and during publication proces)	P	DOPS Continuous assessment

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Medico legal aspects in ophthalmology

Medicolegal aspects Competencies

Sl No	Competencies	Level of competency KH-Knows HowS-Shows P- Performs	Assessment
1.	Understand the Medicolegal role of anophthalmologist a) As a third party expert b) As an expert who has treated the case) As a doctor facing Legal Proceeding againsthim/her.	KH	Essay questions, MCQs, Case discussions, Viva Voce.
2.	Define Transplantation of Human organ Act. Describe the legal aspects of Eye Donation, Keratoplasty and eye bank under Transplantationof Humanorgan Act 1994(Recent amendment 2014) and The Bombay corneal Grafting Act,1957	KH	Essay questions, MCQs, Case discussions, Viva Voce.
3.	Desribe the types of legal proceedings such as legalnotice, summons, warrant, police statement, cognizable offence, complaint, judicial proceeding.	KH	Essay questions, MCQs, Case discussions, Viva Voce.
4.	Explain the Liabilities of Doctor arising under Lawand the enactments under which Civil and Criminalcases for medicalnegligence of the doctors can be filed	KH	Essay questions, MCQs, Case discussions, Viva Voce.
5.	Describe the IPC Various sections relevant for theMedical profession.	KH	Essay questions, MCQs, Case discussions, Viva Voce.
6.	Define The Consumer Protection Act 1986 (No. 68of 1986) with Amendments of 1991, 1993 and 2002, 2019. Describe Medical Negligence, act of omission,act of commission Analyse the type of Hospitals under CPApreview. List the primary responsibilities of Hospital If not carried outamounts to negligence	KH	Essay questions, MCQs, Case discussions, Viva Voce.

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7.	Analyse the Pecuniary Jurisdiction of Consumer Forum(As per Amendments of 2002)	KH	Essay questions, MCQs, Case discussions, VivaVoce.
8.	Describe the Procedural sequences of complaintslodge byPatients with various bodies.	KH	Essay questions, MCQs, Case discussions, Viva Voce.
9.	Analyse which ophthalmic complications are not negligence,what acts of an ophthalmologists are liable ,when is a manufacturer of products liable fornegligence in Case Laws of State and National Commission of CPA	KH	Essay questions, MCQs, Case discussions, Viva Voce.
10	Describe "Prevention Of Violence And Damage ToProperty Act", also known as the "Medical Protection Act (MPA)".	KH	Essay questions, MCQs, Case discussions, Viva Voce.
11	Demonstrate proficiency about when to informpolice	P	Log Book ,WPBA,Role play, Case discussion. Essay questions, Viva Voce.
12	Perform Documentation of all the clinical events and record keeping of all required medical recordsfor the predeterminedduration.	P	Log Book ,WPBA,Role play, Case discussion. Essay questions, Viva Voce.
13	Analyse the necessity of indemnity insurance ofdoctorsand get one self insured	KH P	Log Book ,WPBA,Role play, Case discussion. Essay questions, Viva Voce.
14	Demonstrate proficiency in taking Various types of Consentrelevant to the clinical circumstances	P	Log Book ,WPBA,Role play, Case discussion. Essay questions, Viva Voce.

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Research methodology in ophthalmology

Research Methodology Competencies			
Sl.No.	Competencies	Level of competency KH-Knows HowS- Shows Performs	Assessment
1	Should be able to understand evidence-basec medicine andresearchmethodology And Ethics in research	KH	Group discussionand theory
2	Able to perform Proper literature searchAn Framing aresearch question	P	Demonstration andgroup discussion
3	Describe Various study designs and Qualitativ research/epidemiologicalstudies/ development of tools for quality of life and studies relatedto social issues	K	Seminars ,MCQs
4	Describe Concept of population, concep ofsample, sample sizecalculation	K	Theory questions Demonstration andgroup discussion,
5	Understanding of Basics of statistics a. Types of data b. Central tendency and spread of data c. Understanding *P* value . Standard error of mean (SEM) andconfidence interval	K	Seminars ,MCQs
6	Describe Hypothesis testing . Concept of null hypothesis an alternatehypothesis b. Type I error c. Type II error d. Power of study e. Various statistical tests	KH	Seminars ,MCQs

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7	Understanding various terminologies a. Risk ratio b. Odds ratio c. Sensitivity d. Specificity e. Positive predictive value f. Negative predictive value g. Receiver operator curve (ROC) h. Area under ROC i. Risk reduction j. Absolute risk reduction k. Number needed to treat l. Number needed to harm	K	Seminars/symposia ,MCQs
8	Protocol writing 12. Scientific writing . How to read and review a paper (criticalappraisal).	P	Demonstration andgroup discussion

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Annexure 2

MONTHWISE TEACHING SCHEDULE FOR POST GRADUATES DEPARTMENT OF OPHTHALMOLOGY

MONTH	SITE	Teacher
January	Optics and Refraction	Moderator
February	Conjunctiva	Moderator
March	Cornea	Moderator
April	Lens	Moderator
May	Uvea	Moderator
June	Glaucoma	Moderator
July	Lids	Moderator
August	Ocular oncology	Moderator
September	Retina	Moderator
October	Squint and neuro ophthal	Moderator
November	Orbit and Lacrimal Apparatus	Moderator
December	Systemic and community Ophthalmology	Moderator

Note:

1. The respective faculty will be in charge of the entire process...planning, implementation and assessment.
2. It is preferable to put the time table latest by 20th of previous month.
3. PGs are expected to keep in touch with the respective teachers well ahead of the class.

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Annexure 3
SEPTEMBER TEACHING SCHEDULE FOR POST GRADUATES

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 Grand Rounds	2 Grand Roun
3	4 Seminar	5 ALC	6 Case Present	7 Journal Club	8 Grand Rounds	9 Grand Round
10	11 Seminar	12 ALC	13 Case Present	14 Journal Club	15 Grand Rounds	16 Grand Round
17	18 Seminar	19 ALC	20 Case Present	21 Journal Club	22 Grand Rounds	23 Grand Round
24	25 Seminar	26 ALC	27 Case Present	28 Journal Club	29 Grand Rounds	30 Grand Round

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ANNEXURE –4

DEPARTMENT OF OPHTHALMOLOGY

POLICY FOR OUTSIDE PG POSTINGS

Year wise PG Posting

1. 3rd year students are posted for 1 month peripheral posting (Narayana Netralaya).
2. All compulsory posting to DRP (District Residency Programme)

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Annexure 5

Logbook entry

Date	
Setting/method	
Presented/attended	
Summary in brief	
Reflection	
Teachers comments	

Student's signature

Guide's Signature

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ANNEXURE-6

Postgraduate Students Appraisal Form Name of the PG Student Period of Training Duration:.....to.....

Sl. No	Particulars	Not satisfactory (1,2,3)	Satisfactory (4,5,6)	More than Satisfactory (7,8,9,10)	Remarks
1	Journal based learning				
2	Patient care and rounds				
3.	Bedside teaching, Clinical seminars				
4.	Communication skills				
5.	Log book				
6.	Thesis work				
7.	CME/Outreach programmes/Conference presentations				
8.	Self-directed learning				
9.	Under-graduate teaching				
10.	Research/Publication				

Sign of the student Sign of the assessor Sign of Head of the Department

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Course Specifications

MS Ophthalmology 2022 onwards

Course Code: MSC509A

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Course Specifications

Course Title	**Basic Sciences related to Ophthalmology, Refraction & Optics**
Course Code	**MSC509A**
Department	**Ophthalmology**
Faculty	**Ramaiah Medical College**

Course summary:
This course is designed in such a way that the student will master the basics of Optics and refraction, basic sciences in Ophthalmology.

Course Outcomes:
CO 1: Demonstrate comprehensive knowledge of applied anatomy, Physiology. Biochemistry , Microbiology, Pathology and pharmacology pertinent to the eye. (C)
CO 2: Demonstrate the understanding of various concepts of Optics and refraction. (C)

Course Content:

A. Basic sciences in Ophthalmology

1. Orbital and ocular anatomy

a. Gross anatomy

b. Histology

c. Embryology

2. Ocular Physiology

3. Ocular Pathology

4. Ocular Biochemistry, General biochemistry, biochemistry applicable to ocular function

5. Ocular Microbiology, General Microbiology, specific microbiology applicable to the eye

6. Immunology with particular reference to ocular immunology

7. Genetics in ophthalmology

B. Optics and refraction

1. Basic physics of optics
2. Applied ophthalmic optics
3. Applied optics including optical devices
4. Errors of Refraction

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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Out	Program Outcomes				Program Specific Outcomes				
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5
MSC509A Basic Sciences related to Ophthalmology, Refraction & Optics	CO 1	3	NA	1	1	1	NA	NA	1	NA
	CO 2	3	3	2	3	3	3	1	2	NA
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution										

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Course Specifications

MS Ophthalmology 2022 onwards

Course Code: MSC510A

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Course Specifications

Course Title	Clinical Ophthalmology
Course Code	MSC510A
Department	Ophthalmology
Faculty	Ramaiah Medical College

Course Summary:
This course is designed in such a way that the student will master the evidence based management of disorders of anterior segment and adnexae

Course Outcomes:
CO 1: Demonstrate the ability to diagnose diseases of the anterior segment and discuss appropriate management. (C,A,P)
CO 2: Demonstrate the ability to diagnose diseases of the adnexa and discuss appropriate management. (C,A,P)

Course Content:

A.Disorders of anterior segment

1.Disorders of the Conjunctiva

2.Disorders of the Sclera

3.Disorders of the Cornea

4.Disorders of the Uveal Tract

5.Disorders of the Lens
6.Glaucoma

B. Disorders of adnexa

1.Disorders of the lids

2.Disorders of the lacrimal system

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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Outcomes	Program Outcomes				Program Specific Outcomes				
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5
MSC510A Clinical Ophthalmology	CO1	3	3	3	3	3	2	3	3	2
	CO 2	3	3	3	3	3	2	2	3	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution										

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Course Specifications

MS Ophthalmology 2022 onwards

Course Code: MSC511A

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Course Specifications

Course Title	Systemic Diseases in Relation to Ophthalmology
Course Code	MSC511A
Department	Ophthalmology
Faculty	Ramaiah Medical College

Course Summary:

This course is designed to enable the student to learn the principles of diagnosis and management of disorders of the posterior segment of the eye, disorders of strabismus, neuro-ophthalmology. In addition, the student learns the multi-disciplinary approach to diagnosing and managing ophthalmological disorders with systemic associations.

Course Outcomes:

CO 1: Demonstrate the ability to diagnose and manage disorders pof the posterior segment.. (A,C,P)
CO 2: Demonstrate the ability to diagnose and manage ocular motility disorders and neuro-ophthalmology(A, C, P)
CO3 : Demonstrate the ability to diagnose and correlate ocular manifestations of systemic diseases and discuss appropriate management. (A,C, P).

Course Content:

A.Diseases of the retina, uvea and intraocular tumours
1.Disorders of the Retina
2.Disorders of the Orbit
3.Paediatric ophthalmology
4.Ocular oncology

B.Diseases of ocular motility and neuro-ophthalmology
1. Strabismus and Amblyopia
2.Disorders of the Optic Nerve and Visual Pathway
3.Neuro-ophthalmology

C. Ocular manifestations of systemic diseases

1. Immune ocular disorders

2. Ocular involvement in systemic disease

3. Ocular genetics and disorders

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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Out	Program Outcomes				Program Specific Outcomes				
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5
MSC511A Systemic Diseases in Relation Ophthalmology	CO1	3	3	3	3	3	2	2	3	1
	CO 2	3	3	3	3	3	2	2	3	1
	CO3	3	3	2	2	3	2	2	2	1
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution										

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Course Specifications

MS Ophthalmology 2022 onwards

Course Code: MSC512A

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Course Specifications

Course Title	Recent Advances in Ophthalmology and Community Ophthalmology
Course Code	MSC512A
Department	Ophthalmology
Faculty	Medicine

Course Summary:

The course is designed in such a way that the student will develop an understanding of community ophthalmology and master recent developments in ophthalmology

Course Outcomes:

CO 1: Be cognisant of the newer advances in the management of ocular disorders.(C)

CO 2: Demonstrate the ability to perform community screening and identify common preventable and treatable ophthalmological disorders and discuss appropriate management (C,A,P)

Course Content:

A. **Recent advances in ophthalmology**

Ethics and Professionalism in Ophthalmology

Medico legal aspects in ophthalmology

Research methodology in ophthalmology

Designing a modern ophthalmic operation theatre

Video assisted surgeries

Awareness of 3D printing in ophthalmology

Awareness of Robotic surgeries

Newer lasers

Newer surgical techniques

Newer equipments

B. **Community ophthalmology**

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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Outcomes	Program Outcomes				Program Specific Outcomes				
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5
Recent Advances in Ophthalmology and Community Ophthalmology MSC512A	CO 1	2	2	1	1	2	1	NA	1	NA
	CO 2	3	3	2	3	3	3	3	2	1
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution										

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Course Specifications

MS Ophthalmology 2022 onwards

Course Code: MSP503A

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Course Specifications

Course Title	Thesis- Ophthalmology
Course Code	MSP503A
Department	Thesis – Ophthalmology
Faculty	Ramaiah medical College

Course Summary:
The course is designed in such a way that the student will master the science of research in terms of designing, conducting and interpreting the results.

Course Outcome:
CO 1 : Describe the techniques of research, identify available literature and critically analyse the same. (C)

Course content

To conduct research on a designated topic, write a proposal collect data, perform appropriate statistics and write a dissertation.

Course details:
Every candidate pursuing MS Ophthalmology degree course is required to carry out work on a selected research project under the guidance of a recognised post graduate teacher. The results of such a work shall be submitted in the form of a dissertation. The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, comparison of results and drawing conclusions.

Every candidate shall submit to the Registrar (Academic) of the University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within six months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel.
Such synopsis will be reviewed and the dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.
The dissertation should be written under the following headings:

1. Introduction
2. Aims or Objectives of study
3. Review of Literature
4. Material and Methods
5. Results
6. Discussion
7. Conclusion
8. Summary
9. References (Vancouver style)
10. Tables
11. Annexures

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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Outcomes	Program Outcomes				Program Specific Outcomes				
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5
MSP503A Thesis – Ophthalmology	CO 1	3	3	3	3	3	3	3	3	NA

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Course Materials:

Books and Journals

1. Ophthalmic Surgery: Principles and Techniques. Blackwell Science. AlbertDM.
2. Principles and Practice of Ophthalmology. Albert DM, Jakobiec. W BSaunders
3. Principles & Practice of Ophthalmology. GholamA Paymen
4. The Current American Academy of Ophthalmology Basic and Clinical Science Course (13volumes)
5. Duke Elder"s Practice of Refraction. Abrams D. Churchill Livingstone.
6. Text book of Ophthalmology. Yanoff and Duker
7. Retina. Stephen J Ryan:
8. Ophthalmic Ultrasound: Sandra Byrne and Ronald Green.
9. Cornea: Fundamentals, Diagnosis, and Management. Krachmer JH, Mannis MJ, Holland EJ. MosbyElsevier.
10. Ophthalmology: YanoffN,DukerJS.MosbyElsevier.

10.Review of Ophthalmology. Friedman NJ, Kaiser PK, TrattlerWB. ElseviewSaunders,Philadelphia. 12. Corneal Transplantation. Vajpayee RB. Jaypee Brothers MedicalPublishers (P) Ltd, NewDelhi.

11. Fundamentals of Clinical Ophthalmology Series. Coster D. Cornea. Blackwell PublishingLimited. 14. The Contact Lens Manual. A practical guide to fitting. GassonA, Morris A J. Butterworth HeinemannElsevierSteinert"s cataractsurgery. Shields Text bookofglaucoma Smith and Nozik :Uvea

12. Rootman"s diseases of theorbit 1
13. Eyelid, conjunctival and orbital tumors. An atlas and textbook. Shields JA, Shields CL. Philadelphia: Lippincott Williams &Wilkins.
14. Intraocular tumors. An atlas and textbook. Shields JA, ShieldsCL.

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15. Pediatric Ophthalmology. Taylor and Hoyt: SaundersLtd.

16. Management of Strabismus and Amblyopia. Pratt-Johnson and Tilson: ThiemeVerlag.

17. Handbook of Pediatric Eye and Systemic disease. Wright, Spiegel and Thompson.

18. BinocularVision and Ocular Motility. Theory and Management of Strabismus. Von NoordenGK. Mosby.

19. Surgical Management of Strabismus.Helveston:

20. Strabismus: A Decision Making Approach. Von NoordenandHelveston:

21. Thyroid Eye Diseases. Char DR. Williams and Wilkins,Baltimore.

22. A Manual of Systematic Eyelid Surgery.Collin JRO (ed). ChurchillLivingstone, Edinburgh.

23. Refractive Surgery. AgarwalA, AgarwalA, Jacob Soosan.Jaypee.

24. LASIK Complications, Prevention and management. Gimbel HV, Penno EEA. SlackInc.

25. Management of Complications of Refractive Surgery. AlioJL, Azar DT. Springer.

26. Quality of Vision: Essential Optics for the Cataract and Refractive Surgeon. Holladay JT. SlackInc. 33. Ocular Pharmacology:Havener

27. Anatomy: Wolff 's Anatomy of the Eye andOrbit

28. Physiology: Adler"s Physiology of theEye

29. Textbook of Ophthalmology (2 volumes). Easty DL, Sparrow JM.Oxford Oxford MedicalPublications.

30. The Eye. Basic Sciences in Practice. Forrester JV, Dick AD, McMenamin PG, Lee WR. W BSaunders

31. Indian Journal of Ophthalmology

32. Journal of Glaucoma

33. Clinical and Experimental Ophthalmology

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