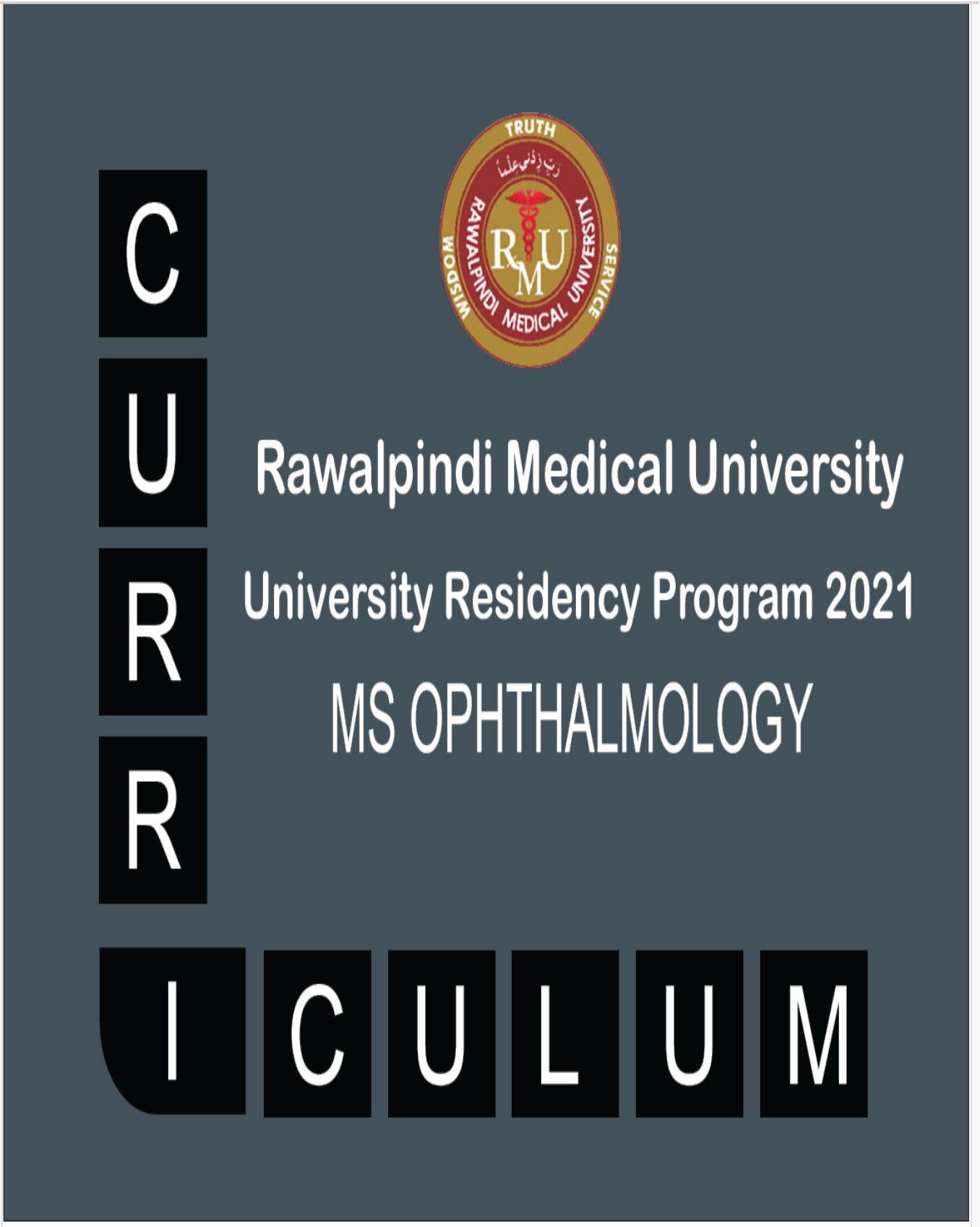
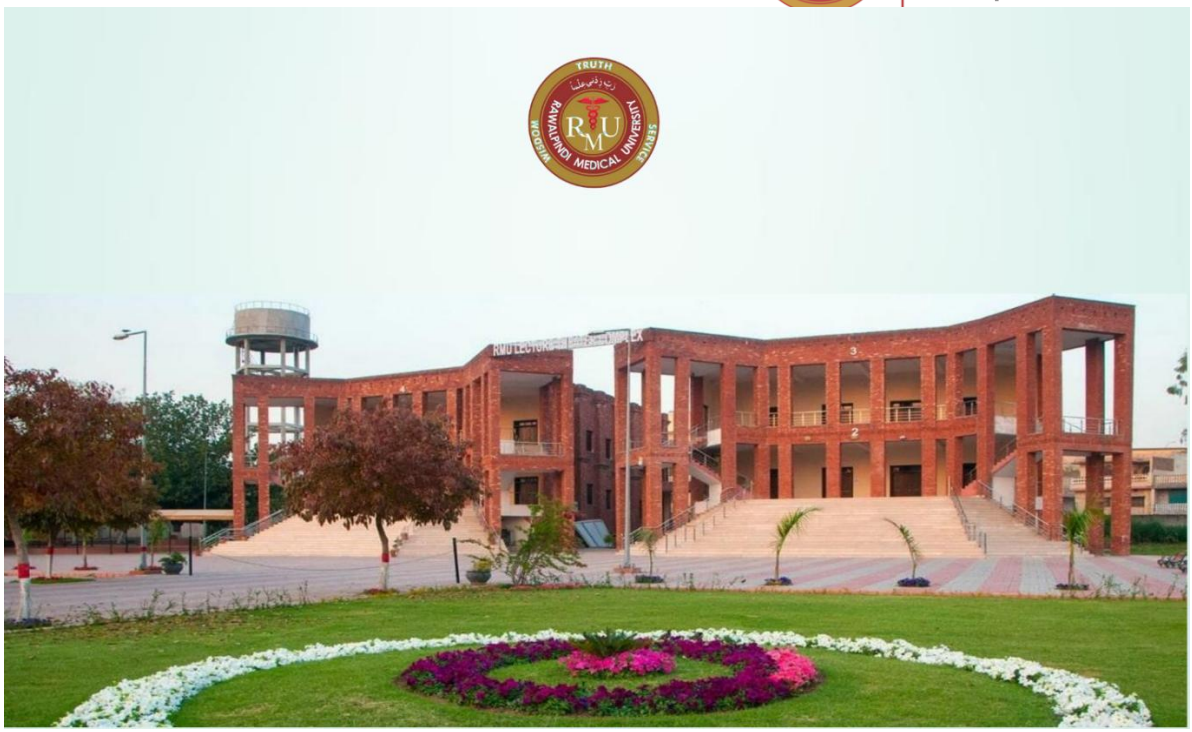

CURRICULUM
Rawalpindi Medical University
University Residency Program 2021
MS OPHTHALMOLOGY



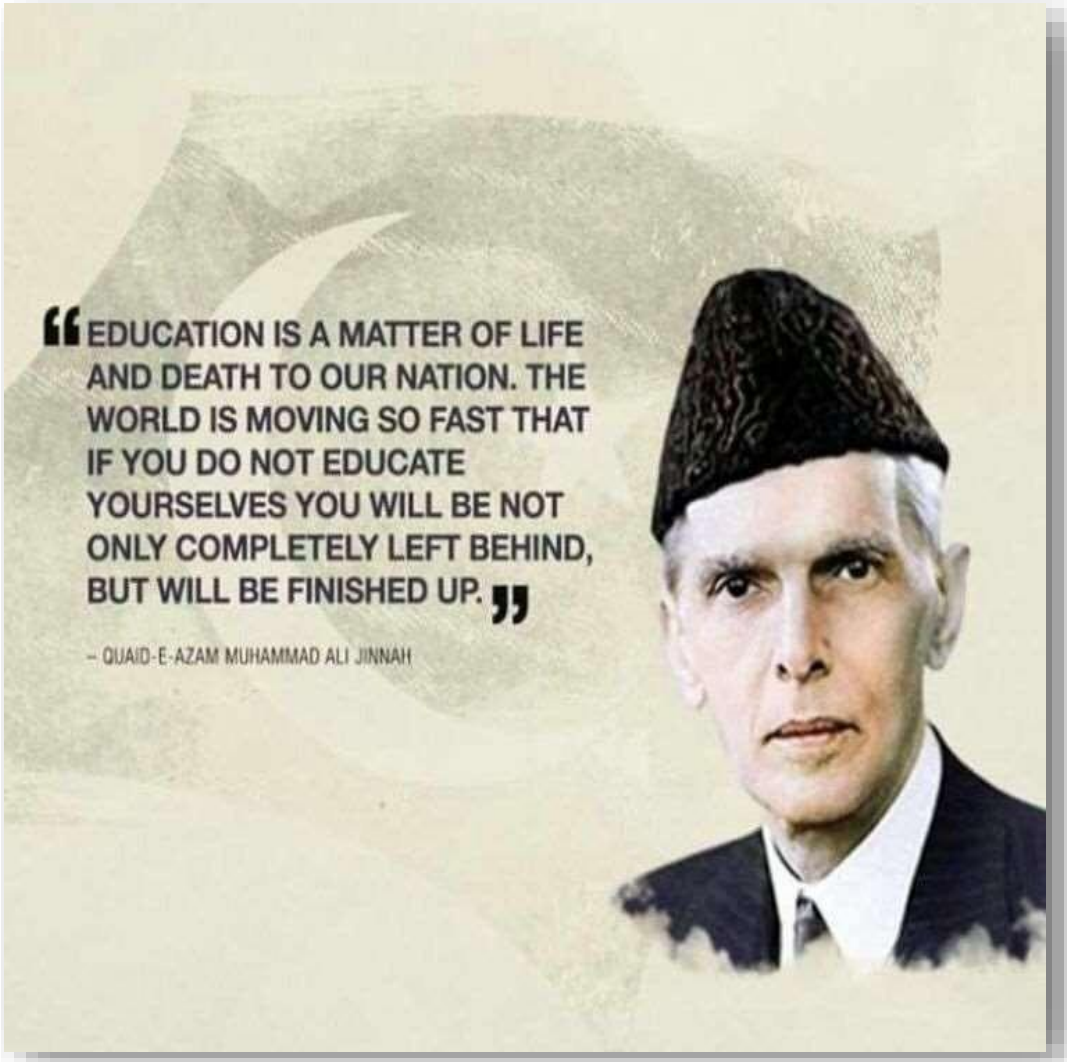
RAWALPINDI MEDICAL UNIVERSITY

CURRICULUM & REGULATIONS

FOR

MS OPHTHALMOLOGY

(Revised February, 2025)


"EDUCATION IS A MATTER OF LIFE AND DEATH TO OUR NATION. THE WORLD IS MOVING SO FAST THAT IF YOU DO NOT EDUCATE YOURSELVES YOU WILL BE NOT ONLY COMPLETELY LEFT BEHIND, BUT WILL BE FINISHED UP."
– QUAID-E-AZAM MUHAMMAD ALI JINNAH

PREFACE

The horizons of Medical Education are widening & there has been a steady rise of global interest in Post Graduate Medical Education, an increased awareness of the necessity for experience in education skills for all healthcare professionals and the need for some formal recognition of postgraduate training in Internal Medicine.

We are seeing a rise in the uptake of places on postgraduate courses in medical education, more frequent issues of medical education journals and the further development of e-journals and other new online resources. There is therefore a need to provide active support in Post Graduate Medical Education for a larger, national group of colleagues in all specialties and at all stages of their personal professional development. If we were to formulate a statement of intent to explain the purpose of this log book, we might simply say that our aim is to help clinical colleagues to teach and to help students to learn in a better and advanced way. This book is a state-of-the-art log book with representation of all activities of the MS Ophthalmology program at RMU.A summary of the curriculum is incorporated in the logbook for convenience of supervisors and residents. MD curriculum is based on six Core Competencies of ACGME (Accreditation Council for Graduate Medical Education) including

Patient Care, Medical Knowledge, System Based Practice, Practice Based Learning, Professionalism, Interpersonal and Communication Skills. A perfect monitoring system of a training program including monitoring of teaching and learning strategies, assessment and Research Activities cannot be denied so we at RMU have incorporated evaluation by Quality

Assurance Cell and its comments in the logbook in addition to evaluation by University Training Monitoring Cell (URTMC). Reflection of the supervisor in each and every section of the logbook has been made sure to ensure transparency in the training program. The mission of Rawalpindi Medical University is to improve the health of the communities and we serve through education, biomedical research and health care. As an integral part of this mission, importance of research culture and establishment of a comprehensive research structure and research curriculum for the residents has been formulated and a separate journal for research publications of residents is available.

Prof. Muhammad Umar
(Sitara-e-Imtiaz)
(MBBS, MCPS, FCPS, FACG,
FRCP (Lon), FRCP (Glasg), AGAF)
Vice Chancellor Rawalpindi Medical University & Allied Hospitals

RMU Motto

Mission and Vision of Rawalpindi Medical University

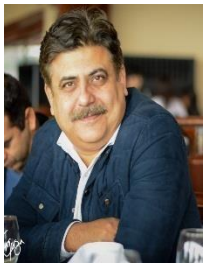
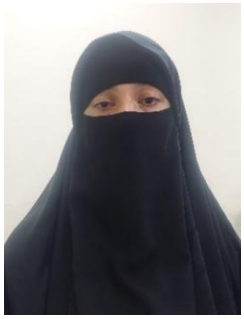
Vision

To impart evidence-based research-oriented health professional education in order to provide best possible patient care and inculcate the values of mutual respect, ethical practice of healthcare and social accountability.

Mission

Highly recognized and accredited center of excellence in Medical Education, using evidence-based training techniques for development of highly competent health professionals, who are lifelong experiential learner and are socially accountable

CONTRIBUTIONS

SR. NO.	NAME & DESIGNATION		CONTRIBUTIONS IN FORMULATION & REVISION OF CURRICULUM OF OPHTHALMOLOGY
1.		**Prof. Dr. Fuad Ahmad Khan Niazi** Head Of ophthalmology Department RMU & Allied Hospitals, Rawalpindi	Over all synthesis, structuring & over all write up of Curriculum of MS Ophthalmology, Log Book of MS Ophthalmology & Allied and also Log Book for MS Ophthalmology rotations under guidance of Prof. Muhammad Umar Vice Chancellor, Rawalpindi Medical University, Rawalpindi. Also, Proof reading & synthesis of final print version of Log Books of MS Ophthalmology and Rotation Log Book
2.		**Dr. Ambreen Gull** Associate Professor Ophthalmology Department Benazir Bhutto Hospital, Rawalpindi	Assistance of Professor Dr. Fuad Ahmad Khan Niazi in revising & updating the MS & MD curriculum, adding frameworks, Calgary model, EPA's, formulating the log books and computer work under his direct guidance & supervision.
3.		**Dr. Fatima Sidra** Senior Registrar Ophthalmology Department Holy Family Hospital, Rawalpindi	Assistance of Professor Dr. Fuad Ahmad Khan Niazi in revising & updating the MS & MD curriculum under his direct guidance & supervision.

4.		**Dr. Saira Bano Satti** Senior Registrar Ophthalmology Department Holy Family Hospital, Rawalpindi	Assistance of Professor Dr. Fuad Ahmad Khan Niazi in formulating the log books & computer work under his direct guidance & supervision.
5.		**Dr. Bilal Humayun Mirza** Ex-Senior Registrar Ophthalmology Department DHQ Hospital, Rawalpindi	Assistance of Professor Dr. Fuad Ahmad Khan Niazi in formulating the log books & computer work under his direct guidance & supervision.

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SECTION I: PREAMBLE

Mission of Training Program

To cultivate dedication in trainees, develop expertise in diagnostic and therapeutic ophthalmology, advancing clinical and research knowledge, and delivering high standards of patient-centered, evidence-based care. To promote ocular health locally and globally, embedding lifelong commitment to program values.

We are pleased to introduce this updated edition of the MS Ophthalmology curriculum, designed to provide a comprehensive, structured, and competency-driven educational experience for our residents. This revision reflects our commitment to excellence in ophthalmic education, integrating feedback from faculty and residents, advancements in medical knowledge, and best practices in training.

Introduction to curriculum

A curriculum is a structured framework outlining the essential knowledge, skills, attitudes, and competencies that learners need to acquire over a specified training period. It includes a comprehensive plan for teaching, assessment, and learning activities tailored to achieve the desired educational outcomes. A curriculum aligns learning objectives with educational content, teaching methodologies, and assessment strategies to ensure that learners develop both theoretical knowledge and practical skills needed for their professional roles.

ACGME Competency Model

At Rawalpindi Medical University (RMU), we are committed to training our residents according to the Accreditation Council for Graduate Medical Education (ACGME) competencies, incorporating six core domains: Patient Care, Medical Knowledge, Practice-Based Learning and Improvement, Interpersonal and Communication Skills, Professionalism, and Systems-Based Practice. Additionally, we emphasize research as a fundamental component of our training. RMU proudly leads as the first public sector university in Pakistan to implement an ACGME-aligned postgraduate curriculum, reflecting our dedication to producing competent, compassionate, and research-oriented clinicians prepared to excel in today's dynamic healthcare landscape.

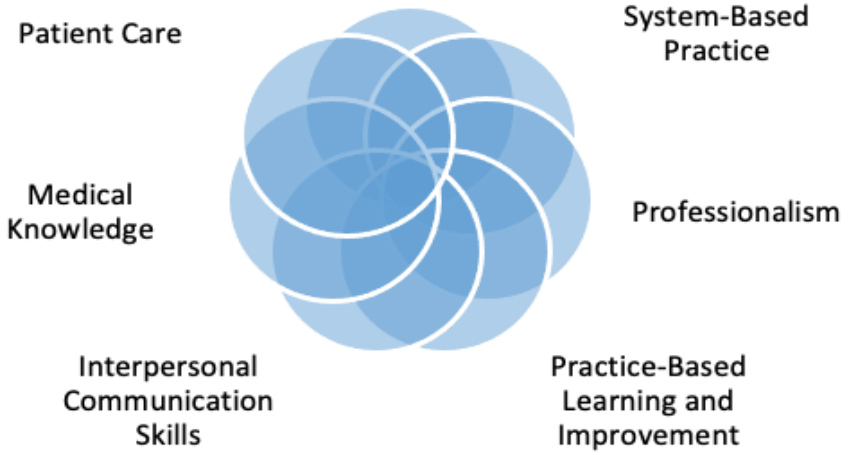


Figure 1: ACGME core competencies (Ref: https://sl.bing.net/hO8ZQtFeM1I)

Overview of Program

The **MS Ophthalmology** program is a well-established and globally recognized medical degree designed to equip trainees with in-depth expertise in the field of ophthalmology. This program, conferred as a **Master of Surgery in Ophthalmology (MS Ophthalmology)**, reflects decades of tradition and excellence in ophthalmic education and clinical training. The structured curriculum prepares residents with essential diagnostic, therapeutic, and surgical skills to advance ophthalmic healthcare and research, meeting international standards of medical education and patient care. The program of MS Ophthalmology of Rawalpindi Medical University is conducted with a goal to develop ophthalmologists who can provide quality eye care to meet the needs of patients both now and in the future, and who can contribute to the field of ophthalmology through participation in research.

Admission criteria

1. Resident Appointments

Eligibility Criteria

For admission in MS Ophthalmology course, the candidate shall be required to have:

- MBBS degree
- Completed one year House Job
- One year experience in Ophthalmology/General surgery/Allied surgical discipline in the given order of preference
- Registration with PMDC
- Passed Entry Test conducted by the University & aptitude interview by the Institute concerned
- Merit will be adhered to strictly for induction as per RMU rules.

Exemptions: A candidate holding FCPS ophthalmology/FRCS ophthalmology/Diplomat American Board shall be exempted from Entrance and Midterm Examinations and shall be directly admitted for Exit Examination, subject to fulfillment of requirements for the examination.

Number of Residents

The minimum number of residents in an accredited four-year program is eight or two per year.

Training sites

1. Holy Family Hospital, Rawalpindi Medical University

2. Benazir Bhutto Hospital, Rawalpindi Medical University

Monthly case presentations, journal club meetings and academic tests will be held for all the residents at each participating site alternatively.

Program Leadership

Program Director

The Program Director, serving as the Chairman of the Ophthalmology Department at Rawalpindi Medical University, oversees the residency program.

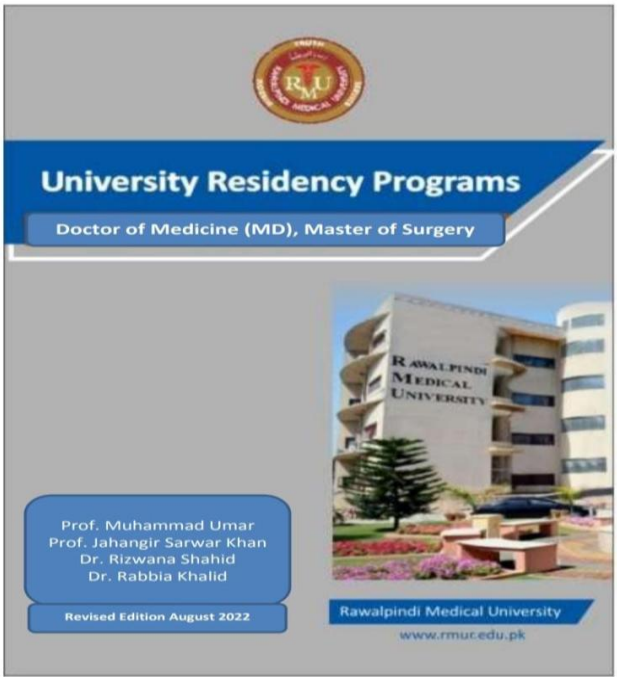
Faculty

The ophthalmology teaching faculty includes the Professor, Associate Professor, Assistant Professor, and Senior Registrars, all appointed according to PMDC standards, and actively engaged in resident education and training.

Additional Program Personnel

The Qualified allied vision science professionals, including an Optometrist, Orthoptist, and Ophthalmic Technologist, support resident training in their specialized fields within the ophthalmology department.

Rules and Regulations



Residents must maintain at least 80% attendance in clinical rotations, academic sessions, and case presentations, with full participation in exams, journal clubs, and assessments, all under faculty supervision. They must demonstrate professionalism, ethical conduct, and respect toward patients, staff, and peers. Competency in diagnostic and therapeutic ophthalmic procedures must be achieved progressively, alongside completion of coursework, case logs, and continuous assessments. Participation in research, presentations, conferences, and surgical audits is required, with regular feedback from faculty to address deficiencies. Duty hours are capped at 80 hours per week to ensure well-being, and any non-compliance with program rules may lead to disciplinary action or delay in certification.

Statutes

The MS Ophthalmology Residency Program at Rawalpindi Medical University follows structured statutes that guide clinical training, academic performance, and ethical practice. These statutes define essential competencies, promote professionalism, require research participation, and provide regular assessments to support growth. Collaboration with hospitals and community health initiatives expands clinical exposure, aligning with the program's mission to develop skilled, ethical, and community-focused ophthalmologists.

Program Structure

The duration of MS Ophthalmology course shall be four (4) years consisting of structured training in a recognized department under the guidance of an approved supervisor. The course is structured in two phases:

Phase I is structured for the 1st and 2nd calendar year. Doctors entering this will require closely supervised training in basic examination methods and techniques and should rapidly be introduced to the elements of surgery and the management of general outpatients and accident and emergency ophthalmic patients. In their second year, they will be expected to take a larger role in both theatre and outpatients, where they will benefit from special clinics. The training units should therefore provide a broad-based training in general ophthalmic medicine and surgery and exposure to the common subspecialties. The candidate shall undertake didactic and interactive training in Basic Ophthalmic Medical and Surgical Sciences, Optics & Refraction, Biostatistics & Research Methodology and Community Ophthalmology. At the end of 1st year, a theory and clinical based formative assessment will be conducted. At the end of 2nd year mid-term examination (MTA) will be held, comprising of MCQ based theory and Clinical OSCE.

Phase II is structured for 3rd and 4th calendar years in MS Ophthalmology. The trainee should see sufficient patients in a clinic to develop competency and fluency in managing patients in an outpatient setting but the number seen must not be excessive to the extent that training is impaired. The actual number of patients seen should be appropriate to the competency of the trainee and the complexity of the clinical condition of the patient. Surgical experience should develop as indicated by the learning outcomes in the curriculum. It is essential for the trainee to perform sufficient numbers of surgical cases (particularly cataract procedures) to experience a full range of clinical situations so that the trainee learns techniques to manage a range of cases and becomes competent in managing complications. At the end of 3rd year, a theory and clinical based formative assessment will be conducted. The candidate will have to achieve sufficient clinical and research capability during this phase so as to qualify his final term examination (FTA) for the award of degree.

Framework of the Program

Component	Details
Course Title	MS OPHTHALMOLOGY
Training Center	Department of Ophthalmology, Rawalpindi Medical University (RMU) & Allied Hospitals
Duration of Course	4 years
Credit Hours	132 hours
Supervision	Structured training under the guidance of an approved supervisor. Induction Period
Basic Training (Phase I) Duration Focus **Rotations**	 1st and 2nd year in the Department of Ophthalmology Orientation and training in Ophthalmology and mandatory workshops 1 month in Emergency Medicine
Assessment (Part I) **Mid Term Assessment (MTA)**	Continuous internal assessment based on competency & Formative assessment: In-Training- Assessment Year-1 At the end of 2 years, candidates will take the Mid Term Assessment (Summative)
Advanced Training (Phase II) Duration Focus **Rotations**	 3rd and 4th year Ophthalmology, Research, and Thesis writing 16 weeks
Assessment (Part II) **Final Term Assessment (FTA)**	Competency-based continuous internal assessment & Formative assessment: In-Training Assessment Year-3 At the end of four years, candidates will take the Final term assessment (Summative)
Research Component	Research component aligned with the Research Cycle, including thesis writing and submission according to RMU guidelines

Training Pathway MS ophthalmology

Phase	Year	Placement Departments and Duration	Research	Assessment
Phase 1	1st year	▪ Ophthalmology (11 months) ▪ Emergency medicine (1 month)	▪ 1 Disease statistical review ▪ Synopsis topic submission	▪ Formative ▪ In-Training (Theory & Clinical)
	2nd year	▪ Ophthalmology (12 months)	▪ Synopsis submission ▪ DRB ▪ ERB/IRF ▪ BASR	▪ Summative ▪ MTA (Mid training Assessment) (Theory & Clinical)
Phase 2	3rd year	▪ Ophthalmology (20 months) ▪ Dermatology (2 weeks) ▪ Radiology (2 weeks) ▪ Pathology (2 weeks) ▪ Oncology (2 weeks) ▪ Neurology (2 weeks) ▪ Plastic surgery (2 weeks) ▪ Community Ophthalmology (1 month)	▪ Data collection ▪ Data analysis ▪ Thesis writing	▪ Formative ▪ In-Training (Theory & Clinical)
	4th year		▪ BASR- Thesis approval ▪ Thesis completion certificate (DME)	▪ Summative ▪ FTA (Final term assessment) (Theory & Clinical)

Clinical and Surgical Training Resources

Ambulatory and In-patient Department

The hospitals serve a diverse patient population with a wide range of ophthalmologic conditions, encompassing both adult and pediatric cases. This high patient volume enables residents to refine their diagnostic, therapeutic, and procedural skills and to evaluate treatment efficacy. Additionally, the inpatient department includes an exam room equipped with a slit-lamp for detailed evaluations.

Operating rooms

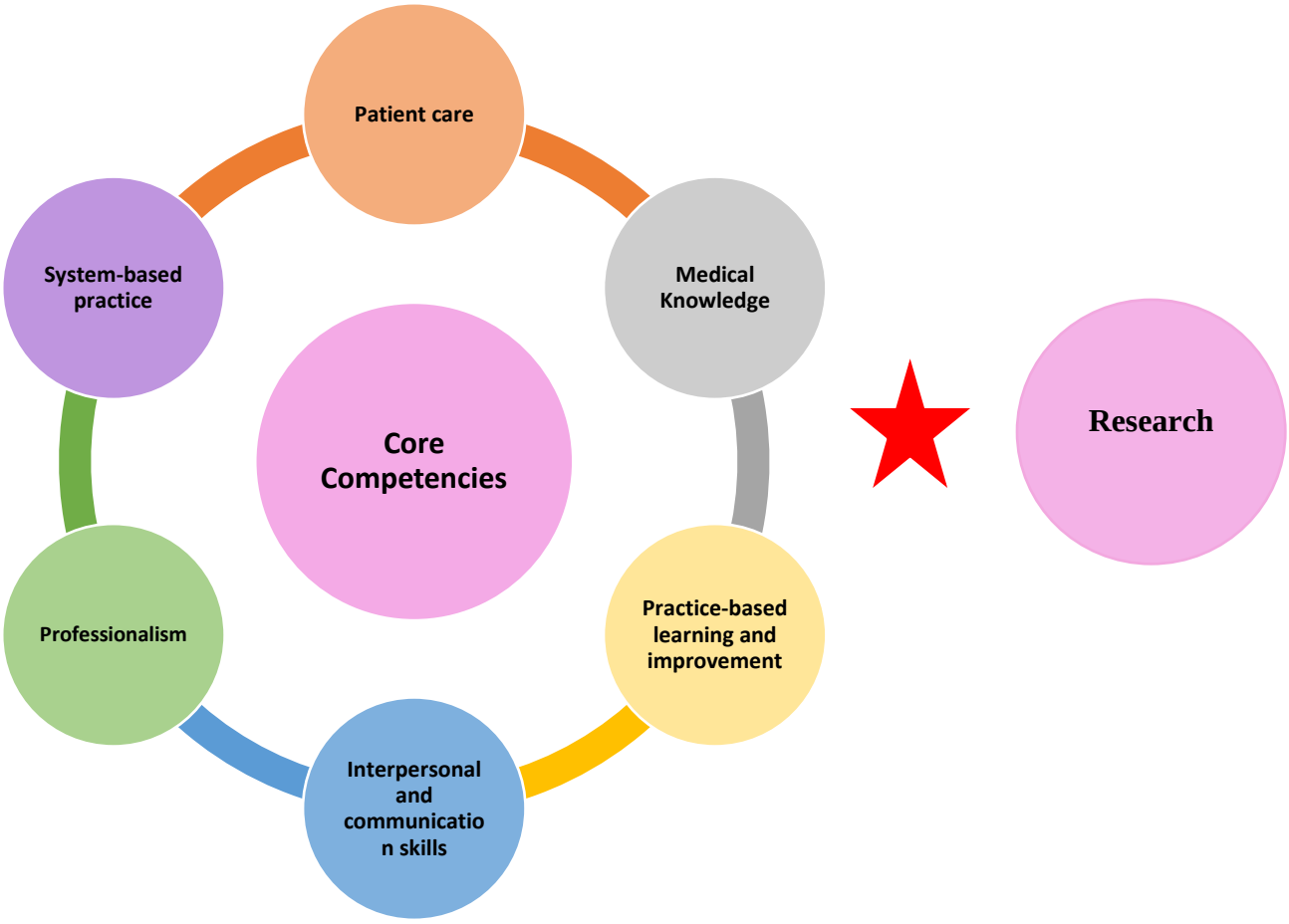
Each participating site provides fully equipped operating rooms for ophthalmic procedures, including anterior and posterior segment surgeries, strabismus correction, and oculoplastic. Training is enhanced by teaching aids attached to operating microscopes, along with audiovisual systems that broadcast live procedures to a separate teaching room for resident observation and learning.

Diagnostic Ophthalmology and Lasers

Residents have access to essential diagnostic tools, including fundus photography, fluorescein angiography, automated perimetry, ultrasonography, keratometry, orthoptic assessment equipment, refraction tools, Nd-YAG and argon laser.

RMU Postgraduate Competency Model

The Rawalpindi Medical University (RMU) postgraduate Competency Model is designed to equip residents for the dynamic demands of modern healthcare. Rooted in ACGME core principles with research as an additional core competency, this model defines essential competencies for all RMU graduates, aligning them with both Pakistan's healthcare priorities and global standards. This approach ensures RMU postgraduates emerge as skilled clinicians, ethical leaders, and compassionate problem-solvers. Complementing this, the RMU postgraduate Competency Model takes a holistic approach, mapping clear developmental pathways from foundational knowledge to advanced clinical practice. Through these competencies, RMU residents are prepared to thrive across diverse healthcare settings, adapt to rapid changes, and contribute meaningfully to society.



RMU Postgraduate Competency Model

RMU Postgraduate Competency Framework of Ophthalmology

RMU Ophthalmology Postgraduate Competency Framework

Aim of The Program

The aim of the MS Ophthalmology Residency Program is to develop skilled and compassionate ophthalmologists who excel in patient-centered care and integrate advanced medical knowledge. The program fosters professionalism, effective communication, and a commitment to lifelong learning, preparing residents to diagnose and treat diverse ocular conditions. Ultimately, it strives to produce leaders who advocate for optimal patient outcomes, collaborate within healthcare teams, and address the needs of their communities through research and education.

Outcomes of the Program

1. Patient Care

Data Acquisition – Basic Ophthalmology Exam and Testing

- To interview, examine, and use appropriate tests to assess a given condition independently.

Hospital-Based Consultation

- To triage and manage hospital-based consultation independently.

Office-Based Procedures

- To perform common office-based procedures independently.

Cataract Surgery – Technical Skill

- To perform cataract surgery and manage complications independently.

Extraocular Surgery (Plastics, Strabismus)

- To perform extraocular surgery and manage complications.

Intraocular Surgery (Cornea, Retina, Glaucoma)

- To gain experience with surgery in these subspecialties.

2. Medical Knowledge

Pathophysiology

- To demonstrate progressive understanding of the pathophysiology of common and complex ophthalmic conditions.

Differential Diagnosis

- To progress in knowledge from creating a broad differential to a problem-focused differential to guide accurate clinical evaluation and management, and avoid unnecessary testing and use of resources.

Therapeutic Interventions

- To obtain comprehensive understanding of medical and surgical therapeutic interventions.

3. Practice-Based Learning and Improvement

Evidence-Based and Informed Practice

- To incorporate evidence and patient values into clinical practice.

Reflective Practice and Commitment to Personal Growth

- To seek clinical performance information with the intent to improve care; reflects on all domains of practice, personal interactions, and behaviors, and their impact on colleagues and patients (reflective mindfulness); develop clear objectives and goals for improvement in some form of a learning plan.

4. Interpersonal and Communication Skills

Patient- and Family-Centered Communication

- To deliberately use language and behaviors to form constructive relationships with patients, identify communication barriers including self-reflection on personal biases, and minimize them in the doctor-patient relationships; to organize and lead communication around shared decision making.

Interprofessional and Team Communication

- To effectively communicate with the health care team, including consultants, in both straightforward and complex situations

Communication within Health Care Systems

- To effectively communicate using a variety of methods

5. Professionalism

Professional Behavior and Ethical Principles

- To recognize and address lapses in ethical and professional behavior, demonstrate ethical and professional behaviors, and use appropriate resources for managing ethical and professional dilemmas.

Accountability/Conscientiousness

- To take responsibility for one's own actions and the impact on patients and other members of the health care team.

Self-Awareness and Help-Seeking

- To identify, use, manage, improve, and seek help for personal and professional well-being for self and others.

6. Systems-Based Practice

Patient Safety and Quality Improvement (QI)

- To engage in the analysis and management of patient safety events, including relevant communication with patients, families, and health care professionals; to conduct a QI project.

System Navigation for Patient-Centered Care

- To effectively navigate the health care system, including the interdisciplinary team and other care providers, to adapt care to a specific patient population to ensure high-quality patient outcomes.

Physician Role in Health Care Systems

- To evaluate and understand the physician's role in the complex health care system and how to optimize the system to improve patient care and the health system's performance.

7. Research

Engagement in Research Activities

- Develop research skills by engaging in clinical or basic research activities, contributing to the body of knowledge in ophthalmology.

Critical Appraisal and Application of Research Findings

- Critically appraise and apply research findings to clinical practice, using evidence-based approaches to improve patient care.

Participation in Academic Research Dissemination

- Participate in presentations, conferences, or publications, actively contributing to the research mission of the Ophthalmology Department.

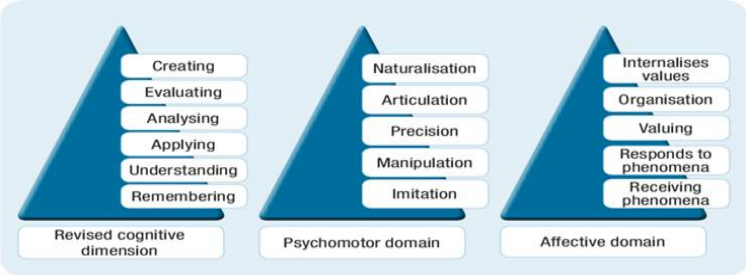
SECTION II: COURSE CONTENT

Content Overview

The MS Ophthalmology program is structured to provide a comprehensive understanding of both **Clinical Ophthalmology** and **Optics & Refraction**, ensuring residents develop the knowledge and skills essential for diagnosing, treating, and managing a wide range of ocular conditions. A detailed syllabus is crucial for structuring the learning pathway, ensuring comprehensive coverage of essential topics and competencies in ophthalmology. By breaking down each content area, the curriculum enables focused study, promotes skill development in specific sub-specialties, and ensures that residents are prepared for both routine and complex cases in their practice. It also facilitates uniformity across training institutions, helps meet accreditation standards, and provides a benchmark for evaluation and assessment throughout the program.

Bloom's Taxonomy Domains

To effectively guide learning and assessment in the MS Ophthalmology program, **Cognitive**, **Psychomotor**, and **Affective** domains are outlined below, based on Bloom's Taxonomy.



Cognitive Domain	Psychomotor Domain	Affective Domain
Remembering C1	Imitation/Perception P1	Receiving A1
Understanding C2	Manipulation/guided response P2	Responding A2
Applying C3	Precision/complex overt response P3	Valuing A3
Analyzing C4	Articulation P4	Organization A4
Evaluating C5	Naturalization P5	Characterization by value set A5
Creating C6		

The residents must demonstrate technical skills for effective patient care at minimum levels of competencies identified.

Key for Assessing Competencies:

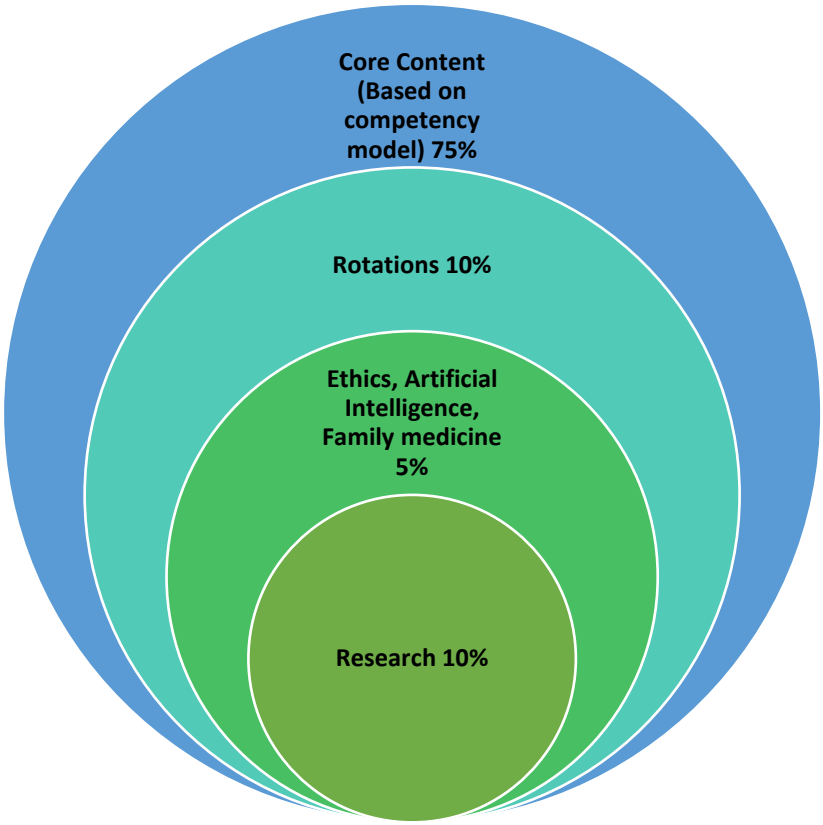
1. Level 1: Observer Status.
2. Level 2: Assistant Status.
3. Level 3: Performed Under Direct Supervision.
4. Level 4: Performed Under Indirect Supervision.

Credit Hours of MS Ophthalmology Program

According to the HEC criteria, **16 teaching/learning hours equate to 1 credit hour**:

1. **For each training year:**
   - 33 credit hours x 16 hours = **528 teaching/learning hours per year**.
2. **For the 4-year program:**
   - 528 hours x 4 years = **2,112 total teaching/learning hours** for the entire program.

Therefore, the **MS Ophthalmology training program comprises a total of 2,112 teaching/learning hours, equating to 132 credit hours** over the four years. This extensive allocation aligns with HEC criteria and supports a robust foundation in clinical and academic training for ophthalmology residents.



Core Content Clinical Ophthalmology

Modules And Themes

The comprehensive content of ophthalmology is divided into four modules for postgraduate residents and relevant themes are assigned for each module.

Module 1: Anterior Segment

Theme: Diseases and Disorders of the Eyelids, Lacrimal System, Conjunctiva and Orbit

- **Eyelids (Weeks 1-8)**

    - Introduction
    - Non-neoplastic lesions
    - Benign epidermal tumors
    - Benign pigmented lesions
    - Benign adnexal tumors
    - Miscellaneous benign tumors
    - Malignant tumors
    - Disorders of the eyelashes
    - Allergic disorders
    - Bacterial infections
    - Viral infections
    - Blepharitis
    - Ptosis
    - Ectropion
    - Entropion
    - Miscellaneous acquired disorders
    - Cosmetic eyelid and periocular surgery
    - Congenital malformations
- **Lacrimal Drainage System (Weeks 9-10)**
    - Introduction
    - Acquired obstruction
    - Congenital obstruction
    - Chronic canaliculitis
    - Dacryocystitis
- **Conjunctiva (Weeks 11-12)**
    - Introduction
    - Bacterial conjunctivitis
    - Viral conjunctivitis
    - Allergic conjunctivitis
    - Conjunctivitis in blistering mucocutaneous disease
    - Miscellaneous conjunctivitides
    - Degenerations
    - Subconjunctival hemorrhage
- **Orbit (Weeks 13-16)**
    - Introduction
    - Thyroid eye disease
    - Infections
    - Non infective inflammatory disease
    - Vascular abnormalities
    - Cystic lesions
    - Tumors
    - Anophthalmic socket
    - Craniosynostosis

Module 2: Cornea, Sclera, and Refractive Surgery

Theme: Corneal Diseases and Surgical Interventions

- **Cornea (Weeks 17-26)**
    - Introduction

- Bacterial keratitis
- Fungal keratitis
- Herpes simplex keratitis
- Herpes zoster ophthalmicus
- Interstitial keratitis
- Protozoan keratitis
- Helminthic keratitis
- Bacterial hypersensitivity-mediated corneal disease
- Rosacea
- Peripheral corneal ulceration/thinning
- Neurotrophic keratopathy
- Exposure keratopathy
- Miscellaneous keratopathies
- Corneal ectasias
- Corneal dystrophies
- Corneal degenerations
- Metabolic keratopathies
- Contact lenses
- Congenital anomalies of the cornea and globe

- **Corneal and Refractive Surgery (Weeks 27-30)**
  - Keratoplasty
  - Keratoprostheses
  - Refractive procedures
- **Episclera and Sclera (Weeks 31-34)**
  - Anatomy
  - Episcleritis
  - Immune-mediated scleritis
  - Infectious scleritis
  - Scleral discoloration
  - Blue sclera
  - Miscellaneous conditions

Module 3: Glaucoma, Lens, and Uveitis

Theme: Intraocular Pressure, Cataract Management, and Inflammatory Eye Diseases

- **Glaucoma (Weeks 35-44)**
  - Introduction
  - Tonometry
  - Gonioscopy
  - Evaluation of the optic nerve head
  - Imaging in glaucoma
  - Perimetry
  - Medical treatment of glaucoma
  - Laser treatment of glaucoma
  - Trabeculectomy
  - Non-penetrating glaucoma surgery
  - Drainage shunts
  - Ocular hypertension
  - Primary open-angle glaucoma

- Normal-tension glaucoma
- Primary angle-closure glaucoma
- Classification of secondary glaucoma
- Pseudoexfoliation
- Pigment dispersion
- Neovascular glaucoma
- Inflammatory glaucoma
- Lens-related glaucoma
- Traumatic glaucoma
- Iridocorneal endothelial syndrome
- Glaucoma associated with intraocular tumors
- Glaucoma secondary to epithelial ingrowth
- Iridoschisis
- Primary congenital glaucoma
- Iridocorneal dysgenesis
- Glaucoma in phacomatoses

- **Lens (Weeks 45-48)**
  - Acquired cataract
  - Management of age-related cataract
  - Congenital cataract
  - Ectopia lentis
  - Abnormalities of lens shape
- **Uveitis (Weeks 49-52)**
  - Classification
  - Anterior uveitis
  - Uveitis in spondyloarthropathies
  - Fuchs uveitis syndrome
  - Uveitis in juvenile idiopathic arthritis
  - Uveitis in bowel disease
  - Uveitis in renal disease
  - Intermediate uveitis
  - Vogt–Koyanagi–Harada (VKH) syndrome
  - Sympathetic ophthalmitis
  - Lens-induced uveitis
  - Sarcoidosis
  - Behçet disease
  - Parasitic uveitis
  - Viral uveitis
  - Fungal uveitis
  - Bacterial uveitis
  - Miscellaneous idiopathic chorioretinopathies

Module 4: Posterior Segment and Miscellaneous Topics

Theme: Vitreoretinal Diseases, Ocular Oncology, and Systemic Effects

- **Retinal Vascular Disease (Weeks 53-57)**
  - Retinal circulation
  - Diabetic retinopathy
  - Non-diabetic retinopathy

- Retinal venous occlusive disease
- Retinal arterial occlusive disease
- Ocular ischemic syndrome
- Hypertensive eye disease
- Sickle cell retinopathy
- Thalassemia retinopathy
- Retinopathy of prematurity
- Retinal artery macroaneurysm
- Primary retinal telangiectasia
- Eales disease
- Radiation retinopathy
- Purtscher retinopathy
- Valsalva retinopathy
- Lipaemia retinalis
- Retinopathy in blood disorders

- **Acquired Macular Disorders (Weeks 58-62)**
  - Introduction
  - Clinical evaluation of macular disease
  - Investigation of macular disease
  - Age-related macular degeneration
  - Retinal angiomatous proliferation
  - Polypoidal choroidal vasculopathy
  - Peripheral exudative hemorrhagic chorioretinopathy
  - Idiopathic choroidal neovascularization
  - Vitreomacular interface disorders
  - Central serous chorioretinopathy
  - Idiopathic macular telangiectasia
  - Cystoid macular edema
  - Microcystic macular edema
  - Degenerative myopia
  - Angioid streaks
  - Choroidal folds
  - Hypotony maculopathy
  - Solar retinopathy
  - Focal choroidal excavation
- **Hereditary Fundus Dystrophies (Weeks 63-65)**
  - Introduction
  - Investigation
  - Generalized photoreceptor dystrophies
  - Macular dystrophies
  - Generalized choroidal dystrophies
  - Hereditary vitreoretinopathies
  - Albinism
  - Cherry-red spot at the macula
- **Retinal Detachment and Vitreous Opacities (Weeks 66-70)**
  - Introduction
  - Peripheral lesions predisposing to retinal detachment
  - Posterior vitreous detachment
  - Retinal breaks
  - Rhegmatogenous retinal detachment

- Tractional retinal detachment
- Exudative retinal detachment
- Pars plana vitrectomy
- Vitreous opacities

- **Ocular Tumors (Weeks 71-75)**
  - Benign epibulbar tumors
  - Malignant and premalignant epibulbar tumors
  - Iris tumors
  - Iris cysts
  - Ciliary body tumors
  - Tumors of the choroid
  - Neural retinal tumors
  - Retinal vascular tumors
  - Primary intraocular lymphoma
  - Tumors of the retinal pigment epithelium
  - Paraneoplastic syndromes
- **Neuro-ophthalmology (Weeks 76-80)**
  - Neuroimaging
  - Optic nerve
  - Pupils
  - Chiasm
  - Retrochiasmal pathways
  - Ocular motor nerves
  - Supranuclear disorders of ocular motility
  - Nystagmus
  - Ocular myopathies
  - Miller Fisher syndrome
  - Neurofibromatosis
  - Migraine
  - Neuralgias
  - Facial spasm
- **Trauma and Ocular Side Effects of Systemic Medication (Weeks 81-82)**
  - Eyelid trauma
  - Orbital trauma
  - Trauma to the globe
  - Chemical injuries
  - Ocular side effects of systemic medication
- **Ocular Anesthesia & Surgeries (Weeks 83-84)**
  - Surface, infiltration, regional anesthesia
  - Premedication, sedation for local anesthesia
  - Premedication for general anesthesia
  - Akinesia & intraocular tension during anesthesia
  - Cardio pulmonary complication with anesthesia
  - Cardiac arrest & local anesthetic emergency
  - Operative Surgeries

- **Ocular Diagnostic & Operative Instrument (Weeks 85-86)**

  - Radiology in ophthalmologic diagnosis
  - Ultrasonography – A scan & B scan

- Fluorescein angiography.
- Pachymeter
- Auto perimeter
- Autorefractometer
- Applanation tonometry
- Indirect ophthalmoscope
- Recent trends / advances in ophthalmology

- **Artificial Intelligence (AI) in Imaging and Diagnostics**

- AI applications in retinal imaging (e.g., fundus photography, OCT)
- AI in glaucoma screening and progression prediction
- AI for corneal disease detection (e.g., keratoconus screening)
- Role of AI in cataract grading and surgical planning
- AI in pediatric ophthalmology, especially for amblyopia and strabismus detection

- **AI in Surgery and Robotics**

- Overview of AI-guided robotic systems in ocular surgery
- Augmented reality (AR) and AI-based intraoperative assistance
- Virtual surgery planning and simulation tools

- **Ethics in Ophthalmology**

- Foundations of Medical Ethics
- Principles of autonomy, beneficence, non-maleficence, and justice.
- Ethics in informed consent and patient rights.

- **Confidentiality and Patient Privacy in Eye Care**

- Handling patient information securely.
- Addressing ethical concerns related to sensitive diagnoses (e.g., hereditary conditions).

- **Ethical Dilemmas in Ophthalmology**

- Common issues like treatment refusal, resource limitations, and cost considerations.
- Discussion of scenarios and ethical decision-making frameworks.
- **Ethical Communication**

- Maintaining respect, empathy, and cultural competence in patient interactions.
- Handling difficult conversations about prognosis and lifestyle impacts of eye conditions.

- **Research Ethics and Integrity**

- Guidelines for ethical research with human subjects.
- Informed consent and transparency in clinical trials and observational studies.

Implementation in the Academic Calendar

- **Module 1: Anterior Segment** (Weeks 1-16)
- **Module 2: Cornea, Sclera, and Refractive Surgery** (Weeks 17-34)
- **Module 3: Glaucoma, Lens, and Uveitis** (Weeks 35-52)
- **Module 4: Posterior Segment and Miscellaneous Topics** (Weeks 53-85)

Regular assessments and practical sessions will be integrated into the schedule to reinforce learning and provide hands-on experience.

Core Content Optics and Refraction

- Properties of Light and Visual Function
- Reflection of Light
- Refraction of Light
- Prisms
- Spherical Lenses
- Astigmatic Lenses
- Optical Prescriptions, Spectacle Lenses
- Aberrations of Optical systems Including the Eye
- Refraction by the Eye
- Optics of Ametropia
- Presbyopia
- Contact Lenses
- Optics of Low Vision Aids
- Instruments
- Lasers
- Practical Clinical Refraction
- Refractive Surgery

Modules and Themes

Module 1: Fundamentals of Light and Optics (Weeks 1-8

Themes:

- Properties of Light and Visual Function
- Reflection of Light
- Refraction of Light

Module 2: Optical Systems and Lenses (Weeks 9-16)

Themes:

- Prisms
- Spherical Lenses
- Astigmatic Lenses
- Aberrations of Optical Systems, Including the Eye

Module 3: Clinical Application of Optics (Weeks 17-24)

Themes:

- Optical Prescriptions and Spectacle Lenses
- Refraction by the Eye
- Optics of Ametropia
- Presbyopia

Module 4: Specialized Optics and Technology in Ophthalmology (Weeks 25-32)

Themes:

- Contact Lenses
- Optics of Low Vision Aids
- Instruments
- Lasers
- Practical Clinical Refraction
- Refractive Surgery

SECTION III: SPECIFIC LEARNING OUTCOMES

Specific Learning Outcomes Optics and Refraction

1st Year Resident Outcomes

By the completion of their 1st year residency, the residents should be able to:

A. Cognitive Skills

Physical Optics	Cognitive Domain
1. Describe the wave and particle nature of light. 2. Explain the phenomenon of diffraction. 3. Explain the concepts of interference and coherence. 4. Define optical resolution. 5. Explain polarization. 6. Explain light scattering. 7. Define and compare transmission and absorption. 8. Explain photometry. 9. Define illumination. 10. Describe image quality. 11. Differentiate brightness and radiance. 12. Define refractive index.	**C2, C3**
Geometric Optics	
Reflection (Mirrors)	
1. List the laws of reflection. 2. Explain images and objects as light sources. 3. Define refractive index.	
Refraction	
1. Explain the law of refraction (Snell law), including: a. Passage of light from one medium to another b. Absolute index of refraction c. Total internal reflection 2. Explain critical angle and total internal reflection.	
Prisms	
1. Define a prism. 2. Explain the notation of prisms (e.g., prism diopters). 3. Describe the use of prisms in ophthalmology (i.e., diagnostic and therapeutic). 4. Explain prentice rule. 5. Describe Fresnel and similar prisms.	**C2, C3**

6. Explain the concept of thin prisms. 7. Explain the prismatic effect of lenses. 8. Define spherical decentration and prism power.	**C2, C3**
Spherical Lenses 1. Define a spherical lens. 2. Describe the cardinal points. 3. Recite the thin lens and thick lens formulas. 4. Define vergence of light, including diopter, convergence, divergence, and vergence formula. 5. Define the terms concave and convex. 6. Define the term magnification, including linear, angular, relative size, and electronic.	
Astigmatic Lenses 1. Describe cylindrical lenses, including: a. Spherocylindrical lenses and surfaces b. Cross cylinders (e.g., Jackson cross cylinder) 2. Describe toric lenses.	
Clinical Optics 1. Define emmetropia. 2. Define ametropia. 3. Define myopia. 4. Define hypermetropia (hyperopia). 5. Define astigmatism. 6. Define anisometropia. 7. Define aniseikonia (including Knapp rule). 8. Define aphakia. 9. Explain optical parameters affecting retinal image size. 10. Describe the pupillary response and its effect on the resolution of the optical system (Stiles-Crawford effect). 11. Define visual acuity, including: a. Distance and near acuity measurement b. Minimal acuity (i.e., visible, perceptible, separable, legible) c. Visual acuity charts 12. Describe higher-order aberrations of the eye. 13. Explain how accommodation is affected by age. 14. Explain how the pinhole effect impacts visual acuity. 15. Explain accommodative problems.	**C2, C3**
16. Describe convergence or accommodative insufficiency or excess. 17. Define accommodative-convergence over accommodation (AC/A) ratio. 18. Describe the epidemiology of refractive errors, including:	**C2, C3**

a. Prevalence b. Inheritance c. Changes with age d. Surgical considerations	
19. Describe the potential problems with aphakic spectacles.	**C2, C3**
20. Describe the effect of spectacles and contact lens correction on accommodation and convergence (i.e., amplitude, near point, far point).	
21. Explain the principles of contrast sensitivity measurements.	
22. Describe the correction of ametropia, including: a. General principles b. Spectacle lenses c. Contact lenses d. Intraocular lenses e. Principles of refractive surgery	
Clinical Refraction	
Objective Refraction: Retinoscopy	**C2, C3**
1. List the principles and indications for retinoscopy.	
Subjective Refraction Techniques	
1. Describe the major types of refractive errors. 2. Describe the indications for and use of trial lenses for simple refractive error.	
Cycloplegic Refraction	
1. Describe medication concentrations according to age (e.g. cyclopentolate, atropine).	**C2, C3**

B. Technical skills

	Psychomotor Domain	**Level of Competence**
Geometric Optics **Reflection (Mirrors)** 1. Illustrate reflection at a plane surface (i.e., image and field of a plane mirror). 2. Illustrate reflection at curved surfaces (i.e., focal point and focal length of a spherical mirror). 3. Demonstrate a multiple lens system. **Refraction**	P2	3

1. Illustrate refraction at a plane surface. 2. Illustrate refraction at curved surfaces. 3. Demonstrate image jump and displacement. **Prisms** 1. Demonstrate the types of prisms (e.g., plane, parallel, plate). 2. Illustrate refraction of light through a prism. **Spherical Lenses** 1. Demonstrate binocular balancing. **Astigmatic Lenses** 1. Demonstrate how the Maddox rod works. 2. Locate the conoid of Sturm. **Notation of Lenses** 1. Design myopic, hyperopic, and astigmatic lenses. 2. Perform simple transposition. 3. Perform toric transposition. 4. Calculate a lens prescription. **Aberration of Lenses** 1. Correct aberrations relevant to the eye, including spherical, coma, astigmatism, and distortion. 2. Describe color aberrations and perform the duochrome test. **Clinical Optics** 1. Illustrate optics of the eye, including the dioptric power of different structures. 2. Draw a schematic eye and reduced eye. 3. Demonstrate contrast sensitivity measurements. 4. Demonstrate the calculation of intraocular lens power. **Clinical Refraction**	P2 P2 P2 P2 P2	3 3 3 3

Objective Refraction: Retinoscopy 1. Perform the technique of retinoscopy. 2. Perform an integrated refraction based upon retinoscope results. 3. Identify media opacities with retinoscopy. 4. Perform cycloplegia. 5. Prescribe refractive correction based on the obtained objective and subjective measurements. **Subjective Refraction Techniques** 1. Perform elementary refraction techniques for myopia, hyperopia, and near-vision add. 2. Perform techniques for the correction for presbyopia (i.e., measuring for near adds). **Instruments and Tests** 1. Demonstrate the use of the direct ophthalmoscope. 2. Demonstrate the use of the indirect ophthalmoscope. 3. Demonstrate the use of the retinoscope. 4. Demonstrate glare and contrast sensitivity testing. 5. Demonstrate the use of the automated refractor. 6. Demonstrate measurement of higher-order aberrations. 7. Demonstrate the use of stereoacuity testing. 8. Demonstrate the use of corneal topography (e.g., placido disc, keratometer, automated corneal topography). 9. Demonstrate the use of the Hess screen or describe its use if not available.	P2 P2	3 3

10. Demonstrate the use of the synoptophore. 11. Demonstrate the use of color vision tests (e.g., Ishihara color plates; Farnsworth-Munsell test).	P2	3

2nd Year Resident Outcomes

By the completion of their 2nd year residency, the residents should be able to:

A. Cognitive Skills

	Cognitive Domain
Optics **Spectacles** 1. Describe materials index. 2. Describe the principles underlying progressive spectacle lens design. 3. Describe progressive lenses measurements. 4. Describe spectacles specificities in children.	**C2, C3**
Lasers 1. Describe the technology behind the excimer laser and the femtosecond laser. 2. List different wavelengths used in ophthalmic lasers. 3. Describe indications for refractive surgery.	
Aberrometer Technology 1. Explain the principles underlying Hartmann-Shack aberrometers. 2. Describe the concept of Zernike polynomials.	
Diagnostic Equipment 1. List indications for and the use of intraocular lens (IOL) calculation algorithms. 2. List indications for the use of corneal pachymetry. 3. List indications for the use of specular microscopy. 4. List indications for the use of corneal tomography with anterior segment optical coherence tomography (OCT). 5. List indications for the use of topographic/elevation corneal evaluation (i.e., Penta Cam, Orbscan II, Galilei). 6. List indications for the use of laser interferometry for macular testing.	**C2, C3**
Refraction 1. Describe and prescribe more complex types of refractive errors, including postoperative refractive errors.	

2. Describe the more advanced ophthalmic optics and optical principles of refraction and retinoscopy (e.g., post keratoplasty, post-cataract extraction). 3. Describe how to test muscle balance.	

B. Technical skills

	Psychomotor Domain	Level of Competence
Optics		
Aberrometry Technology		
1. Estimate the clinical incidence of higher-order aberrations.	P3	4
Diagnostic Equipment		
1. Demonstrate the use of IOL calculation algorithms.		
2. Demonstrate the use of corneal pachymetry.		
3. Demonstrate the use of specular microscopy.		
4. Demonstrate the use of corneal tomography with anterior segment optical coherence tomography (OCT).		
5. Demonstrate the use of topographic/elevation corneal evaluation (i.e., Pentacam, Orbscan II, Galilei).		
6. Demonstrate the use of accommodometer.	P3	4
7. Demonstrate the use of laser interferometry for macular testing.		
Refraction		
1. Perform more advanced refraction techniques (e.g., astigmatism, complex refractions, asymmetric accommodative add).		
2. Perform objective and subjective refraction techniques for more complex refractive errors, including astigmatism, irregular astigmatism (e.g., keratoconus, keratectasia, post corneal graft), and postoperative refractive error.	P3	
3. Measure the accommodative power.		
4. Demonstrate the measurement of interpupillary distance (IPD).		
5. Demonstrate the prescribing of multifocal lenses.		
6. Demonstrate the prescribing of lenses for children.		

7. Describe binocular balance. 8. Describe how to use more advanced techniques using trial lenses or the phoropter for more complex refractive errors, including modification and refinement of subjective manifest refractive error and more complex refractive errors (e.g., advanced and irregular astigmatism, vertex distance).	P3	4

Specific Learning Outcomes Clinical Ophthalmology

1st Year Resident Outcomes

By the completion of their 1st year residency, the residents should be able to:

Cataract and Lens

A. Cognitive Skills

	Cognitive domain
1. Describe the lens anatomy, physiology, and accommodation. 2. Identify the most common causes and types of cataracts (e.g., anterior polar, cortical, nuclear sclerotic, posterior sub capsular, posterior polar, mature lenses such as the morgagnian cataract). 3. Describe the relationship between the lens and systemic disease (e.g., diabetes, myotonic dystrophy). 4. List ocular conditions that are associated with cataract (e.g., uveitis, Wilson disease, ocular ischemia, and ocular tumors, including treatment for tumors such as radiotherapy). 5. List systemic and topical medicine that can cause pathologic changes in the lens (e.g., oral and topical corticosteroid use). 6. List the basic history and examination steps for preoperative cataract and posterior capsular opacification evaluation.	C2, C3
7. Describe the principles and mechanisms of the following instruments in the evaluation of cataract: a. Lensometer b. Autorefractor c. Retinoscope d. Phoropter or loose lenses e. Keratometer f. Slit-lamp biomicroscope g. Glare and contrast testing devices	C2, C3

h. Potential acuity meter 8. Describe the basics of IOL power estimation, including: a. Linear regression formulas (e.g., Sanders-Retzlaff-Kraff [SRK] and SRKII) b. Theoretical eye model prediction formulas (e.g., SRKT, Holladay, and Haigis) 9. Describe the methods to estimate axial eye length, including: a. Contact ultrasound b. Immersion ultrasound c. IOLMaster, LENSTAR, or equivalent, even if equipment is unavailable 10. List the steps of routine intracapsular cataract extraction (ICCE), ECCE, and phacoemulsification. 11. Define the elementary refraction techniques to obtain best-corrected vision prior to considering cataract extraction. 12. Describe the major etiologies of dislocated or subluxated lens (e.g., pseudo exfoliation syndrome, trauma, Marfan syndrome, homocystinuria, Weill-Marchesani syndrome, syphilis). 13. Describe the following: a. Basic ophthalmic optics as related to cataract b. Types of refractive error in cataract c. Retinoscopy techniques for cataract d. Subjective refraction techniques for cataract patients 14. Describe methods to prevent postoperative infection, including presurgical preparation, intraoperative antibiotics, and postoperative antibiotic techniques. 15. Describe postoperative medications used for cataract surgery, including antibiotics, non-steroidal anti-inflammatory drugs, and corticosteroid therapy. 16. Describe the risk factors for intraoperative floppy iris syndrome (IFIS) and intraoperative techniques to limit the risk of this syndrome (e.g., alpha blockers, use of rings, hooks) 17. Describe the special considerations when dealing with a unilateral cataract (trauma, history of uveitis, history of topical steroid use, past surgeries)	C2, C3

B. Technical skills

	Psychomotor domain	Level of competency
1. Perform basic slit-lamp biomicroscopy, retinoscopy, and ophthalmoscopy. 2. Classify common types of lens opacities. 3. Perform subjective refraction techniques and retinoscopy in patients with cataract. 4. Perform laser capsulotomy on routine cases of posterior capsule opacification. 5. Perform direct and indirect ophthalmoscopy prior to and following cataract surgery. 6. Perform the basic steps of cataract surgery (e.g., incision, wound closure) in the practice lab, if available. 7. Assist with cataract surgery. 8. Prepare patient for surgery including sterile draping and anesthesia. 9. Implement the basic preparatory procedures for cataract surgery (e.g., obtaining informed consent, identification of instruments, sterile technique, gloving and gowning, prep and drape, and other preoperative preparation). 10. Use the operating microscope for basic cataract surgery. 11. Perform some of the steps of cataract surgery under direct supervision.	**P2** **P2**	**3** **2**

Contact Lenses

A. Cognitive Skills

	Cognitive domain
1. List advantages and disadvantages of contact lens (CL) wear. 2. List indications and contraindications for CL wear. 3. Describe a systematic and comprehensive ophthalmic examination oriented for CL fitting, including complex and challenging cases.	**C2, C3**

4. Describe the various CL indications and options for each contact lens type (e.g., soft CL [SCL], rigid gas permeable [RGP] CL, toric CL, multifocal CL, scleral CL). 5. Decide which CL categories (e.g., SCL, RGP CL, hybrid CL, and subgroups within each category (e.g., sphere, toric, bifocal, frequent planned replacement) are best suited for a particular patient. 6. Describe how to convey the basic CL parameters for SCL and RGP CL: a. Base curve b. Diameter refractive power c. Lens materials i. Center thickness ii. Peripheral curvature 7. Explain the concept and clinical relevance of oxygen permeability (Dk) and oxygen transmissibility (Dk/center thickness). 8. Describe various materials used in the manufacture of CL. 9. Explain the optics of SCL and RGP CL: a. Base curve changes b. Lacrimal lens c. Vertex distance d. Optic zone. 10. Recognize the importance of obtaining central keratometry in CL fitting of patients without complex needs, and explain the conversion between radians and diopters. 11. Identify different methods of obtaining central keratometry readings (e.g., manual keratometry, computerized corneal topography). 12. Explain the importance of using diagnostic staining agents (e.g., fluorescein, lissamine green, rose Bengal) to assess corneal and conjunctival staining patterns. 13. Describe basic tests to assess the tear film properties (e.g., Schirmer test, tear break-up time, phenol red thread tear test, and meibomian gland assessment). 14. Describe conversion of a spectacle prescription (Rx) to a CL Rx, including method of converting from plus to minus cylinder and vertex distance calculations. 15. Describe basic steps for SCL fitting.	**C2, C3**

16. Identify the main characteristics to be present in a CL prescription (eye designation, brand identification, base curve, diameter, and refractive power). 17. Describe CL care guidelines to be given to the patient related to insertion, removal, and disinfection of CL. 18. Describe risk factors for CL-related complications (e.g., overnight wear, non-preserved saline solution usage). 19. Describe treatment of CL-related complications (e.g., tight lens syndrome, overwear syndrome, giant papillary conjunctivitis, infectious keratitis).	

B. Technical skills

	Psychomotor/Affective domain	**Level of competency**
1. Perform a basic CL history.	**P2**	**3**
2. Perform all the steps of a basic clinical examination oriented for CL fitting (i.e., refraction, keratometry, visual acuity assessment).		
3. Perform a routine comprehensive slit-lamp examination of the anterior segment as applied to CL fitting.		
4. Perform tear film assessment required for CL patients.		
5. Perform the techniques of retinoscopy, refraction, and over-refraction in the routine CL patient.		
6. Perform central keratometry.		
7. Discuss with the patient the most appropriate choice for their particular clinical case.		
8. Perform initial SCL fitting, evaluation of fit (loose CL versus tight CL), and over refraction.		
9. Insert and remove a trial SCL.		
10. Instruct patients regarding safe CL insertion and removal, CL wearing schedule, lens care regimens, CL disinfection care, indications, contraindications, and possible complications.	**A2**	
11. Work effectively within a medical care team.		

Cornea and External Diseases

A. Cognitive Skills

	Cognitive domain
1. Describe the basic anatomy, embryology, physiology, pathology, microbiology, immunology, genetics, epidemiology, and pharmacology of the cornea, conjunctiva, sclera, eyelids, lacrimal apparatus, and ocular adnexa. 2. Describe the fundamentals of corneal optics and refraction (e.g., astigmatism, keratoconus). 3. Describe congenital abnormalities of the cornea, sclera, and globe (e.g., Peter anomaly, microphthalmos, birth trauma, and buphthalmos). 4. Describe characteristic corneal and conjunctival degenerations (e.g., pterygium, pinguecula, Salzmann nodular degeneration, senile plaques of the sclera). 5. Recognize the classic corneal dystrophies (e.g., map-dot-fingerprint dystrophy, lattice, dystrophy, granular dystrophy, macular dystrophy, Fuchs dystrophy). 6. Describe the fundamentals of ocular microbiology and recognize corneal and conjunctival inflammations and infections (e.g., staphylococcal hypersensitivity, simple microbial keratitis, fungal corneal ulcers, trachoma, ophthalmia neonatorum, herpes zoster ophthalmicus, herpes simplex keratitis, adenovirus keratoconjunctivitis and conjunctivitis). 7. Describe the basic principles of ocular pharmacology of anti-infective, anti-inflammatory and immune modulating agents (e.g., indications and contraindications for topical corticosteroids, non-steroidal anti-inflammatory agents, and antibiotics). 8. Manage lid margin disease (e.g., staphylococcal blepharitis, meibomian gland dysfunction). 9. Describe the basic differential diagnosis of acute and chronic conjunctivitis or red eye (e.g., scleritis, episcleritis, conjunctivitis, orbital cellulitis, gonococcal and chlamydial conjunctivitis). 10. Manage pyogenic granuloma.	**C2, C3**

11. Recognize the basic presentations of ocular allergy (e.g., phlyctenules, seasonal hay fever, vernal conjunctivitis, allergic and atopic conjunctivitis, giant papillary conjunctivitis). 12. Comprehend the mechanisms of ocular immunology and the external manifestations of anterior segment inflammation (e.g., red eye associated with acute and chronic iritis). 13. Describe the symptoms, signs, testing, and evaluation for dry eye (e.g., Schirmer test, tarsorrhaphy); and treatment for dry eye. 14. Describe the etiologies and treatment of superficial punctate keratopathy (e.g., dry eye, Thygeson superficial punctate keratopathy, neurotrophic keratitis, blepharitis, toxicity, ultraviolet photo keratopathy, contact lens-related keratitis). 15. Enlist the etiologies of hyphema and microhyphema. 16. Describe the basic mechanisms of traumatic and toxic injury to the anterior segment and treatment (e.g., chemical and thermal burns, lid laceration, and orbital fracture). 17. Recognize corneal lacerations (perforating and non-perforating), anterior segment trauma, corneal and conjunctival foreign bodies. 18. Describe the epidemiology, differential diagnosis, evaluation, and management of common benign and malignant lid lesions, including pigmented lesions of the conjunctiva and lid (e.g., nevi, melanoma, primary acquired melanosis, ocular surface squamous neoplasia).	**C2, C3**

B. Technical skills

	Psychomotor domain	**Level of competence**
1. Perform external examination (illuminated and magnified) and slit-lamp biomicroscopy, including drawing of anterior segment findings. 2. Administer topical anesthesia, as well as special topical stains of the cornea (e.g., fluorescein dye and rose Bengal). 3. Perform tests for dry eye (e.g., Schirmer test, tear film breakup, and dye disappearance). 4. Perform punctal occlusion (temporary or permanent) or insert plugs. 5. Perform simple corneal sensation testing (e.g., cotton-tipped swab).	**P2**	**3**

6. Perform tonometry (e.g., applanation, Tono-Pen, Schiøtz, pneumotonometry). 7. Perform techniques of sampling for viral, bacterial, fungal, and protozoal ocular infections (e.g., corneal scraping and appropriate culture techniques). 8. Interpret simple stains of the cornea and conjunctiva (e.g., Gram stain, Giemsa stain). 9. Manage corneal epithelial defects (e.g., pressure patching and bandage contact lenses). 10. Perform removal of a conjunctival or corneal foreign body (e.g., rust ring). 11. Perform simple (non-recurrent) pterygium excision (e.g., with autologous conjunctival transplantation). 12. Perform an isolated lid laceration repair. 13. Perform an isolated corneal laceration repair (e.g., linear laceration not extending to limbus, not involving uveal or intraocular structures). 14. Perform epilation. 15. Perform a lateral tarsorrhaphy. 16. Perform incision, drainage, and/or remove a primary chalazion/stye. 17. Perform a simple incisional or excisional biopsy of a lid lesion. 18. Perform irrigation of chemical burn to the eye. 19. Perform Seidel test.		

Refractive Surgery

A. Cognitive Skills

	Cognitive domain
1. Describe simple types of refractive errors: a. Myopia b. Hyperopia c. Astigmatism d. Presbyopia	**C2, C3**

2. Describe basic optic principles, such as line of sight and Purkinje image. 3. Explain theories of accommodation. 4. Describe the basics of ophthalmic optics, including how the following affect the optics of the eye: a. Low and high order aberrations b. Corneal layers c. Shape of cornea d. Shape of lens 5. Describe basic refraction techniques using trial lenses or phoropter for basic refractive errors, including: a. Retinoscopy b. Modification and refinement of subjective refraction c. Cycloplegic retinoscopy and refraction d. Postcycloplegic refraction 6. Describe the optical principles of common refractive surgery diagnostic tools, including: a. Ultrasonic pachymetry b. Keratometer c. Lensometer d. Pupillometry e. Corneal topography f. Scheimpflug imaging and elevation maps g. Optical coherence tomography (OCT) 7. Describe the following topographic maps using different scales (i.e., absolute, normalized, adjustable) 8. Describe normal corneal topographic patterns, as well as topographic signs of keratoconus and ectasia. 9. Describe elevation topography maps and their importance in screening refractive surgery candidates. 10. Describe indications and limitations of corneal topography in refractive surgery. 11. Enlist the mandatory diagnostic tests necessary for refractive surgery. 12. Describe the basics of laser biophysics and laser tissue interaction. 13. Describe the complications of high myopia, high hyperopia, and pathologies related to high astigmatism. 14. Define the clinical stages of keratoconus and forme fruste keratoconus using clinical and topographic tests. 15. Describe the milestones in refractive surgery development, including radial keratotomy, keratomileusis, and phakic intraocular lenses (IOLs).	**C2, C3**

16. Enlist current refractive procedures, their mechanisms of action, indications, and limitations, including: a. Types of excimer laser procedures b. Phakic IOLs c. Implantation of intracorneal ring segments d. Corneal inlays e. Accommodative lenses 17. Describe the main IOL calculation formulas. 18. Describe the principles and different types (i.e., linear, rotational, pendular) of mechanical microkeratomes, including their characteristics, indications, risks, and possible complications. 19. Describe the role of femtosecond technology in refractive surgery, including advantages and limitations of flap creation with a femtosecond laser. 20. Describe different techniques of keratoplasty and their relation with refractive surgery.	**C2, C3**

C. Technical skills

	Psychomotor/affective domain	**Level of competence**
1. Perform objective and subjective refraction, including cross cylinder and Worth 4-dot test. 2. Diagnose refractive defects. 3. Apply different prescription formulas. 4. Prescribe spectacles for at least 20 patients with simple refractive errors (e.g., myopia, hyperopia, regular astigmatism). 5. Perform refraction on patients with extreme errors of refraction (e.g., 5 patients with hyperopia over 8.0 D, and 5 patients with myopia above 20.0 D). 6. Use the lensometer to measure spectacle power. 7. Use the keratometer to make corneal measurements. 8. Use the ultrasonic pachymeter to measure corneal thickness. 9. Validate corneal topography maps, including elevation topography. Recognize signs of ectatic disorders and/or candidates at risk for	P2	3

an unsatisfactory refractive surgery outcome, and rule out poor-quality tests (e.g., artifacts, alignment, and corneal exposure issues).		
10. Interpret an aberration map and evaluate its significance in the refractive defect of a patient, as well as the need to treat or not.	P2	3
11. Validate a manual refraction as a real refractive defect of a patient, comparing results with keratometers, aberrometers, and topography.		
12. Analyze tear film and tear deficiency.		
13. Unmask astigmatism from higher order aberrations, such as coma.		
14. Demonstrate how informed consent should be explained.	A3	3

Glaucoma

A. Cognitive Skills

	Cognitive domain
Basic Science 1. Describe the anatomy of the anterior chamber, angle, and ciliary body. 2. Describe the anatomy of the retinal nerve fiber layer, optic nerve head, and visual pathway from the retina to the visual cortex. 3. Describe the mechanisms and dynamics of aqueous humor inflow and outflow. 4. Describe the microscopic anatomy of the retina from inner to outer portions, with attention to the retinal ganglion cell layer and nerve fiber layer. 5. Describe the blood supply of the optic nerve and ciliary body. 6. Describe the apoptotic mechanism of retinal ganglion cell death. 7. Describe the physiology underlying visual-field examination and its interpretation. 8. Describe the fundamentals of Goldmann static, kinetic perimetry, and standard automated perimetry. 9. Describe basic principles of tonometry and aqueous outflow, and applications of tonometric data (e.g., diurnal curve, peak and trough values). **Clinical Science**	**C2, C3**

1. Describe the major features of primary open-angle glaucoma (high and low tension), angle-closure glaucoma, glaucoma suspects, and ocular hypertension. 2. Describe the major risk factors for primary open-angle glaucoma and angle-closure glaucoma. 3. Describe the steps in evaluating primary open-angle glaucoma and angle-closure glaucoma. 1. Define glaucoma as a progressive neural degeneration of retinal ganglion cells, their axons and their connections to central visual centers. 2. Describe the features of glaucomatous optic neuropathy. 3. Describe the basic features of the major glaucoma's: primary open-angle glaucoma, angle closure glaucoma, exfoliative glaucoma, and pigmentary glaucoma. 4. Describe the role of intraocular pressure (IOP) in the development and progression of glaucoma. 5. Enlist the factors that influence IOP. 6. Describe and understand basic principles of Goldmann applanation tonometry. 7. Describe tonometers (e.g., Schiøtz, Tono-Pen) and recognize artifacts of testing. 8. Describe principles and basic techniques of gonioscopy (3 or 4 mirror lenses) to evaluate angle structures. 9. Describe normal and abnormal angle findings. 10. Enlist risk factors other than IOP for primary open-angle glaucoma. 11. Classify angle-closure glaucoma (e.g., pupillary block, plateau iris, lens-related angle-closure, and malignant glaucoma). 12. Describe corneal pachymetry and how biomechanics and measurements of corneal thickness affect IOP interpretations. 13. Highlight the principles of indirect ophthalmoscopy to evaluate the optic nerve and retinal nerve fiber layer. 14. Describe the most common types of visual field defects in glaucoma. 15. Describe principles and mechanisms of medical management of glaucoma. 16. Describe major classes of glaucoma medications, their mechanisms of action, indications, contraindications, and side effects (topical and systemic). 17. Enlist drug interactions between systemic drugs and glaucoma drugs.	

18. Interpret major glaucoma studies. 19. Describe the major results of large prospective clinical trials in addition to those appropriate to the practice region. a. The Glaucoma Laser Trial (GLT) b. The Ocular Hypertension Treatment Study (OHTS) c. The Collaborative Initial Glaucoma Treatment Study (CIGTS) d. The Fluorouracil Filtering Surgery Study (FFSS) e. The Normal Tension Glaucoma Study (NTGS) f. The Advanced Glaucoma Intervention Study (AGIS) g. The European Glaucoma Prevention Study (EGPS) h. The Early Manifest Glaucoma Trial (EMGT)	

B. Technical skills

	Psychomotor/affective domain	**Level of competence**
1. Take a relevant patient history. 2. Identify the signs and symptoms of glaucoma. 3. Perform basic slit-lamp biomicroscopy (including peripheral anterior chamber depth evaluation, Van Herick test). 4. Perform basic tonometry (e.g., applanation, Schiøtz, Tono-Pen, airpuff). 5. Correct artifacts while performing tonometry. 6. Disinfect tonometer 7. Check calibration of Goldmann's applanation tonometer. 8. Perform basic gonioscopy with Goldmann-type and indentation lenses. 9. Evaluate angle structures, abnormalities, and appositional and synechial angle closure. 10. Perform central corneal pachymetry and relate to IOP findings. 11. Recognize the common features of the glaucomatous optic nerve including the significance of optic nerve head size, and perform stereo examination, using direct	**P2**	**3**

ophthalmoscope, fundus lens, and indirect lenses (i.e., 60, 66, 78, or 90 diopter lens). 12. Recognize typical features of glaucomatous optic neuropathy (e.g., neuroretinal rim changes, disc hemorrhage, and peripapillary atrophy). 13. Recognize optic nerve features of disorders that cause visual field loss (e.g., optic nerve head drusen, optic neuritis). 14. Describe slit-lamp findings of secondary glaucomas (e.g., iridocorneal endothelial syndrome, pigment dispersion syndrome, exfoliation syndrome, and angle recession). 15. Interpret visual field results for Goldmann kinetic perimetry and Humphrey or Octopus standard automated perimetry. 16. Test for leaking filtering bleb using the Seidel method. 17. Test for relative afferent pupillary defect. 18. Recognize ocular emergencies of acute angle closure, and blebitis/endophthalmitis. 19. Perform paracentesis to lower acute IOP.	**P2**	**3**

Neuro-Ophthalmology

A. Cognitive Skills

	Cognitive domain
1. Describe the neuroanatomy of the visual pathways. 2. Describe the anatomy and functions of cranial nerves 2-8. 3. Describe the anatomy of the bony orbit. 4. Describe the pupillary and accommodative neuroanatomy. 5. Describe ocular motility and related neuronal pathways. 6. Describe the typical features, evaluation, and management of the most common optic neuropathies (e.g., infectious, demyelinating, ischemic, inflammatory, hereditary, toxic, nutritional, compressive, and infiltrative). 7. Describe the typical features, evaluation, and management of the most common ocular motor neuropathies (e.g., third, fourth, sixth nerve palsy).	**C2, C3**

8. Describe the typical features of cavernous sinus syndrome and superior orbital fissure syndrome. 9. Describe and distinguish congenital nystagmus versus acquired nystagmus. 10. Describe the typical features, evaluation, and management of the most common efferent pupillary abnormalities (e.g., Horner syndrome, third nerve palsy, tonic pupil, light-near dissociation). 11. Describe the typical features and evaluation of the most common visual field defects (e.g., optic nerve, optic chiasm, optic radiation, occipital cortex). 12. Describe the clinical features and evaluation of ocular myasthenia gravis. 13. Describe the clinical features and evaluation of carotid-cavernous fistula. 14. Describe the differential diagnosis, evaluation, and management of congenital optic nerve abnormalities (e.g., optic pit, disc coloboma, papillorenal syndrome, morning glory syndrome, tilted disc, optic nerve hypoplasia, myelinated nerve fiber layer, melanocytoma, disc drusen, Bergmeister papilla). 15. Describe the features of simple supranuclear and internuclear palsies (e.g., internuclear ophthalmoplegia, vertical gaze palsy). 16. Describe the signs of nonorganic visual loss. 17. Describe the indications for obtaining neuroimaging studies, including computerized tomography (CT) scanning, magnetic resonance imaging (MRI), orbital ultrasonography and catheter angiography. 18. Describe the signs and symptoms of giant cell arteritis and the indications for performing a temporal artery biopsy. 19. Describe the clinical features, evaluation and neuro-ophthalmic aspects of thyroid ophthalmopathy. 20. Describe a systematic, sign-and-symptom-oriented neuro-ophthalmic patient interrogation (i.e., history taking) and recording techniques. 21. Describe features of common headache and facial pain syndromes (e.g., migraine, trigeminal neuralgia).	**C2, C3**

B. Technical skills

	Psychomotor domain	**Level of competence**

1. Perform basic visual function tests (e.g., color vision testing, Amsler grid, photostress test, contrast sensitivity testing). 2. Perform tests of binocularity and fusion (e.g., polarized Titmus stereo test, worth 4-dot test). 3. Perform a basic pupillary examination. 4. Perform basic pharmacologic pupillary testing for Horner syndrome, pharmacologic dilation, and tonic pupil. 5. Detect a relative afferent pupillary defect. 6. Detect light-near dissociation. 7. Perform a basic assessment of ocular alignment. 8. Use simple observational techniques (e.g., Hirschberg test, Krimsky method). 9. Perform basic cover/uncover testing for tropia. 10. Perform alternate cover testing for phoria. 11. Perform simultaneous prism and cover testing. 12. Perform measurement of deviations with prisms. 13. Describe the indications for and apply Fresnel and grind-in prisms. 14. Describe the indications for and in a clinical setting perform forced duction and forced generation testing. 15. Perform a complete evaluation of the major ocular motor systems (e.g., fixation, pursuit, saccades, convergence, and vestibuloocular reflex). 16. Perform an evaluation of eyelids (e.g., assess lid position, measure palpebral fissure, quantify levator function). 17. Perform confrontational field testing (e.g., static and kinetic, central and peripheral, red and white targets). 18. Perform basic kinetic perimetry and interpret results. 19. Perform basic automated perimetry and interpret results.	**P3** **P3**	**3** **3**

20. Describe the format of standard clinical tests (e.g., light stimulus, background illumination, and test points). 21. Perform basic direct, indirect, and magnified ophthalmoscopy examination of the optic disc, macula, vessels, and periphery of the retina (e.g., recognize optic disc swelling, optic atrophy, neuroretinitis, nerve head vascular abnormalities, and macular abnormalities, such as edema, pigmentary changes, subretinal fluid, vessel abnormalities, pigmentary changes). 22. Use the findings to generate a differential diagnosis. 23. Interpret basic echography (ultrasound) of the orbits. 24. Perform exophthalmometery. 25. Check pulse, blood pressure in both arms, carotid bruit, and heart sounds.	**P3**	**3**

Ophthalmic Pathology

A. Cognitive Skills

	Cognitive domain
1. Describe the professional duties and specific and unique aspects of professionalism of ophthalmic pathology, and the significance of ophthalmic pathology to the practice of ophthalmology. 2. Describe basic ocular anatomy and histology of the major structures of the eye and its adnexa 3. Describe basic pathophysiology of the common disease processes of the eye and its adnexa, and identify the major histologic findings: a. Degeneration (e.g., pterygium, keratoconus) b. Dystrophy (e.g., Fuchs dystrophy, TGFBI-associated dystrophies) c. Infection (e.g., fungal keratitis, bacterial endophthalmitis) d. Inflammation (e.g., chalazion, idiopathic orbital inflammation)	**C2, C3**

e. Neoplasm and proliferation (e.g., basal and squamous cell carcinoma, uveal melanoma, retinoblastoma) 4. Describe common methods of specimen acquisition and handling for ophthalmic pathology, especially handling methods that avoid artifacts and ensure representative sampling: a. Surgical biopsy, with special emphasis on the eyelids and conjunctiva, cornea, and vitreous b. Resection margin marking c. Enucleation d. Exenteration e. Impression cytology f. Fine needle aspiration biopsy 5. Describe basic information necessary to communicate to the ophthalmic pathologist regarding study of these specimens. 6. Describe common indications for frozen sections in ophthalmic pathology (e.g., complete resection margins in basal and squamous cell carcinoma, demonstration of lipid in sebaceous gland carcinoma). 7. Describe basic steps in handling and processing of gross specimens in the ophthalmic pathology laboratory through a site visit, with relevance to ophthalmic surgery.	**C2, C3**

C. Psychomotor Domain

	Psychomotor domain	**Level of competence**
1. Process specimens for submitting to an ophthalmic pathology laboratory. 2. Interpret reports from these specimens written by the ophthalmic pathologist. Participate as an observer through a site visit in the macroscopic and microscopic examination of ophthalmic pathology specimens from active cases	**P2**	**3**

Oculoplastic Surgery and Orbit

A. Cognitive Skills

	Cognitive domain
General	**C2, C3**

1. Perform preoperative and postoperative assessment of patients with common oculoplastic disorders. **Eyelid** 1. Describe basic anatomy and physiology (e.g., orbicularis, meibomian glands, Zeis glands, orbital septum, levator muscle, Müller muscle, Whitnall ligament, Lockwood ligament, preaponeurotic fat, scalp, face). 2. Describe basic mechanisms and indications for treatment of eyelid trauma (lid margin sparing, lid margin involving, and canaliculus involving). 3. Describe mechanisms and indications for treatment of ptosis. 4. Describe mechanisms and indications for treatment of upper and lower eyelid retraction. 5. Describe mechanisms and indications for treatment of entropion. 6. Describe mechanisms and indications for treatment of ectropion. 7. Identify floppy eyelid syndrome and its systemic associations. 8. Identify blepharospasm and hemifacial spasm. 9. Describe history and examination findings for benign and malignant lid lesions. **Lacrimal** 1. Describe basic anatomy and physiology (e.g., puncta, canaliculi, lacrimal sac, nasolacrimal duct, endonasal anatomy, lacrimal glands). 2. Identify dacryocystitis. 3. Describe mechanisms of tearing. 4. Describe mechanisms and indications for treatment of congenital and acquired nasolacrimal duct obstruction. 5. Recite the differential diagnosis of lacrimal gland mass (e.g., inflammatory, neoplastic, congenital, infectious). **Orbital** 1. Describe basic anatomy (e.g., orbital bones, orbital foramina, paranasal sinuses, annulus of Zinn, arterial and venous vascular supply, nerves, and extraocular muscles). 2. Identify normal orbital and relevant nasal and paranasal sinus anatomy on imaging studies (e.g., computed tomography, magnetic resonance imaging). 3. Describe basic mechanisms and indications for treatment of orbital trauma (e.g., medial wall and floor fractures, retrobulbar hemorrhage). 4. Describe the pathophysiology of thyroid eye disease. 5. Recite the differential diagnosis of common orbital tumors in children and adults.	**C2, C3**

6. Recite the differential diagnosis of proptosis in children and adults. 7. Describe typical features of orbital cellulitis.	

A. Technical skills

	Psychomotor / affective domain	Level of competency
Eyelid 1. Describe indications for and perform the basic office examination techniques for the most common eyelid abnormalities (e.g., margin reflex distance, palpebral fissure height, levator function, lagophthalmos, lid crease, lid laxity assessment, brow height, dermatochalasis, eversion, double eversion). 2. Perform minor lid and conjunctival procedures (e.g., repair of small eyelid laceration including marginal, removal of benign eyelid lesions, chalazion curettage or excision, conjunctival biopsy). 3. Treat complications of minor operating room procedures (e.g., incision and drainage of chalazia, excision of small eyelid lesions). 4. Manage trichiasis (e.g., epilation, cryotherapy, surgical therapy). 5. Perform a temporary tarsorrhaphy. 6. Perform everting sutures (Quickert sutures). 7. Perform a lateral canthotomy/cantholysis. **Lacrimal** 1. Perform the basic office examination techniques for the most common lacrimal abnormalities (e.g., Schirmer test, dye disappearance test, punctal position, punctal dilation, canalicular probing, lacrimal probing and irrigation). 2. Describe indications for and perform an incision and drainage of the lacrimal sac. 3. Perform punctal plug insertion or removal. **Orbital**	**P2**	**3**

1. Describe indications for and perform the basic office examination techniques for the most common orbital abnormalities (e.g., Hertel measurement, inspection, palpation, auscultation). 2. Identify indications for and perform the basic anophthalmic socket assessment (e.g., types of implants, implant movement, socket health, socket surface, socket volume, fornices, prosthesis type and fit).		

Pediatric Ophthalmology and Strabismus

A. Cognitive Skills

	Cognitive domain
1. Describe basic examination techniques for strabismus (e.g., ductions and versions, cover and uncover testing, alternate cover testing, prism cover testing). 2. Describe basic visual development and visual assessment of the pediatric ophthalmology patient (e.g., central, steady, maintained fixation), including any one matching card, resolution and recognition acuity, and crowding using standard vision testing (e.g., tumbling E eye chart, Allen cards, Landolt "C" Broken Ring vision chart). 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 4. Describe basic sensory adaptations for binocular vision, including: a. Normal and anomalous retinal correspondence b. Suppression c. Horopter d. Panum area	**C2, C3**

e. Fusion f. Stereopsis 5. Describe pseudostrabismus. 6. Describe the different etiologies of amblyopia, including: a. Deprivation b. Ametropic c. Strabismic d. Anisometropic e. Organic 7. Describe various forms of esotropia, such as: a. Congenital b. Comitant and incomitant c. Accommodative and nonaccommodative d. Decompensated e. Sensory f. Neurogenic g. Myogenic h. Neuromuscular junction i. Restrictive j. Nystagmus and esotropia k. Spasm of the near l. Monofixation syndrome m. Consecutive 8. Describe various forms of exotropia, such as: a. Congenital b. Comitant and incomitant c. Decompensated d. Sensory e. Neurogenic f. Myogenic g. Neuromuscular junction h. Restrictive i. Basic divergence excess j. Exophoria k. Convergence insufficiency 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	C2, C3

10. Describe different forms of childhood nystagmus. 11. Describe features, classification, and treatment indications for retinopathy of prematurity. 12. Describe etiologies and types of pediatric cataract with consideration of: a. Age of onset b. When do you treat and types of treatment c. Postoperative rehabilitation 13. Describe ocular findings in child abuse (e.g., retinal hemorrhages) 14. Describe basic evaluation of decreased vision in infants and children, such as: a. Delayed maturation of vision b. Leber congenital amaurosis c. Other hereditary retinal disorders d. Congenital glaucoma e. Congenital rubella syndrome f. Retinopathy of prematurity (ROP) g. Various globe anomalies 15. Describe the symptoms, associations, findings, and treatment of childhood glaucoma. 16. Summarize ocular embryology development (i.e., lens development, fetal vasculature, anterior segment development, closure of embryonic fissure). 17. Describe common causes of conjunctivitis in infants and children in terms of symptoms, diagnosis, and treatment. 18. Assess subluxated and dislocated lenses and their systemic associations (e.g., Marfan syndrome, homocystinuria, Weill-Marchesani syndrome). 19. Describe management of epiphora in children, including congenital nasolacrimal duct obstruction. 20. Describe refractive errors and spectacle correction in childhood (recognizing that it is arguably the most common cause of preventable visual impairment in children worldwide). 21. Describe accommodation and drugs used for cycloplegia. 22. Describe indications and uses of contact lenses in childhood. 23. Describe normal visual development milestones. 24. Describe the basic principles of genetics.	C2, C3

B. Technical skills

	Psychomotor domain	Level of competence
1. Perform an extraocular muscle examination based on knowledge of the anatomy and physiology of ocular motility.	P3	3
2. Assess ocular motility using duction and version testing.	P3	3
3. Apply Hering law and Sherrington law.		
4. Perform basic measurement of strabismus (e.g., Hirschberg test, Krimsky method, cover testing, prism cover testing, simultaneous prism cover testing, alternate cover testing).		
5. Perform assessment of vision in the neonate, infant, and child, including: a. Fixation preference test b. Standard subjective visual acuity tests c. Induced tropia test		
6. 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.		
7. Measure the refractive condition of a patient's eyes using a retinoscope.		
8. Apply in a clinical setting the following skills in the ocular motility examination: a. Stereoacuity testing b. Accommodative convergence/accommodation ratio (e.g., heterophoria method, gradient method) c. Tests of binocularity and retinal correspondence d. Cycloplegic refraction (i.e., retinoscopy) e. Anterior and posterior segment examination f. Basic and advanced measurement of strabismus g. Teller acuity cards		
9. Assist a primary surgeon in performing extraocular muscle surgery, including: a. Recession b. Resection		

c. Muscle weakening (e.g., tenotomy) and strengthening (e.g., tuck) procedures d. Transposition e. Use of adjustable sutures f. Intraoperative forced duction test (FDT) 10. Probe tear ducts to diagnose and treat an obstruction. 11. Medically and, if indicated, surgically manage chalazions. Treat molluscum contagiosum with curettage, if indicated		

Vitreoretinal Diseases

A. Cognitive Skills

	Cognitive domain
1. Describe basic principles of retinal anatomy and physiology (i.e., basic retinal and choroidal anatomy, retinal and choroidal physiology), with emphasis on macular anatomy and physiology. 2. Describe fundamentals of ancillary testing and demonstrate basic understanding of fluorescein angiography (angiographic phases), optical coherence tomography (OCT) (e.g., macular anatomy, determine pathophysiology behind structural alterations). 3. Describe pathological anatomy, physiopathology, and clinical pictures of the most common vascular diseases: a. Diabetic retinopathy b. Central vein occlusion c. Branch vein occlusion d. Arterial occlusion e. Hypertensive retinopathy 4. Describe features of different types of retinal detachment (i.e., rhegmatogenous, tractional, exudative). 5. Describe typical features of common macular diseases (e.g., age-related macular degeneration [AMD], macular whole, macular pucker, central serous chorioretinopathy, chloroquine maculopathy, pseudophakic cystoid macular edema). 6. Describe features of traumatic pathologies, including: a. Commotio retinae b. Traumatic choroidal rupture c. Purtscher retinopathy	**C2, C3**

7. Describe typical features of retinitis pigmentosa, main macular dystrophies (e.g., Stargardt, Best, cone dystrophy), and other hereditary pathologies. 8. Describe basic principles of laser photocoagulation (e.g., laser response to change in power, duration, and spot size) and photodynamic therapy for retinal treatment. 9. Describe basic principles, techniques, and safety of intravitreal injections. 10. Manage postoperative/posttraumatic endophthalmitis.	

B. Technical skills

	Psychomotor domain	**Level of competence**
1. Perform direct ophthalmoscopy. 2. Perform indirect ophthalmoscopy. 3. Perform slit-lamp biomicroscopy with precorneal lenses, 3-mirror contact lenses, or other wide-field contact lenses. 4. Diagnose the presence of common retinal disorders such as exudative AMD, diabetic retinopathy, cystoid macular edema, central serous retinopathy, based on results of fundus examination, fundus photographs, OCT, and fluorescein angiography.	**P2**	**3**

Uveitis and Ocular Inflammation

A. Cognitive Skills

	Cognitive domain
1. Describe the definition and classification of intraocular inflammation. 2. Describe the basic principles of history taking: a. Ocular history i. Correlate with possible anatomical diagnosis (e.g., photophobia and anterior ii. uveitis; floaters and posterior uveitis) iii. Describe the onset (sudden or insidious)	**C2, C3**

iv. Describe the duration (limited or persistent) v. Describe the course (acute, recurrent, chronic) vi. Investigation and treatment history b. Systemic history i. Known diseases, including immunosuppressed states, such as HIV, malignancy, ii. diabetes mellitus iii. Symptoms of recent onset for (e.g., fever, chills, and rigors may suggest sepsis) iv. Systems review, including all medications, past and current v. List the clinical features of: vi. Anterior uveitis vii. Intermediate uveitis viii. Posterior or panuveitis ix. Episcleritis and scleritis (e.g., red eye, blurred vision) x. Anterior segment cell and flare xi. Keratic precipitates (non-granulomatous or granulomatous) xii. Posterior synechiae xiii. Vitreous cell and flare xiv. Vitreous opacities xv. Snowbank xvi. Retinal and/or choroidal lesions xvii. Retinal vasculitic xviii. Retinal detachment (exudative, tractional, and rhegmatogenous) xix. Optic disc changes (e.g., optic disc edema, optic neuritis). 3. Describe the typical demographic features, clinical features, and differential diagnosis of common, rapidly blinding causes for items 3a–3n (based on local epidemiological data). For example: a. Anterior uveitis i. Infectious (e.g., bacterial, viral, protozoal, parasitic)	

ii. Inflammatory (e.g., sarcoidosis, HLA B27-associated, juvenile idiopathic iii. arthritis, Behçet disease, collagen vascular disease) iv. Postsurgical uveitis v. Posttraumatic vi. Fuchs uveitis syndrome vii. Posner-Schlossman syndrome b. Intermediate uveitis i. Pars planitis ii. Toxocariasis iii. Sarcoidosis iv. iv. Multiple sclerosis c. Posterior or panuveitis i. Infectious (e.g., toxoplasmosis, toxocariasis, tuberculosis, acquired and congenital ocular syphilis, acute retinal necrosis) ii. Inflammatory (e.g., sarcoidosis, Behçet disease, Vogt-Koyanagi-Harada disease, sympathetic ophthalmia) iii. Postoperative uveitis iv. Endophthalmitis (e.g., postoperative, traumatic, endogenous, fungal, phacoanaphylactic) d. Episcleritis and scleritis i. Collagen vascular diseases (e.g., rheumatoid arthritis, Wegener granulomatosis) ii. Infection (e.g., syphilis, tuberculosis, fungal, parasitic, bacterial) 4. Describe indications for ancillary testing in the evaluation of uveitis (e.g., fluorescein angiography [FA], indocyanine green [ICG] angiography, optical coherence tomography [OCT], B-scan ultrasonography). 5. Describe indications for a tailored approach (based on clinical features) to laboratory investigations, including obtaining tissue and fluid samples for examination and systemic imaging studies (e.g., x-ray of chest, sacroiliac joint, chest computerized axial tomography [CT or CAT] scan).	

6. Describe the indications and contraindications of topical steroids, nonsteroidal antiinflammator drugs (NSAIDs), and cycloplegics.	

C. Technical skills

	Psychomotor domain	Level of competence
1. Evaluate clinical features of anterior uveitis, including: a. Corneal pathology (active keratitis or scars, endotheliitis, band keratopathy) b. Pattern of keratic precipitates (nongranulomatous, granulomatous) c. Iris changes (rubeosis iridis, gross iris atrophy) d. Anterior chamber evaluation of cells and flare, including grading according to standardization of uveitis nomenclature (SUN) working group grading system e. Differentiate episcleritis from scleritis 2. Describe the activity (active or quiescent) 3. Perform: a. Dilated examination of the posterior segment with slit-lamp biomicroscopy using noncontact and contact lenses, indirect ophthalmoscopy. b. Vitreous evaluation for cells and flare, including grading of vitreous haze according to SUN working group grading system c. Retina/choroid (retinal detachment, choroidal or retinal inflammation) d. Retinal vasculature (vascular inflammation) e. Optic disc (swelling, pallor) 4. Describe the regional epidemiology of uveitis and relate this information to the diagnosis. 5. Enist the following:	**P2**	**3**

a. Uveitis in immunosuppressed individuals with active and recovered acquired immune b. deficiency syndrome or pharmacologic immunosuppression (e.g., cytomegalovirus retinitis, pneumocystis (carinii) jiroveci) c. Unusual infectious etiologies for uveitis (e.g., Lyme disease, West-Nile fever) d. Masquerade syndromes such as vitreoretinal lymphoma e. Differentiate infective from noninfective causes of uveitis. 6. Perform pars plana evaluation and sclera depression. 7. Interpret fluorescein angiography, B-scan ultrasonography, and correlate clinically. 8. Provide patient with all relevant information about proposed ancillary testing procedures for uveitis, including risks and complications.		

Ocular Oncology

A. Cognitive Skills

	Cognitive domain
1. Describe the basic categorization of common conjunctival and intraocular tumors. 2. Describe the clinical features of the major types of ocular tumor. 3. Describe the symptoms and clinical manifestations indicating the presence of an ocular tumor (e.g., leukocoria, sentinel vessels). 4. Describe the differential diagnosis of the major tumors. 5. Describe the examinations and tests by which ocular tumors are diagnosed. 6. Describe the systemic features of ocular tumors and how these features are detected. 7. Describe the basic management principles of ocular tumors. 8. Describe the epidemiology of the more common tumors (e.g., melanoma).	C2, C3

9. Describe the methods, risks, and benefits of tumor biopsy.	

D. Technical skills

	Psychomotor domain	Level of competence
1. Perform slit-lamp and ophthalmoscopic examination of patients with an ocular tumor. 2. Recognize an ocular tumor and refer to an ocular oncology subspecialist. 3. Contribute to the care of patients after treatment.	**P2**	**3**

Low Vision Rehabilitation

A. Cognitive Skills

	Cognitive domain
1. Describe the definition, categories (types), and degrees of low vision. 2. Describe the most common causes of low vision (global and regional epidemiology and its impact on different age groups). 3. Describe the role of the ophthalmologist in recognizing the need for referring patients to a low vision rehabilitation service. 4. Describe the special aspects of vision-assessment techniques for children and adults with low vision (e.g., Early Treatment of Diabetic Retinopathy Study charts, Log MAR visual acuity chart, SOSH low vision chart set, LEA test eye charts). 5. Describe significant co-morbidities that impact low vision rehabilitation. 6. Describe various low vision aids. 7. Describe the basic optics of low-vision devices. 8. Demonstrate sensitivity to psychological and emotional aspects of visual impairment. 9. Describe challenges commonly encountered by individuals with visual impairments. 10. Describe how low vision impacts safety, including risk of falls, errors in medication, and driving accidents. 11. Describe the importance of different visual functions, including: a. Visual acuity (far and near distance) b. Contrast sensitivity	**C2, C3**

c. Central and peripheral visual field d. Light and dark adaptation e. Depth perception f. Color vision	

E. Technical skills

	Psychomotor domain	Level of competence
1. Perform an evaluation of visual function in patients with low vision. 2. Describe how to use high-add reading glasses with and without a base-in (BI) prism. 3. Prescribe simple but appropriate rehabilitative therapies and optical devices to help the patient meet their goals (e.g., magnification, illumination). 4. Encourage patients with low vision to actively participate in visual rehabilitation. 5. Describe the functional losses of vision that may occur with various ocular diseases. 6. Describe the functional losses that might result from certain treatments. **Ethics and Professionalism in Ophthalmology** 1. Provide the definition and basic concepts behind the following terms used in medical ethics: a. Morality versus ethics (intent-based standards versus conduct-based standards) b. Autonomy and surrogacy c. Beneficence d. Nonmaleficence e. Truth telling f. Distributive justice g. Fiduciary responsibility to patients h. Compassion 2. Describe the ethical principles listed in the following key medical documents: a. Hippocratic Oath b. Declaration of Geneva	**P2**	**3**

c. Code of Ethics, American Academy of Ophthalmology 3. Describe the basics of ophthalmic practice management: a. Partnership arrangements b. Contractual negotiations c. Hiring and supervising of employees d. Basic accounting i. Profit/loss statements ii. Billing iii. Collections e. Financial management 4. Describe the basics of the health care system and reimbursement for services as appropriate to the local, regional, and national market of the trainee.		

Community Eye Health

A. Cognitive Skills

	Cognitive domain
Principles for the prevention of blindness 1. Explain the World Health Organization (WHO) definition of blindness and low vision. 2. Describe the magnitude of blindness in different economic settings. 3. List the major causes of blindness in different economic settings. 4. Describe the magnitude of blindness in the resident's own country. 5. List the major causes of blindness in the resident's own country. 6. Define the concept of blind-person years. 7. Outline the structure of the health service, and how eye care services are integrated into this structure. 8. Outline the social and economic implications of visual impairment and the impact on quality of life. 9. Outline the barriers to the uptake of eye care services. 10. Describe the principles of primary health care and their application for primary eye care. **Inclusive practice** 1. Explain the WHO definition and conceptualization of disability. 2. Appraise the epidemiology of disability (including due to visual impairment) and its impact in different economic settings.	**C2, C3**

3. Describe the intersection of blindness and visual impairment with other issues that may cause marginalization, including the patient's age, gender, other impairments, poverty, ethnic group, and faith community. 4. Critically appraise the impact of disability in peoples lives (eg, poverty, education, quality of life [social and economic], and occupation). 5. Describe the barriers to the uptake of eye care services within health systems by marginalized groups. 6. Describe the principles of rehabilitation and community-based rehabilitation with relevance to people with visual impairment and the integration of rehabilitation within a health system. 7. Describe strategies and partnerships with disability support services that can improve quality of life (eg, health, education, livelihoods, economic security, social inclusion) of people with long term visual impairment. **Cataract** 1. Describe the prevalence and incidence of blindness due to cataract. 2. Define cataract surgical rate (CSR). 3. Describe the desired CSR required to eliminate blindness due to cataract. 4. List the barriers to the uptake of cataract surgery. 5. Outline the rationale for the monitoring of cataract services. 6. Describe the components of a system for the monitoring of cataract services. 7. List the WHO's recommendations for the visual acuity outcomes following cataract surgery. **Refractive error** 1. Define significant refractive error. 2. Describe the prevalence of significant refractive error in children and in adults. 3. Outline the strategy for including refractive error in a blindness prevention program, including a system for screening of school children to detect refractive error. 4. List the barriers to the uptake of refractive error services. **Low vision** 1. Define low vision. 2. Describe the prevalence of low vision. 3. Outline the strategy for including low vision in a blindness prevention program. 4. List the barriers to the uptake of low vision services.	

5. Describe the impact of low vision on the affected person and how it impacts their access to wider health, education, economic, and social inclusion. 6. List the resources available for people with low vision (eg, low-vision devices, low vision training, and access to wider opportunities in education, livelihoods, and social inclusion). **Childhood blindness** 1. Define childhood blindness. 2. Describe the prevalence of childhood blindness in different economic settings. 3. Describe the incidence of childhood blindness. 4. Describe the classification of the causes of childhood blindness. 5. Outline the blind school survey method and the key informant method for identifying the causes of childhood blindness. 6. Summarize the results of blind school surveys that have been conducted. 7. List the barriers to the uptake of services for childhood eye problems. 8. Outline the role of primary eye care in the prevention and treatment of childhood blindness. 9. Outline how to partner with services that can improve quality of life (eg, health, education, livelihoods, and social inclusion) of children with long term visual impairment. **Trachoma** 1. Describe the risk factors for trachoma. 2. Outline the WHO clinical grading of trachoma. 3. Outline the surgery, antibiotics, facial cleanliness, and environmental changes (SAFE) strategy for the control of trachoma. 4. Describe the magnitude of trachoma, and describe the affected regions. 5. Outline the role of primary health care in the prevention and treatment of trachoma. **Glaucoma** 1. Describe the prevalence of glaucoma and blindness due to glaucoma. **Diabetic retinopathy** **2.** Describe the prevalence of diabetes and diabetic retinopathy. 3. Human resources for blindness prevention program 4. Describe the role and distribution of different cadres working in eye care. 5. Planning of blindness prevention programs	

Describe the steps in developing a one-year operational plan for a blindness prevention program for a health district with a population of one million people	

B. Technical Skills

	Psychomotor domain	Level of competence
Principles of prevention of blindness 1. Calculate prevalence rates from given data sets. 2. Calculate numbers blind from given prevalence rates. 3. Calculate blind-person years from given data sets. 4. Calculate estimates of numbers of persons who are blind. 5. Calculate estimates of blind-person years. 6. Calculate an estimate of the number of persons who are irreversibly blind and require rehabilitation services.	**P2**	**3**
Cataract 1. Calculate an estimate of the number blind due to cataract. 2. Calculate cataract surgery rate. 3. Calculate cataract surgery coverage from given data sets. 4. Calculate and comment on visual acuity outcomes following cataract surgery from given data sets.	**P2**	**3**
Refractive error 1. Calculate estimates of numbers of children and adults with significant refractive error. 2. Calculate estimates of numbers of children and adults with low vision.		
Childhood blindness 1. Calculate estimates of the numbers of children blind due to different causes.		

2nd Year Resident Goals

By the completion of their 2nd year residency, the residents should be able to:

Cataract and Lens

A. Cognitive Skills

	Cognitive domain
1. Describe the less common causes of lens abnormalities (e.g., spherophakia, lenticonus, ectopia lentis, coloboma). 2. Describe the preoperative evaluation of the cataract patient, including: a. Systemic diseases of interest or relevance to cataract surgery. b. Systemic medication of relevance to cataract surgery (e.g., alpha 1 adrenergic blocking agent, blood thinning agents, corticosteroids) c. Relationship of external and corneal diseases of relevance to cataract and cataract surgery (e.g., lid abnormalities, dry eye) d. Management of uveitis prior to and following cataract surgery e. Management of glaucoma prior to and following cataract surgery, including options for postoperative intraocular pressure (IOP) control 3. Describe glare analysis testing for cataract surgery. 4. Describe the use of A-scan and B-scan contact and immersion ultrasonography and optical coherence techniques in cataract surgery to measure axial eye length. 5. Describe the instruments and techniques of cataract extraction, including extracapsular surgery and phacoemulsification. 6. Describe the important parameters of the phacoemulsification machine and how to alter them for particular conditions of surgery. 7. Describe the types, indications, and techniques of anesthesia for cataract surgery (e.g., topical, local, general). 8. Describe indications, techniques, and complications of surgical procedures, including: ECCE, ICCE, and phacoemulsification, paracentesis, and IOL placement. 9. Describe the pathogenesis and strategies for prevention of posterior capsular opacification. 10. Describe history and techniques of basic IOL implantation.	**C2, C3** **C2, C3**

11. Correlate the level of visual acuity with the lens or capsular opacities. 12. Describe the pathogenesis, clinical presentation, differential diagnosis, evaluation, clinical course, treatment, and outcome of the common complications of cataract and anterior segment surgery (e.g., intraoperative floppy iris syndrome, corneal edema, IOP elevation, hyphema, endophthalmitis, toxic anterior segment syndrome (TASS), cystoid macular edema (CME), retinal detachment, IOL dislocation, lens-induced glaucoma, and uveitis). 13. Describe the indications for, principles of, and techniques of yttrium aluminium garnet (YAG) laser capsulotomy, and understand the proper timing of YAG laser capsulotomy. 14. Describe advanced IOL power calculation (e.g., after radial keratotomy [RK], myopic laser-assisted in situ keratomileusis [LASIK]/photorefractive keratectomy [PRK], hyperopic LASIK/PRK). 15. Describe the properties of different ophthalmic viscoelastic devices (OVDs) (e.g., dispersive, cohesive, adaptive) and the advantages and disadvantages for certain phases of surgery. 16. Describe the fluid dynamics in phacoemulsification, including the difference between peristaltic and venture pump types. 17. Manage common postoperative complications of cataract surgery (e.g., endophthalmitis, toxic anterior segment syndrome, elevated IOP, CME, wound leak, uveitis, and capsular block syndrome). 18. Define the more complex indications for cataract surgery (e.g., better view of posterior segment, lens-induced glaucoma). 19. Describe the techniques to manage a small pupil, including mechanical manipulation, management of iris membrane, iris hooks, viscoelastic, and phaco techniques. 20. Describe techniques to diagnose and operate on patients with posterior polar cataract. 21. Describe the preoperative preparations for surgery and special intraoperative considerations for patients with uveitis. 22. Describe techniques for prevention of capsular opacification and phimosis (before, during, after surgery), including the use of capsular tension rings and IOL factors.	

B. Technical skills

	Psychomotor domain	Level of competence
1. Perform local injections of corticosteroids, antibiotics, and anesthetics, including retrobulbar and subtenon.	P3	4
2. Perform extracapsular surgery in a practice setting (e.g., animal or practice lab).		
3. Practice surgery in the operating room under supervision, including mastery of the cataract surgical skills:	P2	3
2. Perform paracentesis of the anterior chamber.		
3. Implement advanced applications of viscoelastics in surgery (e.g., control of iris prolapses, elevation of dropped nucleus, viscodissection, aspiration of residual/retained viscoelastic, soft-shell technique).		3

Contact Lenses

A. Cognitive Skills

	Cognitive domain
1. Explain applied anatomy and physiology (e.g., corneal metabolism and temperature, oxygen consumption, stromal acidosis, tear osmolality, tissue fragility, cell apoptosis, corneal sensitivity, closed eyelid-related ocular surface repercussions).	**C2, C3**
2. Recognize signs and symptoms of CL intolerance and over wear.	
3. Explain the importance of assessing tear film and ocular surface condition with more complex auxiliary tests in certain CL fitting situations (e.g., tear film osmolality and biochemical composition, impression cytology).	
1. Identify CL fitting situations requiring corneal topography (e.g., computerized/Placido rings).	
2. Explain the rationale underlying different topography profiles and how these relate to the manifest refraction.	
3. Analyze topography maps.	
4. Explain physical properties of CL materials:	

a. International Organization for Standardization (ISO) classification 5. Explain advantages and disadvantages of SCL materials. 6. Explain advantages and disadvantages of RGP CL materials. 7. Explain RGP/SCL geometry relation with corneal geometry (i.e., lacrimal meniscus, refraction, and ocular surface implications). 8. Explain main principles to fit RGP CL (e.g., first trial CL choice, fluorescein patterns, alignment, movement, wearing and replacement schedule, fitting motivation, and follow up). 9. Explain main principles to fit toric SCL: a. Stabilization i. LARS rule (i.e., Left Add, Right Subtract) ii. Movement iii. Rotation iv. Possible refitting needs 10. Appraise clinical situations best suited for RGP CL fitting versus toric SCL fitting. 11. Explain when CL refitting is indicated and perform refitting when needed. 12. Recognize signs and symptoms of a tight, optimal, and loose CL fitting. 13. Explain advantages and disadvantages of different wearing schedules (e.g., conventional, frequent planned replacement, flexible, daily). 14. Describe ocular impact and physiological needs regarding different CL wearing schedules. 15. Describe CL requirements for materials needed for extended/flexible CL wearing. 2. Explain patient and CL selection and fitting techniques as applied to fit presbyopia. 3. Explain how to keep a CL fitting trial set (i.e., CL, equipment, and disinfection care). 4. Describe and evaluate different CL care systems. 5. Explain the clinical importance of CL environment (i.e., CL patient surrounding, ocular surface, and storage case).	**C2, C3**

B. Technical skills

	Psychomotor domain	**Level of competence**

1. Perform a CL history in patients requiring more complex CL fitting (e.g., subclinical ectatic corneal disorders such as keratoconus and pellucid marginal degeneration, regular moderate astigmatism, presbyopia, ocular surface disease, and post-refractive surgery). 2. Perform a clinical examination, including retinoscopy and refraction techniques to verify and inspect CL in patients requiring more complex CL fitting (e.g., subclinical ectatic corneal disorders such as keratoconus and pellucid marginal degeneration, regular moderate astigmatism, presbyopia, ocular surface disease, and post-refractive surgery). 3. Indicate more complex additional auxiliary tests (e.g., computer-based corneal topography, tear film osmolarity, impression cytology) in patients requiring more complex CL fitting (e.g., subclinical ectatic corneal disorders such as keratoconus, pellucid marginal degeneration, regular moderate astigmatism, presbyopia, and ocular surface disease, and post refractive surgery). 4. Perform RGP CL fitting (spherical). 5. Perform SCL toric fitting. 6. Perform presbyopia CL fitting. 7. Perform appropriate CL selection and material or parameters modification in CL refit. 8. Perform CL verification for visual acuity, fitting, and comfort in patients requiring more complex CL fitting. 9. Educate patients regarding CL-related complications. 10. Manage CL-related complications.	P3	3

11. Perform the skills needed for long-term management and follow up of CL patients.		3

Cornea and External Diseases

A. Cognitive Skills

	Cognitive domain
1. Describe the more complex anatomy, embryology, physiology, pathology, microbiology, immunology, genetics, epidemiology, and pharmacology of the cornea, conjunctiva, sclera, eyelids, lacrimal apparatus, and ocular adnexa. 2. Describe the more complex congenital abnormalities of the cornea, sclera, anterior segment and globe and their associated systemic manifestations (e.g., Axenfeld, Rieger, and Peter anomalies, aniridia, hamartomas and choristomas). 3. Correlate the concordance of the visual acuity with the density of media opacity (e.g., cataract, corneal scars, edema), and evaluate the etiology of discordance between acuity and findings from examination of the media. 4. Recognize and treat less common corneal or conjunctival presentations of degenerations and common conjunctival neoplasms (e.g., inflamed, atypical, or recurrent pterygium, band keratopathy, benign and malignant tumors). 5. Describe the epidemiology, clinical features, pathology, evaluation, and treatment of peripheral corneal thinning disorders or ulceration (e.g., Terrien marginal degeneration, Mooren ulcer, rheumatoid arthritis-related corneal melt, dellen). 6. Describe the epidemiology, differential diagnosis, evaluation, and management of vitamin A deficiency (e.g., Bitot spot, dry eye, slowed dark adaptation) and neurotrophic corneal diseases. 7. Manage recurrent corneal erosions. 8. Manage chronic conjunctivitis (e.g., chlamydia, trachoma, molluscum contagiosum, Parinaud oculoglandular syndrome, ocular rosacea). 9. Describe the more complex principles of ocular pharmacology of anti-infective, anti-inflammatory, and immune modulating agents (e.g., use of topical non-steroidal and steroidal agents, cyclosporine, and anti-tumor necrosis factor agents).	**C2,C3**

10. Describe more complex differential diagnosis of red eye (e.g., autoimmune and inflammatory disorders causing scleritis, episcleritis, conjunctivitis, orbital cellulitis). 11. Describe key features of trachoma, including epidemiology, clinical features, staging, and its complications (e.g., cicatrization), prevention (e.g., facial hygiene), and topical and systemic antibiotic treatment (especially in hyperendemic regions), and surgery (e.g., tarsal rotation). 12. Manage interstitial keratitis (e.g., syphilis, viral diseases, and noninfectious, immunologic, inflammation). 13. Describe the differential diagnosis and the external manifestations of more complex anterior segment inflammation (e.g., acute and chronic iritis with and without systemic disease). 14. Manage the ocular complications of severe diseases, such as chronic exposure keratopathy, contact dermatitis, and rosacea. 15. Describe the classification, pathology, indications for surgery, and prognosis of common eyelid abnormalities (e.g., blepharoptosis, trichiasis, distichiasis, essential blepharospasm, entropion, ectropion) and understand their relationship to secondary diseases of the cornea and conjunctiva (e.g., exposure keratopathy). 16. Manage foreign body, animal, and plant substance injuries and understand the risk of injury with organic material. 17. Describe more complex mechanisms of traumatic and toxic injury to the anterior segment (e.g., long-term sequelae of acid and alkali burn, complex lid laceration involving the lacrimal system, full-thickness laceration). 18. Manage corneal lacerations (perforating and nonperforating). 19. Manage hyphema (e.g., surgical indications, evacuation). 20. Recognize the anterior segment manifestations of systemic diseases (e.g., Wilson disease) and pharmacologic side effects (e.g., amiodarone vortex keratopathy). 21. Manage common and uncommon benign and malignant lid lesions.	**C2,C3**

B. Technical skills

	Psychomotor domain	**Level of competence**
1. Perform more advanced techniques, including keratometry, keratoscopy, endothelial cell count and/or evaluation, specular microscopy, and pachymetry.	**P2**	**3**

2. Perform more complex and recurrent pterygium excision, including conjunctival grafting. 3. Perform more complex lid laceration repair. 4. Perform more complex corneal laceration repair (e.g., stellate perforating laceration). 5. Perform stains of the cornea and conjunctiva (e.g., calcofluor white, acid fast). 6. Repair simple lacerations of the lacrimal drainage apparatus (e.g., perform intubations and primary closure). 7. Treat hyphaema and microhyphaema with associated increased intraocular pressure and/or blood staining (e.g., surgical evacuation).		

Refractive Surgery

A. Cognitive Skills

	Cognitive domain
1. Describe various types of refractive errors. 2. Define the possible corrective solutions for all types of refractive errors. 3. Describe basic diagnostic tools used in refractive surgery, including topography, pachymetry, and biometry. 4. Describe more complex types of refractive errors, including postoperative refractive errors following cataract surgery, keratoplasty, refractive surgeries, ectatic conditions, and irregular astigmatism. 5. Explain basics of wavefront analysis, including ray tracing and dynamic skiascopy, and graphical representation of wavefront errors, including corneal and entire eye high-order aberration maps, point-spread function, and modulation-transfer function. 6. Describe the basics of Zernike polynomials and Fourier analysis. 7. Use different topographic maps and scales for different purposes (e.g., screening, postoperative evaluation, detection of complications). 8. Describe the basics of measuring contrast sensitivity.	**C2,C3**

9. Describe laser-tissue interaction Munnerlyn formula. 10. Describe corneal biomechanics, including biomechanical responses to keratorefractive surgery, corneal healing after excimer laser procedures, corneal hysteresis, and corneal resistance factor. 11. Identify post laser in-situ keratomileusis (LASIK) ectasia. 12. Describe the mechanism of action, indications, advantages, and potential complications of mitomycin C application in surface ablation. 13. Describe the effect of corneal crosslinking on the biomechanical properties of the cornea, including its indications and how it can be combined with other refractive surgery procedures.	

B. Technical skills

	Psychomotor Domain	**Competence Level**
1. Perform refraction techniques using trial lenses or phoropter for basic and more complex cases, including: a. Modification and refinement of subjective manifest refractive error b. Cycloplegic retinoscopy and refraction c. Post cycloplegic refraction d. Contact lens use e. Irregular astigmatism f. Post-keratoplasty g. Refractive surgery cases	**P1**	**3**
2. Apply the basics of optics and optical principles of refraction and retinoscopy in the clinical setting, including higher order aberrations.	**P2**	**3**
3. Gather accurate information essential for preoperative evaluation of patients seeking refractive surgery, including: a. Medical interview i. Patient expectation ii. Social history iii. Medical history iv. Pertinent ocular history b. Physical examination	**P1**	**4**

i. Uncorrected visual acuity ii. manifest and cycloplegic visual acuity iii. Intraocular pressure iv. Slit-lamp examination v. Fundus examination		
4. Diagnose and manage dry eye prior to surgery.	**P2**	**3**
5. Use the keratometer to make corneal measurements in more complex patients (e.g., prior corneal surgery or corneal disease), and correlate results with corneal topography maps, visual acuity, and quality of vision.	**P2**	**3**
6. Use basic refractive instruments and techniques (e.g., auto refractor, pachymetry, automated corneal topography, aberrometer, pupillometry, contact lens refraction, OCT, corneal hysteresis, and corneal resistance factor) in the clinical setting for refractive surgery patients.	**P2**	**3**
7. Assist in developing patient care management plans for simple refractive errors (e.g., myopia, hyperopia, regular astigmatism), and define the risks and benefits for each procedure.	**P1**	**2**
8. Assist in various types of refractive surgery, including: a. Twenty surface ablation procedures b. Twenty LASIK procedures c. Ten intracorneal ring segment implantation procedures d. Ten phakic IOL surgeries	**P2**	**2**

Glaucoma

A.	**Cognitive Skills**	
1.	Describe epidemiology of congenital glaucoma, primary open-angle glaucoma, exfoliation syndrome and exfoliative glaucoma, and angle-closure glaucoma.	**C2**
2.	Describe the genetics of: a. Primary congenital glaucoma (CYP1B1)	**C2**

b. Syndromes associated with congenital/developmental glaucoma i. Lowe syndrome ii. . Nail-patella syndrome iii. Aniridia (PAX 6) iv. Axenfeld-Rieger syndrome (PITX2, FOXC1, FKHL7) c. Primary open-angle glaucoma i. GLC1A and the molecular biology of myocilin ii. Optineurin iii. Other genes as they become identified	**C2**
3. Describe the features of primary infantile and juvenile glaucomas.	**C2**
4. Describe etiologies and major risk factors for secondary open-angle glaucomas.	**C3**
5. Recognize secondary glaucomas (e.g., angle recession, inflammatory, steroid induced, pigmentary, and exfoliative, phacolytic, neovascular, postoperative, malignant, lens-particle glaucomas, plateau iris, glaucomatocyclitic crisis, and iridocorneal endothelial syndrome) with attention to appropriate pathophysiology.	**C3**
6. Manage complex secondary glaucomas (e.g., exfoliation, angle recession, inflammatory, steroid induced, pigmentary, phacolytic, neovascular, postoperative, malignant, lens-particle glaucomas; plateau iris; glaucomatocyclitic crisis; iridocorneal endothelial syndromes; aqueous misdirection/ciliary block).	**C2**
7. Describe diurnal fluctuations in IOP and ocular perfusion pressure and their application in the approach to therapy.	**C2**
8. Describe more advanced optic nerve and nerve fiber layer anatomy in glaucoma and typical and atypical features associated with glaucomatous cupping (e.g., rim pallor, disc hemorrhage, parapapillary atrophy, rim thinning, notching, circumlinear vessels, central acuity loss, hemianopic or other nonglaucomatous types of visual field loss).	**C2**
9. Describe tools and techniques for quantitative anterior segment imaging such as ultrasound biomicroscopy and anterior segment optical coherence tomography (OCT).	
10. Describe basic principles of tools to analyze optic nerve and retinal nerve fiber layer such as OCT, Heidelberg Retina Tomograph (HRT), and GDx.	**C2**

11. Interpret HRT, OCT, and GDx scans.	
12. Interpret more advanced forms of perimetry (kinetic and automated static), including various perimetry strategies such as threshold testing, suprathreshold testing, and special algorithms.	**C2** **C2**
13. Describe the principals involved in determining glaucomatous progression both clinically and perimetrically.	**C2**
14. Describe the principles, and more advanced anatomic gonioscopic features of primary and secondary glaucomas (e.g., plateau iris, appositional closure).	**C2**
15. Describe target IOP and its use in glaucoma management.	
16. Describe the principles of medical management of more advanced glaucomas (e.g., advanced primary open-angle glaucoma, secondary open and closed angle glaucomas, and normal tension glaucoma).	**C2** **C2**
17. Describe pitfalls of medical treatment, in particular poor compliance and adherence.	**C2**
18. Describe the features of angle-closure glaucomas and aqueous misdirection.	**C2**
19. Describe the most common clinical features and etiologies of ocular hypotonic.	**C2**
20. Describe differential diagnosis and management of hypotony.	
21. Apply the results of major clinical trials in glaucoma to clinical practice (e.g., GLT, OHTS, CIGTS, FFSS, NTGS, AGIS, EGPS, and EMGT).	**C2** **C2**
22. Apply specific medical treatments in more advanced glaucoma.	**C3**
23. Describe the principles, indications, and techniques of various types of laser energy, spot size, and laser wavelengths.	**C2**
24. Describe the principles, indications, and techniques of trabeculectomy (with or without cataract surgery, with or without antimetabolites), glaucoma drainage devices, and cyclodestructive procedures.	**C2**
25. Describe the major etiologies of dislocated or subluxated lens associated with glaucoma (e.g., trauma, Marfan syndrome, homocystinuria, Weill-Marchesani syndrome, syphilis).	**C2**
26. Describe the less common causes of lens abnormalities associated with glaucoma (e.g., spherophakia, lenticonus, and ectopia lentis).	
27. Define the relationships of glaucoma and uveitis.	**C1**

28. Describe diagnostic accuracy, false positive and false negative diagnoses and their significance at individual and societal levels, differences between case-based and community-based screening, including an understanding of sensitivity and specificity, number needed to treat, *t* tests, life-table analysis, prospective versus retrospective studies, case control and cohort studies.	**C2**

B. Technical skills

1. Perform argon and selective laser trabeculoplasty for open-angle glaucoma.	**P1**	**2**
2. Perform argon or YAG laser for angle-closure glaucoma.	**P1**	**2**
3. Perform surgical peripheral iridoectomy for angle-closure glaucoma.	**P1**	**2**
4. Perform peripheral iridoplasty for non-pupillary block angle-closure glaucoma.	**P1**	**2**
5. Perform laser suture lysis.	**P1**	**2**
6. Perform cyclodestructive surgery (photocoagulation or cryotherapy).	**P1**	**2**
7. Assist with trabeculectomy and glaucoma drainage device surgery in the operating room.	**P1**	**2**
8. Describe and manage a flat anterior chamber.	**P1**	**2**
9. Perform routine trabeculectomy.	**P1**	**1**

Neuro-Ophthalmology

A. Cognitive Skills	
1. Describe typical and atypical features, evaluation, and management of the most common optic neuropathies (e.g.,	**C2**

papilledema, optic neuritis, ischemic, inflammatory, infectious, infiltrative, compressive, hereditary optic neuropathies).	**C2**
2. Describe features, evaluation, and management of the more complex supranuclear and internuclear palsies (e.g., progressive supranuclear palsy and subtle internuclear ophthalmoplegia, one-and-half syndrome).	**C2**
3. List the common causes of an acute versus chronic isolated ocular motor neuropathy and define general management of each.	**C2**
4. List the common causes of cavernous sinus syndrome and superior orbital fissure syndrome.	**C3**
5. Differentiate among different forms of acquired nystagmus (e.g., downbeat, upbeat, pendular, gaze evoked, rebound, convergence, retraction).	**C2**
6. List the different mechanism causing nonphysiologic anisocoria and describe characteristics features and evaluation of the less common disorders (e.g., mixed sympathetic and parasympathetic denervation of iris, aberrant regeneration in third nerve palsy, pharmacologic miosis).	**C2**
7. List mechanism and causes of central versus peripheral light near dissociation (e.g., Argyll-Robertson pupil, diabetic neuropathy, tonic pupil, Parinaud syndrome).	**C1**
8. Describe features and evaluation of the less commonly encountered visual field defects (e.g., sectoranopia, checkerboard, monocular temporal crescent).	**C1**
9. Describe more advanced aspects of visual field testing indications, selection, and interpretation (e.g., artifacts of automated perimetry, testing, and thresholding strategies).	**C2**
10. Describe neuro-ophthalmic aspects of common systemic diseases (e.g., hypertension, diabetes, thyroid disease, myasthenia gravis, temporal arteritis, sarcoidosis, systemic infections, and inflammation).	**C2**
11. Describe neuro-ophthalmic findings that are common following head trauma (e.g., traumatic optic neuropathy, bilateral fourth nerve palsy, traumatic brain injury).	**C2**
12. Describe evaluation and management of inherited neuro-ophthalmic diseases (e.g., Leber hereditary optic neuropathy, autosomal dominant optic atrophy, spinocerebellar degenerations).	**C2**

13. Describe evaluation and management of ocular myasthenia gravis. 14. Recognize common pathologic findings of brain and orbits on CT and MRI related to neuro-ophthalmology. 15. Describe the typical features, evaluation, and management of urgent neuro-ophthalmic pathologies (e.g., giant cell arteritis, cavernous sinus thrombosis, orbital apex syndrome, pituitary apoplexy).	**C3** **C2**

A. Technical skills

1. Perform a detailed cranial nerve evaluation other than the oculomotor nerve evaluation (e.g., trigeminal, and facial and acoustic nerve function).	**P1**	**3**
2. Interpretneuro-radiologic images (e.g., indications and interpretation of orbital tumors, thyroid eye disease, pituitary adenoma, optic nerve glioma, optic nerve sheath meningioma).	**P2**	**3**
3. Perform the evaluation, management, and specific testing (e.g., stereopsis, mirror test, red-green testing, monocular prism test) of patients with "functional" (i.e., nonorganic visual loss (e.g., recognize nonorganic spiral or tunnel visual fields).	**P3**	**3**
4. Interpret basic ocular coherence tomography (OCT) imaging of the eye (e.g., optic disc, retinal nerve fiber layer, and macula).	**P1**	**3**
5. interpret basic ocular electrophysiology (e.g., visually-evoked potential [VEP], electroretinogram [ERG], electrooculogram [EOG]).	**P1**	**3**
6. Perform basic neurologic screening examination (e.g., tandem walk, sensory examination, cerebellar function testing, basic cognitive evaluation).	**P2**	**3**
	P1	**3**

7. Identify patients with "functional" visual loss (i.e., nonorganic visual loss) and provide appropriate approach and follow up.	**P2**	**3**
8. Quantify relative afferent pupillary defect (RAPD) with neutral density filter and be able to detect RAPD in patients with only one working pupil.	**P1**	**3**
9. Interpret fluorescein angiography images.		

Ophthalmic Pathology

A.	**Cognitive Skills**	
1.	Describe more advanced ocular anatomy (e.g., common variants), and identify the histology of the major structures of the eye and its adnexa relevant to specific clinical rotation(s) (e.g., oculoplastics, cornea, glaucoma, retina, ophthalmic oncology).	**C2**
2.	Identify the major histologic findings of common diseases of the eye (e.g., keratitis, exfoliation syndrome, corneal and retinal dystrophies and degenerations, frequent neoplasms) relevant to specific clinical rotation(s) (e.g., oculoplastics, cornea, glaucoma, retina, ophthalmic oncology).	**C2**
3.	Describe the pathophysiology and histology of potentially vision or life-threatening diseases (e.g., temporal arteritis, endophthalmitis, retinoblastoma, ocular melanoma, extraocular or orbital spread of an intraocular or periorbital tumor, metastasis to the eye and orbit) relevant to specific clinical rotation(s) (e.g., oculoplastics, cornea, glaucoma, retina, and ophthalmic oncology).	**C2**

B. Technical skills

1. Process appropriately more advanced specimens for submitting to an ophthalmic pathology laboratory, including writing of the accompanying letter to the ophthalmic pathologist (e.g., impression cytology, fine needle aspiration	**P1**	**3**

biopsy, vitreous biopsy, evisceration, exenteration specimen).		
2. Perform a biopsy for frozen section study in ocular pathology.	**P1**	**1**
3. Participate under supervision through a site visit in a macroscopic and microscopic examination of ophthalmic specimens from active cases, working from low to high power.	**P1**	**2**

Oculoplastic Surgery and Orbit

A. Cognitive skills

Eyelid	
1. Describe more advanced eyelid anatomy and physiology (e.g., lymphatics).	**C2**
2. Describe the mechanisms of and indications for eyelid reconstruction.	**C2**
3. Described the genetics (where known), clinical features, evaluation, and treatment of congenital eyelid deformities (e.g., coloboma, distichiasis, epicanthus, telecanthus, blepharophimosis, ankyloblepharon, epiblepharon, euryblepharon, cryptophthalmia, Goldenhar syndrome, Treacher-Collins syndrome, Waardenburg syndrome).	**C2**
4. Describe clinical features, evaluation, syndromic association and management of congenital ptosis (e.g., simple, blepharophimosis-ptosis-epicanthus inversus syndrome [BPES], jaw wink, congenital fibrosis).	**C2**
5. Describe the genetics (when applicable), clinical features, evaluation, and treatment of acquired myogenic ptosis (e.g., oculopharyngeal muscular dystrophy, mitochondrial myopathies, myotonic dystrophy, myasthenia gravis).	**C2**
6. Describe the clinical features, evaluation, and treatment of acquired neurogenic ptosis (e.g., third nerve palsy, Horner syndrome).	**C2**
7. Describe the mechanisms and indications for treatment of more advanced eyelid trauma (e.g., chemical burns, thermal burns, canthal avulsions, eyelid avulsions).	**C2**
8. Describe features, evaluation, and treatment of preseptal cellulitis versus orbital cellulitis.	**C2**

Lacrimal	
1. Describe more advanced lacrimal anatomy and physiology (e.g., lacrimal pump theories).	**C2**
2. Describe the mechanisms and indications for treatment of more advanced lacrimal trauma (e.g., nasolacrimal duct obstructions resulting from facial fractures).	**C2**
3. Describe features, evaluation, and treatment of more complicated cases of nasolacrimal duct obstruction, canaliculitis, dacryocystitis, and acute and chronic dacryoadenitis.	**C2**
4. Describe the genetics, clinical features, evaluation, and management of lacrimal dysgenesis.	**C2**

Orbital	
1. Describe more advanced orbital anatomy and physiology (e.g., vascular anatomy, neural anatomy, orbital septa).	**C2**
2. Describe the clinical features, evaluation, and management of congenital orbital deformities (e.g., anophthalmia, microphthalmia, hypotelorism, hypertelorism versus telecanthus).	**C2**
3. Describe the genetics, clinical features, evaluation, and management of common craniosynostoses and other congenital malformations (e.g., Crouzon syndrome, Apert syndrome).	**C2**
4. Describe the mechanisms and indications for treatment of more advanced orbital trauma (e.g., zygomaticomaxillary complex fractures, naso-orbital ethmoid fractures, Le Fort fractures).	**C2**
5. Describe management plan for thyroid ophthalmopathy (e.g., epidemiology, symptoms and signs, associated systemic diseases, orbital imaging, differential diagnosis, surgical, medical, and radiation indications, side effects of treatment).	**C2**
6. Describe Management nonspecific orbital inflammation (e.g., symptoms and signs, orbital imaging, differential diagnosis, biopsy indications, choice of treatments).	**C2**

B. Technical skills

Eyelids

1. Perform more advanced examination techniques for less common eyelid abnormalities (e.g., decreased blink, orbicularis weakness, contour abnormalities, marginal entropion).	**P2**	**3**
2. Perform more complicated minor lid procedures (e.g., larger benign skin lesions, recurrent chalazia).	**P2**	**3**
3. Perform more complicated eyelid surgery (e.g., upper blepharoplasty, lower lid tightening).	**P2**	**2**
4. Perform more advanced eyelid reconstruction (e.g., wedge/pentagonal block resection).	**P2**	**2**
5. Identify indications for and complications of, and treat blepharospasm and hemifacial spasm.	**P2**	**3**
6. Identify histopathological features of common eyelid conditions.	**P2**	**3**

Lacrimal

1. Perform more advanced lacrimal assessment (e.g., interpretation of dye testing, canalicular probing in trauma).	**P2**	**2**
2. Perform basic lacrimal procedures (e.g., lacrimal drainage testing [irrigation, Jones Dye Tests 1 and 2], lacrimal probing, lacrimal intubation, incision and drainage of lacrimal sac abscess).	**P2**	**2**
3. Identify indications for and interpret lacrimal imaging (e.g., scintigraphy, cystography).	**P2**	**3**
4. Identify histopathological features of common lacrimal conditions.	**P2**	**3**

Orbit

1. Perform more advanced assessment of the orbit (e.g., hypoglobus, facial asymmetry, enophthalmos, and proptosis).	**P2**	**2**
2. Perform enucleation and evisceration.	**P2**	**3**
3. Perform more advanced socket assessment (e.g., extrusion of implants, anophthalmic socket complications).	**P2**	**2**
4. Identify common orbital pathology (e.g., orbital fractures, orbital tumors) on imaging studies (e.g., magnetic resonance imaging, computed tomography, ultrasound).	**P1**	**3**
5. Treat common presentations of orbital cellulitis.	**P2**	**3**
6. Identify histopathological features of common orbital conditions.	**P1**	**3**

Pediatric Ophthalmology and Strabismus

A. Cognitive Skills

1. Describe basic and more advanced strabismus examination techniques (e.g., combined vertical and horizontal prism cover testing, double Maddox rod testing).	**C2**
2. Describe basic and more advanced visual development and visual assessment of the pediatric ophthalmology patient (e.g., blink to light or threat, measures of fixation and following behavior, objective measures of visual acuity) using the optokinetic nystagmus (OKN) drum to assess fixation and electrophysiological techniques such as sweep visual evoked potential (VEP) evaluation.	**C2**
3. Describe basics of binocular sensory testing (e.g., Titmus stereo testing, Randot stereo testing, Worth 4-dot test, Bagolini lenses).	**C2**
4. Describe etiologies, evaluation, and management of vertical strabismus, including: a. Neurogenic b. Myogenic c. Neuromuscular junction d. Oblique overaction or underaction e. Dissociated vertical deviation f. Restrictive	**C2** **C2**

5. Describe various strabismus patterns (e.g., A or V pattern) and associations with various types of comitant strabismus; the anatomic role of muscle pulleys; and the potential role of radiology in assessing complex strabismus.	**C2**
6. Describe common hereditary or congenital ocular motility or lid syndromes (e.g., Duane syndrome, Marcus Gunn jaw-winking syndrome, Brown syndrome).	**C2**
7. Describe typical features of retinoblastoma (e.g., differential diagnosis, evaluation, treatment indications, and types).	**C2**
8. Describe basic evaluation and differential diagnosis of decreased vision in infants and children (e.g., retinal and optic nerve etiologies, amblyopia).	**C2**
9. Describe recognizable causes of blindness in infants (e.g., albinism, optic nerve hypoplasia, achromatopsia, Leber congenital amaurosis, retinal dystrophy, congenital optic atrophy) and appropriate work up and associated diseases.	**C2**
10. Describe cortical visual impairment and periventricular leukomalacia.	**C2**
11. Interpret diplopia charts (e.g., Hess charts, Lees chart, and Harms screen).	**C2**
12. Evaluate a child with congenital blindness, including VEP and interpretation of an electroretinogram (ERG).	

B. Technical skills

1. Perform more advanced strabismus testing, such as Parks-Bielschowsky 3-step test, Lancaster red-green test, Maddox rod testing, double Maddox rod testing, and measurement of dissociated vertical deviation (DVD).	**P2**	**3**
2. Perform forced duction test (FDT) and force generation test (FGT) in the clinic.	**P2**	**2**
3. Perform basic extraocular muscle surgery, and exercise surgical judgment for the indications and contraindications for strabismus surgery.	**P2**	**2**
4. Perform preoperative extraocular muscle surgery assessment, intraoperative techniques, and describe intraoperative and postoperative complications of strabismus surgery.	**P2**	**3**
5. Perform the following strabismus surgeries: a. Recession	**P2**	**2**

b. Resection		

Vitreoretinal Diseases

A. Cognitive Skills

1. Describe more advanced retinal anatomy and physiology.	**C2**
2. Describe more advanced ancillary testing concepts of fluorescein and indocyanine green (ICG) angiography as applied to retinal vascular and other diseases (e.g., indications, basic differential diagnosis based on angiographic patterns).	**C2**
3. Describe the fundamentals of retinal electrophysiology and basic ophthalmic echography.	**C2**
4. Describe the findings of major studies in vascular retinal diseases, including the following: a. Diabetic retinopathy b. Early Treatment Diabetic Retinopathy Study (ETDRS) c. Diabetes Control and Complications Trial (DCCT) d. United Kingdom Prospective Diabetes Study (UKPDS) e. Diabetic Retinopathy Clinical Research Network (DRCRnet) Trials f. Central vein occlusion g. Central Vein Occlusion Study (CVOS) h. Standard Care vs. Corticosteroid for Retinal Vein Occlusion (SCORE) i. Global Evaluation of implaNtable dExamethasone in retinal j. Vein occlusion with macular edemA (GENEVA) Study Group k. Central Retinal Vein Occlusion (CRUISE) Study l. Branch vein occlusion m. Branch Vein Occlusion Study (BVOS) n. Standard Care vs. Corticosteroid for Retinal Vein Occlusion (SCORE) o. GENEVA Study Group p. BRAnch Retinal Vein Occlusion (BRAVO) Trial q. Retinopathy of prematurity r. Cryotherapy for Retinopathy of Prematurity (CRYO-ROP) s. Early Treatment for Retinopathy of Prematurity (ETROP)	**C2**
5. Describe management plan for peripheral retinal diseases and vitreous pathologies (e.g., vitreous hemorrhage, posterior vitreous	**C2**

detachment, retinal tears, giant retinal tears, lattice degeneration with atrophic holes).	
6. Describe the techniques for retinal detachment repair, including indications, mechanics, instruments, basic techniques, and surgical adjuvants, including heavy liquids, expandable gases, and silicone oil for the following: a. Pneumatic retinopexy b. Scleral buckling c. Vitrectomy	**C2**
7. Describe typical features of less common macular diseases: a. Myopic maculopathy b. Serous retinal detachment secondary to optic disc pit c. Ocular histoplasmosis syndrome d. Phenothiazine/tamoxifen toxicity e. Diagnose, evaluate, treat, and classify open and closed globe trauma (e.g., Birmingham Eye Trauma Terminology System).	**C2**
8. Describe management plan for postoperative/posttraumatic choroidal detachments and sympathetic ophthalmia.	**C2**
9. Describe the indications/complications of laser treatment for diabetic retinopathy (e.g., panretinal photocoagulation, macular grid).	**C2**

B. Technical skills

1. Perform indirect ophthalmoscopy with scleral indentation.	P1	2
2. Perform ophthalmoscopic examination with contact lenses, including panfunduscopic lenses.	P2	2
3. Interpret fluorescein and indocyanine green (ICG) angiography and correlate findings with differential diagnosis.	P1	3
4. Diagnose the presence of pigment granules in the anterior vitreous (i.e., Shafer sign) during a retinal detachment or retinal break.	P2	2
5. Interpret retinal imaging technology (e.g., OCT, retinal thickness analysis).	P2	3
6. Perform posterior segment photocoagulation.	P2	2
7. Perform diabetic focal/grid macular laser treatment.	P2	2

8. Perform peripheral scatter photocoagulation (panretinal).	P2	2
9. Perform laser retinopexy (demarcation) for isolated retinal breaks.	P2	2
10. Interpret basic echographic patterns (e.g., rhegmatogenous retinal detachment, tractional retinal detachment, posterior vitreous detachment, choroidal detachment, intraocular foreign body).	P2	3
11. Perform fundus drawings of the retina, showing vitreoretinal relationships and findings.	P2	3
12. Perform (or assist during) cryotherapy of retinal holes and other pathology.	P2	2
13. Perform (or assist during) vitreous tap and intravitreal antibiotic injections for the treatment of endophthalmitis.	P2	3
14. Perform subtenon injections of triamcinolone acetonide for the treatment of macular edema.	P2	3
15. Perform intravitreal injection of anti-vascular endothelial growth factor (VEGF) drugs for the treatment of AMD.	P2	3

Uveitis and Ocular Inflammation

A. Cognitive Skills

1. Describe the pathophysiology of intraocular inflammation.	**C2**
2. Describe the principles of history taking of patients with uveitis according to SUN.	**C2**
3. Describe the importance of being guided by clinical findings from the ocular examination and taking a more specific history in order to generate a list of differential diagnoses.	**C2**
4. Describe more advanced principles of examination of patients with uveitis and differential diagnoses of the clinical signs: a. Anterior segment (e.g., iris nodules, pupillary membrane, peripheral anterior synechiae, iris bombe) b. Posterior segment (e.g., pars plana signs of inflammation [snowballs], retinal detachment, retinal vasculitis, optic swelling [differentiate optic neuritis from hyperemia], macula [macular edema])	**C2**

5. Describe the regional epidemiology of uveitis	
6. Describe the typical demographic feature, clinical features, and differential diagnosis of:	**C2**
a. Common uveitis in immunosuppressed individuals (e.g., cytomegalovirus retinitis, endogenous endophthalmitis)	**C2**
b. Masquerade syndromes such as vitreoretinal lymphoma	
7. Differentiate serious infective from noninfective causes of uveitis. (e.g., recognize an endogenous endophthalmitis and differentiate this from an immune-mediated uveitis, such as Behçet disease).	**C2**
8. Describe angiographic features of retinitis, choroiditis, and vasculitis.	
9. Describe the B-scan features of certain retinal, choroidal, and scleral diseases.	**C2**
10. Describe the OCT features of macular edema.	**C2**
11. Describe the common complications of common uveitis syndromes (e.g., intraocular pressure elevation, cataract, band keratopathy, macular edema).	**C2** **C2**
12. Describe indications and contraindications for corticosteroid treatment of uveitis (e.g., topical, local, systemic), including risks and benefits of therapy.	**C2**
13. Describe the management of common uveitic syndromes.	

B. Technical Skills

1. Perform a more advanced examination of the anterior and posterior segment in addition to that described for Year 1.	**P2**	**3**
a. Anterior segment (e.g., iris nodules, pupillary membrane, peripheral anterior synechiae, iris bombe)		
b. Posterior segment (e.g., pars plana signs of inflammation [snowballs], retinal detachment, retinal vasculitis, optic swelling [differentiate optic neuritis from hyperemia], macula [macular edema])		
2. Recognize and evaluate the typical demographic features, clinical features, and differential diagnosis of common, rapidly blinding causes of	**P2**	**3**

uveitis (based on local epidemiological data), as described in the curriculum of Year 1. a. Administer topical steroids, NSAIDs, and cycloplegics in the treatment of uveitis. b. Interpret the results of ancillary tests (e.g., fluorescein angiography, OCT, B-scan ultrasonography) for diagnosis.		
3. Perform a major investigational work up (e.g., laboratory testing, radiologic testing) according to epidemiologic data, history, and clinical examination.	**P2**	**3**
4. Evaluate uveitis associated with immunosuppressed individuals (e.g., active and recovered acquired immune deficiency syndrome, pharmacologic immunosuppression).	**P2**	**3**
5. Perform posterior subtenon or transseptal injection of corticosteroids.	**P2**	**3**
6. Administer oral corticosteroids in the treatment of uveitis.	**P2**	**3**
7. Manage side effects of immunosuppressive therapy.	**P2**	**3**
8. Perform an anterior chamber and vitreous tap for diagnostic purposes	**P2**	**3**
9. Administer intravitreal injection antibiotics in cases of bacterial endophthalmitis.	**P2**	**3**

Ocular Oncology

A. Cognitive Skills

1. Describe the classification of ocular tumors (i.e., conjunctival and intraocular).	**C2**
2. Describe the clinical features of ocular tumors and their secondary effects.	**C2**
3. List the differential diagnosis for each of the ocular tumors.	**C2**
4. Describe diagnostic techniques for ocular tumors (e.g., examination under anesthesia for pediatric tumors, imaging, biopsy, laboratory tests, and oncology referral).	**C2**

5. Describe indications (e.g., biopsy for lymphoma) and contraindications (e.g., biopsy for retinoblastoma) for the various diagnostic techniques.	**C2**
6. Describe the management options for ocular tumors with indications and contraindications for each form of management.	**C2**
7. Describe the complications of ocular therapy and their management.	**C2**
8. Describe basic histopathology of tumors, including immunohistochemistry.	**C2**
9. Describe the prognosis of the different types of ocular tumor.	**C2**
10. Describe the epidemiology of the more common tumors (e.g., melanoma).	
11. Describe the methods, risks, and benefits of tumor biopsy.	

B. Technical skills

1. Perform naked-eye examination (e.g., to recognize oculodermal melanosis).	**P2**	**3**
2. Perform palpation of cervical lymph nodes.	**P2**	**3**
3. Perform slit-lamp examination, gonioscopy, and indirect ophthalmoscopy to diagnose and localize ocular tumors.	**P2**	**3**
4. Perform transillumination for intraocular tumors.	**P2**	**3**
5. Perform B-scan ultrasonography to detect and measure intraocular tumors.	**P2**	**3**
6. Perform sequential examination to assess the tumor over time (e.g., atypical nevus).	**P2**	**3**
7. Plan to evaluate for systemic disease (e.g., metastases, primary tumor, syndromes).	**P2**	**3**
8. Provide short-term and long-term postoperative care to patients with an ocular tumor, collaborating with a subspecialist and other health care workers as appropriate.	**P2**	**3**
9. Manage ocular complications as appropriate (e.g., radiation retinopathy, macular edema, cataract, glaucoma).	**P2**	**3**
10. Interpret the results of laboratory investigations and adjust management accordingly.	**P2**	**3**
	P2	**3**

11. Council about prognosis and various management options to patients and their families in a detailed, ethical, and compassionate manner.		

Refractive Surgery

A. Cognitive Skills

1. Describe and diagnose various types of refractive problems, including irregular astigmatism, and identify the best solution for each.	**C2**
2. Describe the most complex types of refractive errors, including postoperative refractive errors, post keratoplasty, and refractive surgery.	**C2**
3. Describe the most advanced optics and optical principles of refraction and retinoscopy, including higher-order aberrations.	**C2**
4. List the indications for and interpret preoperative and postoperative diagnostic testing, including: a. Corneal topography b. Wavefront analysis c. Pachymetry d. Calculation of stromal-bed thickness before and after LASIK e. Aspheric profile of ablation	**C2**
5. Formulate informed diagnostic and therapeutic decisions based on patient information, current scientific evidence, clinical judgment, and patient expectations.	**C2**
6. Describe accommodative and non-accommodative treatments of presbyopia, including: a. Monovision b. Excimer laser correction c. Conductive keratoplasty d. Corneal inlays e. Accommodating IOLs f. Multifocal IOLs	**C2**
7. Describe the advanced formulas for IOL calculation in extreme myopia, hyperopia, and after corneal refractive surgery.	**C2**

8. Describe the basics of modulation transfer function (MTF), point speed function (PSF) and Strehl ratio as objective ways to measure quality of vision. 9. Describe the basics of topography-guided, wavefront-guided, and optimized ablations as compared to standard ablations.	**C2**

B. Technical skills

1. Perform basic refractive surgery procedures, such as low myopia or low hyperopia with LASIK (microkeratome) and surface ablation (LASIK or photorefractive keratectomy [PRK]).	**P2**	**2**
2. Perform the most advanced objective and subjective refraction techniques using trial lenses or the phoropter, including: a. Contact lens refraction for more complex refractive errors, including modification b. and refinement of subjective manifest refractive error c. Cycloplegic retinoscopy and refraction d. Postcycloplegic refraction e. Irregular astigmatism f. Postkeratoplasty g. Refractive surgery cases	**P2**	**3**
3. Utilize the most advanced optics and optical principles for refraction and retinoscopy, including higher order aberrations.	**P2**	**3**
4. Utilize the keratometer for detection of subtle or complex advanced corneal refractive errors.	**P2**	**3**
5. Interpret results from more advanced refraction instruments and techniques (e.g., corneal topography, pupillometry, aberrometry, Scheimpflug imaging, OCT).	**P2**	**3**
6. Fit contact lenses in patients with irregular corneas, irregular astigmatism, and following refractive surgery.	**P2**	**2**
7. Assist in advanced refractive surgeries, including topography-guided ablation, wavefrontguided ablation, and combined refractive surgeries.	**P1**	**2**

8. Encourage patients to actively participate in their own care by providing disease and treatment information, and counsel patients on how to prevent postoperative injury.	**P1**	**3**
9. Correct refractive error after surgeries, such as penetrating keratoplasty, deep anterior lamellar keratoplasty, and radial keratotomy	**P2**	**3**

Low Vision Rehabilitation

A. Cognitive Skills

1. Describe clinical applications, indications, and limitations of the various low vision aids (e.g., electronic and optical magnification, large print, Braille, computers with artificial speech, text to speech).	**C2**
2. Describe the more advanced optics of low vision devices.	**C2**
3. Describe visual acuity and visual field evaluation methods for different levels of disability.	**C2**
4. Describe the evaluation of and rationale for licensing automobile drivers who are visually impaired, and explain the local licensing regulations.	**C2**

B. Technical skills

1. Prescribe more complex rehabilitative therapies and optical devices to help the patient meet their goals.	**P2**	**3**
2. Perform evaluation of vision assessment in licensing drivers who are visually impaired.	**P2**	**3**
3. Demonstrate low vision devices and educate low vision patients on the uses and limitations of these devices.	**P2**	**3**

Ethics and Professionalism in Ophthalmology

1. Describe basic medical ethics in the ophthalmic practice, including: a. Confidentiality of health information b. Professional competence and maintenance of competence c. Informed consent d. Responsibility to report the unethical conduct of others e. Adequate patient assessment and avoidance of under/over treatment and under/over testing	C2
2. Describe elements of effective physician-patient communication, including: a. Relevant cultural and linguistic differences that potentially influence ethical delivery of services	C2
3. Describe advanced aspects of practice management (e.g., business models, documentation requirements and coding, privacy requirements, accommodating patients or employees with disabilities).	C2
4. Describe advanced aspects of health care reimbursement (e.g., physicians' role in managed care organizations, administrative role, third-party reimbursement, capitated programs).	C2
5. Describe the framework of patient-care quality as it relates to patient safety, patient advocacy, effectiveness, efficiency, timeliness, and equity.	C2
6. Describe how ophthalmologists are responsible for ensuring that all those in the service area of the practice have access to affordable eye care.	C2
7. Describe the various missions of ophthalmology organizations with respect to service to members, patients, clinical education, and quality of care.	C2
8. Describe how participation of ophthalmologists in ophthalmology organizations serves the profession and society.	C2
9. Describe the responsibilities of ophthalmologists and ophthalmology societies to ensure that everyone has the right to sight.	C2

Community Eye Health

A. Cognitive Skills

Enlist the Principles for the prevention of blindness 1. Outline the magnitude and distribution of global blindness. 2. List the major causes of global blindness. 3. Describe primary, secondary, and tertiary prevention strategies that are applicable to the leading causes of low vision and blindness. 4. Outline the different possible approaches (ie, disease orientated, service orientated, strategy orientated, community orientated) to blindness prevention. 5. Describe the integrated approach to blindness prevention that is recommended for use in VISION 2020. 6. Describe the structure and function of a generic VISION 2020 program for a health service unit with a population of one million. 7. In line with the WHO Universal Eye Health: A Global Action Plan 2014–2019, describe strategies to strengthen inclusive practices related to gender, disability, and other groups within a generic VISION 2020 program.	**C2**

Cataract

1. Describe the prevalence and incidence of blindness due to cataract in different economic settings.	**C2**
2. Describe the cataract surgery rates in different economic settings.	**C2**
3. Describe cataract surgery coverage, including its use and limitations as an indicator to measure program output.	**C2**
4. Outline the possible strategies to overcome the barriers to cataract surgery.	**C2**
5. Define cataract surgery efficiency and cataract surgery volume.	**C2**
6. Outline the factors affecting cataract surgery capacity.	**C2**
7. Outline the principles of an efficient cataract surgical service.	**C2**
8. Describe a model for the staffing and running of a cataract surgical unit.	**C2**
9. Describe the components of a model for the costing of cataract surgery.	**C2**

10. Describe the possible strategies for cataract surgery cost containment. 11. Describe the possible strategies for cataract surgery cost recovery.	**C2**

Refractive error

1. Describe the prevalence of refractive error in different countries/regions.	**C2**
2. Outline the possible strategies for the provision of spectacles in a blindness prevention program.	**C2**

Low vision

1. Describe the prevalence of low vision in different countries/regions.	**C2**
2. Outline the possible strategies for the provision of low-vision aids in a blindness prevention program.	**C2**

Childhood blindness

1. List the main causes of childhood blindness in different socioeconomic settings.	**C2**
2. Describe the primary, secondary, and tertiary prevention strategies for the control of childhood blindness due to corneal scar, cataract, glaucoma, and retinopathy of prematurity.	**C2**
3. Describe the main barriers for children with visual disabilities to access health, education, and social inclusion.	**C2**
4. Outline the models/strategies for supporting education for children with visual impairments through mainstream schools (eg, inclusive education) or “special” schools.	**C2**

Glaucoma

1. Describe the prevalence of glaucoma in different regions and in different race groups.	**C2**
2. Outline the possible strategies for the opportunistic case detection of glaucoma.	**C2**
3. Describe the advantages and disadvantages of medical, laser, and surgical interventions for the management of glaucoma in middle and low-income countries.	**C2**

4. Define glaucoma treatment/surgery rate. 5. Outline the possible strategies for increasing the glaucoma follow-up rate.	**C2** **C2**

Diabetic retinopathy

1. Outline the possible strategies for the prevention of diabetic retinopathy, including the use of appropriate educational health materials for counseling. 2. Outline the possible strategies for screening for diabetic retinopathy. 3. Outline the possible strategies for the treatment of diabetic retinopathy. 4. Outline the possible strategies for increasing the diabetic retinopathy follow-up rate.	**C2** **C2** **C2** **C2**

Human resources for blindness prevention programs

1. Describe the recommended cadres and numbers of human resources required at the community level, primary level, secondary level, and tertiary level for a generic blindness prevention program for a health service unit of one million in the resident's own country or health district. 2. Describe the roles of each of the cadres that are recommended for a generic blindness prevention program. 3. Describe the available training facilities for a generic blindness prevention program.	**C2** **C2** **C2**

Infrastructure for blindness prevention programs

1. From the International Agency for the Prevention of Blindness (IAPB) standard list for VISION 2020, describe the recommended instruments and equipment required at the primary, secondary, and tertiary level for a generic blindness prevention program for a health service unit of one million population. 2. Outline the strategies for the maintenance of the recommended instruments and equipment.	**C2** **C2**

Planning of blindness prevention programs

1. Describe the potential role of a VISION 2020 coordinator and a VISION 2020 committee.	**C2**

B. Technical skills

Principles of blindness prevention

1. For planning purposes, integrate primary, secondary, and tertiary preventions for leading causes of low vision and blindness into a district blindness prevention program plan adhering to inclusive practices.	**P1**	**3**

Cataract

1. For planning purposes, calculate estimates of numbers of people blind due to cataract in different countries and regions.	**P1**	**3**
2. For planning purposes, calculate cataract surgery rate in different countries and regions.	**P1**	**3**
3. For planning purposes, identify and suitable strategies for overcoming the barriers to cataract surgery in a blindness prevention program.	**P**	**3**
4. For planning purposes, identify and include suitable strategies for improving the efficiency of a cataract surgical unit in a blindness prevention program.	**P1**	**3**

Refractive error

1. Calculate estimates of numbers of children and adults with significant refractive error in different countries and regions.	**P2**	**3**
2. For planning purposes, identify and include suitable strategies for including refractive error as a priority in a blindness prevention program.	**P2**	**3**

Low vision

1. Calculate estimates of numbers of children and adults with low vision in different countries and regions. 2. For planning purposes, identify and include suitable strategies for including low vision as a priority in a blindness prevention program.	**P2** **P2**	**3** **3**

Childhood blindness

1. For planning purposes, use available program reports to identify key gaps in and barriers to service delivery.	**P2**	**3**

Trachoma

1. For planning purposes, use available program reports to identify key gaps in and barriers to service delivery.	**P2**	**3**

Glaucoma

1. Calculate estimates of numbers of people with glaucoma in different countries and regions. 2. For planning purposes, identify suitable strategies for including glaucoma as a priority disease in a blindness prevention program.	**P2** **P2**	**3** **3**

Diabetic retinopathy

1. Calculate estimates of numbers of people with diabetic retinopathy in different countries and regions. 2. For planning purposes, identify suitable strategies for including diabetic retinopathy as a priority disease in a blindness prevention program.	**P2** **P2**	**3** **3**

Human resources

1. For planning purposes, identify suitable strategies for improving the human resource capacity in a blindness prevention program.	**P 2**	**3**

Infrastructure

1. For planning purposes, identify suitable strategies for improving the infrastructure capacity in a blindness prevention program.	**P2**	**3**

Planning of blindness prevention programs

1. Develop activities plan for a one-year operational plan for a blindness prevention program for a health district with a population of one million.	**P2**	**3**

3rd Year Resident Goals

By the completion of their 3rd year residency, the residents should be able to:

Cataract and Lens

A. Cognitive Skills

1. Describe the principles, indications for, mechanics of of contact and immersion A-scan ultrasonography and calculation of IOL power.	**C2**
2. Describe the complications of more advanced anterior segment surgery (e.g., pseudoexfoliation, small pupils, intraoperative floppy iris syndrome, mature cataract, hard nucleus, posttraumatic, zonular dehiscence, cataract surgery after pars plana vitrectomy, short eye, corneal endothelial diseases).	**C2**
3. Describe the use of special devices for cataract surgery in complex situations such as specialized IOLs, capsular tension rings and segments, iris hooks, use of indocyanine green/trypan blue staining of the anterior capsule.	**C2**
4. Describe IOL fixation options in the lack of capsular support for in the bag fixation (anterior chamber [AC] IOL, sulcus fixation +/- optic capture, iris fixation, and scleral fixation).	**C2**
5. Describe the indications for, techniques of, and complications of cataract extraction in the context of the subspecialty disciplines of the following: a. Glaucoma (e.g., combined cataract and glaucoma procedures, glaucoma in cataractous eyes, cataract surgery in patients with prior glaucoma surgery) a. Retina (e.g., cataract surgery in patients with scleral buckles or prior vitrectomy)	**C2**

b. Cornea (e.g., cataract extraction in patients with corneal opacities) and the use of fiber optic for better visualization c. Ophthalmic plastic surgery (e.g., ptosis following cataract surgery) d. Refractive surgery (e.g., cataract surgery in eyes that have undergone refractive surgery)	
6. List indications for and techniques of intracapsular surgery (e.g., rare cases may requiremthis procedure, or patients may have had the procedure performed previously).	**C2**
7. Describe instrumentation and techniques used to implant foldable and non-foldable IOLs.	**C2**
8. Describe the evaluation and management of common and uncommon causes of postoperative endophthalmitis and TASS.	**C2**
9. Describe the causes and indication for performing, repositioning, removal, or exchange of IOLs.	**C2**
10. Describe the government and hospital regulations that apply to cataract surgery.	**C2**
11. Describe the indication and option for astigmatism management during cataract surgery (e.g., on axis incision, limbal relaxing incisions [LRI], opposite clear corneal incision [OCCI], toric IOL).	**C2**
12. Describe the use of corneal topography and wave front analysis to help select the best type of IOL for a patient especially following keratorefractive surgery.	**C2**
13. Describe the option for presbyopic correction solutions during cataract surgery (e.g., monovision. multifocal IOLs, accommodative IOLs, dual optic IOLs).	
14. Describe the mechanisms of actions, indications, contraindications, advantages, and disadvantages of premium IOLs (e.g., multifocal, accommodative, toric, aspheric, blue blocker, intraocular miniature telescope).	**C2** **C2**
15. Describe evaluation and management of IOL complications (e.g., intraoperative damage to IOL, postoperative IOL opacification, dislocation, sublocation).	
16. Describe the advantages and disadvantages of the materials used for IOL fabrication (e.g., poly-methylmethacrylate [PMMA], silicone, hydrophobic acrylic, hydrophilic acrylic).	**C2**
17. Describe lens/IOL surgery solutions for myopia and hyperopia (e.g., refractive lens exchange, phakic IOLs).	**C2**

B. Technical skills

1. Assist in the teaching and supervision of basic and standard level learners.	**P2**	**2**
2. Perform phacoemulsification in a practice setting (e.g., animal or practice lab) and then in the operating room, ideally 50-100 cases of a combination of phacoemulsification and ECCE, including mastery of the following skills: a. Wound construction b. Anterior capsulotomy/capsulorhexis c. Viscoelastics d. Intracapsular, extracapsular, and phacoemulsification techniques (e.g., sculpting, divide and conquer, stop and chop, phaco chop) e. Instrumentation and techniques of irrigation and aspiration f. IOL implantation (e.g., anterior and posterior, foldable and non-foldable) g. IOL repositioning, removal, or exchange		**2**
3. Perform intraoperative and postoperative management of any event that may occur during or as a result of cataract surgery.		**3**

Contact Lenses

A. Cognitive Skills

1. Describe the various options for SCL, RPG CL, and hybrid CL fitting in advanced ectatic corneal disorders such as keratoconus and pellucid marginal degeneration, including post-intracorneal ring segment implantation cases.	**C2**
2. Describe the various options for SCL and RPG CL fitting in post keratoplasty cases.	**C2**
3. Describe the various options for SCL and RPG CL fitting in complex post-refractive surgery, including corneal ectasia.	**C2**

1. Describe CL fitting in special clinical situations such as severe dry eye, glaucoma, diabetes, allergy, pregnancy, strabismus, and sports practice, adverse environmental and occupational conditions.	**C2**
2. Describe indications, fitting techniques, and long-term management of CL wear for children and adolescents.	**C2**
3. Describe CL options and most complex fitting techniques for medical CL indications such as aphakia, albinism, recurrent corneal erosions, neurotropic keratitis, corneal scarring, aniridia, and prosthetic cosmesis.	**C2**
4. Identify indications for scleral CL fitting.	**C2**
5. Explain reverse geometry RGP CL for post-graft or post-refractive surgery cases	**C3**
6. List the indications for therapeutic CL.	
7. Describe material selection, physiological implications, mechanisms of action, and adjuvant topical treatment associated with therapeutic CL.	**C2**
8. Describe the various possibilities of fitting with soft and hard therapeutic CL.	**C2**
9. Explain the importance of appreciating visual acuity, fit, and comfort in therapeutic CL.	**C3**
10. Describe the differences among CL material choices especially suited for more complex cases and its clinical correlation.	**C2**
11. Explain the influence of both systemic and topical medication on CL fitting and tolerance.	**C3**
12. Describe the methods of modifying a CL to improve comfort, vision, or physiological response.	**C2**
13. Evaluate CL-induced complications, and describe treatment strategies for their management, in particular acanthamoeba and fungi infections.	**C3**
14. Describe indications and methods for fitting front surface toric, back surface toric, and bitoric RGP CL.	**C2**

B. Technical skills

1. Perform an advanced CL history and examination. 2. Obtain a full ocular history and conduct necessary tests to perform a complex CL fitting examination (e.g., post keratoplasty, multiple surgeries, post-refractive surgery, and corneal ectasia, advanced corneal ectatic disorders such as keratoconus and pellucid marginal degeneration, and active corneal and ocular surface disease). 3. Perform refraction, retinoscopy, and over-refraction in complex cases. 4. Use advanced CL designs including reverse geometry. 5. Indicate the auxiliary CL instruments in patients with complex needs (e.g., computerized topography, fluorescein patterns, and diagnostic lenses). 6. Interpret topography in complex CL fittings. 7. Analyze aberrometry and endothelial/confocal biomicroscopy. 8. Indicate CL modification and refitting in complex cases, when needed. 9. Select the appropriate CL in complex clinical cases (e.g., post keratoplasty, multiple surgeries, post-refractive surgery, and corneal ectasia, advanced ectatic corneal disorders such as keratoconus, pellucid marginal degeneration, and active corneal and ocular surface disease). 10. Perform therapeutic CL fitting and follow up. 11. Manage CL-induced complications, both infectious and noninfectious (e.g., sterile infiltrates, corneal neovascularization, corneal permanent staining, and giant papillary conjunctivitis). Develop an educational skill set to effectively educate rotating students and residents about CL topics.	**P2**	**3** **3** **3** **2** **2** **3** **3** **2** **2** **3** **3**

Cornea and External Diseases

A. Cognitive Skills

1. Describe the most complex anatomy, embryology, physiology, histopathology, microbiology, immunology, genetics, epidemiology, and pharmacology of the cornea, conjunctiva, sclera, eyelids, lacrimal apparatus, and ocular adnexa.	**C2**
2. Discuss the most complex corneal optics and refraction (e.g., post keratoplasty) and their methods of treatment (e.g., contact lenses, refractive surgery).	**C2**
3. Describe the most complex and less common congenital abnormalities of the cornea, sclera, and globe (e.g., cornea plana, keratoglobus).	**C2**
4. Recognize the less common corneal dystrophies and degenerations (e.g., Meesman dystrophy, Reis-Buckler dystrophy, François syndrome, Schnyder crystalline dystrophy, congenital hereditary stromal dystrophy, congenital hereditary endothelial dystrophy, posterior polymorphous dystrophy) in addition to the more common dystrophies (e.g., anterior membrane dystrophy, granular, lattice, and macular).	**C3**
5. Recognize common and uncommon corneal and conjunctival neoplasms and degenerations (e.g., spheroidal degeneration, carcinoma in situ).	**C2**
6. Describe less common and rare ocular infections, and describe the differential diagnosis of the most complicated corneal and conjunctival infections (e.g., amoebas, leishmaniasis, and nematodes). a. In non-endemic areas, describe the basic features of onchocerciasis. b. In endemic areas, define the etiology, vector (e.g., black fly), and incidence, diagnostic features (e.g., microfilariae, keratitis, iritis), diagnosis (e.g., skin snip test), course and prognosis, treatment (e.g., ivermectin, nodulectomy), and prevention (e.g., vector control, environmental and behavioral changes) of onchocerciasis.	**C2**
7. Describe the most complex principles of ocular pharmacology of anti-infective, anti-inflammatory, and immune modulating agents (e.g., combination therapies of antiviral and anti-inflammatory agents).	**C2**
8. Describe the most complex differential diagnosis of red eye (e.g., pemphigoid, pemphigus, Stevens-Johnson syndrome).	**C2**
9. Describe the differential diagnosis and the external manifestations of the most complex or uncommon anterior segment inflammations (e.g., syphilitic keratouveitis).	**C2**

10. Describe the indications for ocular surface transplantation, including conjunctival autograft/flap, amniotic membrane transplantation, and limbal stem cell transplantation.	**C2**
11. Describe the surgical indications (e.g., Fuchs dystrophy, aphakic/pseudophakic bullous keratopathy, and keratoconus), surgical techniques, and recognition and management of postoperative complications (especially immunologically-mediated rejection) of corneal transplantation (e.g., penetrating, lamellar).	**C2**

B. Technical skills

1. Interpret the most advanced corneal techniques (e.g., endothelial microscopy, computerized corneal topography and tomography, anterior segment ocular coherence tomography).	**P2**	**3**
2. Perform a thin conjunctival flap (e.g., Gunderson flap).		**2**
3. Perform specialized and complicated fitting of contact lenses (e.g., post keratoplasty, advanced keratoconus).		**3**
4. Perform more complex corneal surgery (e.g., penetrating or lamellar keratoplasty, keratorefractive procedures, and phototherapeutic keratectomy), and understand the postoperative management including postkeratoplasty astigmatism management and graft rejection.		**3**
5. Perform other complex conjunctival surgery (e.g., autograft, stem cell transplant).		**3**
6. Manage more complex neoplasms of the conjunctiva (e.g., carcinoma, melanoma).		**3**

Glaucoma

A. Cognitive Skills

1. Describe the etiology, pathophysiology, and clinical characteristics of the most complex glaucomas (e.g., angle	**C2**

recession, multi mechanism glaucoma, traumatic glaucoma, neovascular, uveitic glaucoma, iridocorneal endothelial syndrome).	
2. Identify the key examination techniques and management of complex medical and surgical problems in glaucoma (e.g., complicated or postoperative primary and secondary open-angle and closed-angle glaucoma, uncommon visual field defects).	**C2**
3. Describe visual field damage, progression, and rate of progression, caveats, and their use in glaucoma management.	**C2**
4. Describe medical management of the most advanced and complex glaucoma (e.g., advanced primary open-angle glaucoma previously treated with medicine, laser, or surgery; secondary glaucomas).	**C2**
5. Describe the clinical features of ocular hypotony, recognize and know how to treat common and uncommon etiologies (e.g., choroidal detachment, leaking trabeculectomy bleb).	**C2**
6. Describe the results, apply the conclusions, and critically analyze the major clinical trials in glaucoma (e.g., GLT, OHTS, CIGTS, FFSS, NTGS, AGIS, EGPS, EMGT), as well as describe and use other publications in the management of glaucoma patients.	**C2**
7. Describe the principles, indications, and complications of laser treatment of more advanced or complex glaucoma (e.g., repeat procedures).	**C2**
8. Describe the more advanced surgical treatment of glaucoma: (e.g., trabeculectomy, combined cataract and trabeculectomy, glaucoma drainage devices, and cyclodestructive procedures), including indications, techniques, and complications.	**C2**
9. Describe use of antimetabolites and anti angiogenic agents and potential complications from their use.	
10. Recognize glaucoma surgical complications, their etiologies, and options for treatment.	**C3**
11. Describe new non-penetrating glaucoma surgery techniques: principles, techniques, advantages, limitations, and complications.	**C2**
12. Describe new microsurgical devices (e.g., EX-PRESS, iStent, gold shunt, Trabectome) used in glaucoma surgery.	**C2**

B. Technical skills

1. Perform YAG or argon laser procedures in glaucoma patients (e.g., monocular patient, repeat laser, vitreolysis, and suture lysis).	**P2**	**2**
2. Perform laser peripheral iridotomy for more advanced glaucoma (e.g., monocular patient, acute angle closure, hazy cornea).		**2**
3. Perform laser treatments (e.g., argon laser trabeculoplasty, iridoplasty) for more advanced glaucoma cases (e.g., repeat treatments, monocular patient).		**2**
4. Perform cyclophotocoagulation for more advanced cases (e.g., prior surgery, monocular patient).		**2**
5. Perform routine and repeat trabeculectomy with or without antimetabolites.		**2**
6. Manage medically and/or surgically a flat anterior chamber as appropriate.		**3**
7. Perform small incision phaco/intraocular lens surgery combined with trabeculectomy, at the same or different sites.		**3**

Neuro-Ophthalmology

A. Cognitive Skills

1. Describe the typical and atypical features, evaluation, and management of papilledema and raised intracranial pressure due to a variety of causes (e.g., sinus thrombosis, idiopathic, meningitis).	**C2**
2. Describe the typical features, evaluation, and management of urgent neuro-ophthalmic pathologies (e.g., giant cell arteritis, cavernous sinus thrombosis, orbital apex syndrome, pituitary apoplexy).	**C2**
3. Describe typical features of the most advanced and least common optic neuropathies (e.g., chronic recurrent inflammatory optic neuritis, posterior ischemic optic neuropathy, neuromyelitis optica, autoimmune optic neuropathy, toxic/nutritional).	**C2**

4. Describe typical and atypical features, evaluation, and management of the most complex and least common ocular motor neuropathies and their mimics (e.g., patterns of aberrant regeneration).	**C2**
5. Describe typical and atypical features, evaluation, and management of the most complex and least common forms of nystagmus (e.g., spasmus nutans, see-saw nystagmus, periodic alternating nystagmus).	**C2**
6. Describe typical and atypical features, evaluation, and management of the most advanced and least common pupillary abnormalities (e.g., pupil findings in coma, transient pupillary phenomenon).	**C2**
7. Describe features, evaluation, and management of the most complex and least common visual field defects and recognize pattern mimics (e.g., combination of disc-related scotoma plus hemianopia, binasal hemianopia, sectoranopia, bilateral inferior altitudinal loss due to superior occipital lobe lesions and not bilateral anterior ischemic optic neuropathy).	**C2**
8. Describe syndromes of cortical visual dysfunction.	
9. Detect early neuro-ophthalmic signs and symptoms of drug toxicity for commonly used medications.	
10. Describe the neuro-ophthalmic complications related to pregnancy.	

B. Technical skills

1. Interpret the complete cranial nerve evaluation in the context of neuroophthalmic localization and diseases.	**P2**	**3**
2. Interpret neuro-radiologic images in neuro-ophthalmology (e.g., interpretation of orbital imaging for orbital pseudotumor and tumors, thyroid eye disease, intracranial imaging modalities and strategies for tumors, aneurysms, infection, inflammation, ischemia), and appropriately discuss, in advance of testing, the localizing clinicoradiological features with the neuroradiologist in order to obtain the best study and interpretation of the results.		**3** **3**

3. Identify patients with "functional" visual loss (i.e., nonorganic visual loss) and provide appropriate counseling and follow-up.		**3**
4. Quantify RAPD with neutral density filter and detect small RAPD in patients with only one working pupil.		**1c1**
5. Perform optic nerve sheath decompression, if trained, for papilledema.		**3**
6. Perform neuro-ophthalmic evaluations for people with special needs (e.g., comatose patients, children, children with developmental and visual maturation evaluations).		

Ophthalmic Pathology

A. Cognitive Skills

1. Describe more advanced ocular anatomy	**C2**
2. Describe the major histologic findings of common diseases of the eye (e.g., keratitis, exfoliation syndrome, corneal and retinal dystrophies and degenerations, frequent neoplasms) relevant to specific clinical rotation(s) (e.g., oculoplastics, cornea, glaucoma, retina, ophthalmic oncology).	**C2**
3. Describe the pathophysiology and histology of potentially vision or life-threatening diseases (e.g., temporal arteritis, endophthalmitis, retinoblastoma, ocular melanoma, extraocular or orbital spread of an intraocular or periorbital tumor, metastasis to the eye and orbit) relevant to specific clinical rotation(s) (e.g., oculoplastics, cornea, glaucoma, retina, and ophthalmic oncology).	**C2**
4. Interpret reports of more advanced techniques in ophthalmic histopathology (e.g., cytology, special stains, transmission electron microscopy, immunohistochemistry, tumor free margins) relevant to specific clinical rotation(s) (e.g., oculoplastics, cornea, glaucoma, retina, ophthalmic oncology), including how the clinician communicates the need for these studies.	**C3**

B. Technical skills

1. Process appropriately more advanced specimens for submitting to an ophthalmic pathology laboratory, including writing of the accompanying letter to the ophthalmic pathologist (e.g., impression cytology, fine needle aspiration biopsy, vitreous biopsy, evisceration, exenteration specimen).	**P2**	**3**
2. Perform a biopsy for frozen section study in ocular pathology.		**3**
3. Participate under supervision through a site visit in a macroscopic and microscopic examination of ophthalmic specimens from active cases, working from low to high power.		**3**

Oculoplastic Surgery and Orbit

A. Cognitive skills

Eyelid

1. Describe the most advanced eyelid anatomy and physiology.	**C2**
2. Describe the etiology, evaluation, and medical and surgical treatment of the following eyelid diseases: a. Complex ectropion (e.g., congenital, paralytic, involutional, cicatricial, mechanical, allergic) b. Complex entropion (e.g., involutional, spastic, cicatricial, congenital) c. Complex myogenic ptosis (e.g., myasthenia gravis, chronic progressive external ophthalmoplegia [CPEO], oculopharyngeal muscular dystrophy [OPMD], myotonic dystrophy) d. Upper eyelid retraction e. Lower eyelid retraction f. Benign, pre-malignant, or malignant eyelid tumors (e.g., papilloma, seborrheic keratosis, epidermal inclusion cyst, molluscum contagiosum, verruca vulgaris, keratoacanthoma, actinic keratosis, basal cell carcinoma, squamous cell carcinoma, sebaceous cell carcinoma, melanoma) g. Single or recurrent inflammatory lesions (e.g., recurrent chalazion or its mimics)	**C2**

h. Facial nerve palsy with exposure keratopathy (e.g., tarsorrhaphy, gold weight, lower lid tightening/elevation)	

Lacrimal

1. Describe the most advanced lacrimal anatomy and physiology. 2. Describe the etiology, evaluation, and medical and surgical treatment of the following lacrimal diseases: a. Punctal stenosis b. Canalicular stenosis c. Common canalicular stenosis	**C2** **C2**

Orbital

1. Describe the most advanced orbital anatomy and physiology. 2. Describe the etiology, evaluation, and medical and surgical treatment of the following orbital diseases: a. Orbital trauma i. All orbital fractures ii. Retrobulbar hemorrhage 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 4. Nonspecific orbital inflammation 5. Describe epidemiology, clinical features, evaluation, and management of fetal alcohol syndrome.	**C2** **C2**

B. Technical skills

Eyelid

1. Perform more complicated and advanced "in office" examination techniques for less common but important eyelid abnormalities. 2. Perform more complicated lid procedures, including: a. Frontalis sling b. Lateral tarsal strip c. Eyelid reconstruction	**P2**	**3** **3**

Lacrimal

1. Perform more complicated and advanced "in office" examination techniques for less common but important lacrimal abnormalities. 2. Perform more advanced lacrimal assessment (e.g., intraoperative and postoperative testing, more complex trauma to lacrimal system). 3. Manage lacrimal system abnormalities, including surgeries (e.g., lacrimal probing, dacryocystectomy, dacryocystorhinostomy).		**3** **3** **3**

Orbital

1. Perform more complicated and advanced "in office" examination techniques for less common but important orbital abnormalities (e.g., forced duction testing). 2. Describe typical and atypical features and describe the differential diagnosis, clinical features, and treatment of more complicated orbital diseases, including: a. Complex orbital infections (e.g., orbital cellulitis, mucormycosis, aspergillosis b. Congenital tumors (e.g., dermoid)	**P2**	**C2**

c. Fibro-osseous disorders and tumors (e.g., fibrous dysplasia, osteoma, chondrosarcoma, osteosarcoma, Paget disease) d. Vascular tumors (e.g., capillary hemangioma, cavernous hemangioma, hemangiopericytoma, lymphangioma, Kaposi sarcoma) e. Xanthomatous tumors (e.g., xanthelasma, juvenile xanthogranuloma) f. Lacrimal gland tumors (e.g., benign mixed tumor, adenoid cystic carcinoma, malignant mixed tumor, lymphoma) g. Neural tumors (e.g., optic nerve glioma/meningioma, neurofibromatosis, neuroblastoma, schwannoma) h. Sarcomas (e.g., rhabdomyosarcoma, leiomyosarcoma, liposarcoma, osteosarcoma) i. Lymphoid lesions (e.g., lymphoid hyperplasia, lymphoma, leukemia) j. Metastatic lesions (e.g., from breast, prostate, lung, colon) k. Thyroid eye disease l. Nonspecific orbital inflammation m. Trauma (e.g., fractures, foreign body, retrobulbar hemorrhage, traumatic optic neuropathy)		
3. Describe indications and complications of basic orbital skills and procedures, including: a. Anterior orbitotomy for tumor biopsy/excision b. Orbital floor fracture repair		**C2**
4. Describe indications and complications of different orbital approaches and incisions (e.g., Kronlein, Caldwell-Luc, transconjunctival, transnasal).		
5. Describe indications for orbital ultrasound, computerized axial tomography (CT or CAT) scan, and magnetic resonance imaging (MRI) scan (e.g., orbital trauma, orbital lesions, and tumors).		**C2**

Pediatric Ophthalmology and Strabismus

A. Cognitive Skills

1. Describe more advanced anatomy (including pulleys) and physiology of strabismus (e.g., torsion, tertiary actions, consecutive deviations).	**C2**
2. Describe more advanced sensory adaptations (e.g., anomalous head position).	**C2**
3. Describe and recognize the different forms of childhood nystagmus (e.g., infantile nystagmus syndrome [INS], fixation maldevelopment nystagmus syndrome [FMNS], spasmus nutans syndrome [SNS]), and appropriate work up for different time of onset and age groups.	**C2**
4. Describe and recognize ROP (e.g., stages, treatment indications).	**C2**
5. List treatment options and indications of low-birth-weight children, and describe long-term ocular and systemic problems.	**C2**
6. Describe and recognize less common hereditary or malformative ocular anomalies and syndromes (e.g., Mobius syndrome, Goldenhar syndrome, Peter anomaly, including pedigree chart analysis).	**C2**
7. Describe etiology, evaluation, and management of congenital infections (e.g., TORCHES sequence: TOxoplasmosis, Rubella, Cytomegalovirus, HErpes simplex, Syphilis).	**C2**
8. Describe and recognize the common causes of pediatric uveitis with natural history, indicated work up, and treatment.	**C2**
9. Describe congenital optic nerve anomalies in children (e.g., optic nerve coloboma, morning glory syndrome, optic nerve hypoplasia), and indicate necessary work up and associated diseases.	**C2**
10. Describe American Association for Pediatric Ophthalmology and Strabismus (AAPOS) etiology position statements on learning difficulties and dyslexia, and know how to locate educational support resources for parents.	**C2**
11. Identify referral centers for children with retinoblastoma, the work up for leukocoria, the evaluation of family members, and the principals of genetic counseling.	**C2**
12. Describe typical features of childhood tumors (e.g., hemangiomas, rhabdomyosarcoma) and their management.	**C2**

13. Describe identifiable congenital ocular anomalies (e.g., microphthalmia, persistent fetal vasculature), and describe appropriate work up for etiology, criteria for intervention, and genetic counseling for parents. 14. Describe indications for botulinum toxin use in strabismus.	**C2**

B. Technical skills

1. Perform a more advanced extraocular muscle examination based on knowledge of the anatomy and physiology of ocular motility.	**P2**	**3**
2. Assess more advanced ocular motility problems (e.g., bilateral or multiple cranial neuropathy, myasthenia gravis, thyroid eye disease).		
3. Apply Hering law and Sherrington law in more advanced cases (e.g., pseudoparesis of the contralateral antagonist, enhancement of ptosis in myasthenia gravis).		**3**
4. Perform more advanced measurements of strabismus (e.g., use of synoptophore or amblyoscope, when available).		**3**
5. Perform assessment of vision in more difficult strabismus patients (e.g., uncooperative child, mentally impaired, nonverbal, or preverbal).		**3**
6. Perform the following surgical techniques: a. Muscle weakening (e.g., tenotomy) and strengthening (e.g., tuck) procedures of rectus muscles b. Inferior oblique weakening procedures c. Use of adjustable sutures		**3**
7. Manage the complications of strabismus surgery (e.g., slipped muscle, anterior segment ischemia, overcorrection, and under correction).		**3**

Vitreoretinal Diseases

A. Cognitive Skills

1. Describe and apply retinal electrophysiology.	**C2**
2. Evaluate, treat, or refer the most complex forms of retinal vascular diseases: a. Combined arterial and venous obstructions b. Advanced diabetic retinopathy c. Advanced hypertensive retinopathy d. Peripheral retinal vascular occlusive disease	**C3**
3. Describe the findings of major studies in age-related macular degeneration: a. Treatment of Age-Related Macular Degeneration with Photodynamic Therapy Study (TAP) b. Verteporfin in Photodynamic Therapy Study (VIP) c. Minimally Classic/Occult Trial of the Anti-Vascular Endothelial Growth Factor (VEGF) Antibody Ranibizumab in the Treatment of Neovascular AMD (MARINA) d. Anti-VEGF Antibody for the Treatment of Predominantly Classic Choroidal Neovascularisation in AMD (ANCHOR) e. The Comparisons of Age-Related Macular Degeneration Treatments Trials (CATT)	**C2**
4. Evaluate and diagnose complex cases of retinal detachment (e.g., acute retinal necrosis, proliferative vitreoretinopathy).	**C3**
5. Diagnose and classify retinopathy of prematurity.	**C2**
6. Diagnose and manage (or refer) complex trauma cases (e.g., chorioretinitis sclopetaria, intraocular foreign body, shaken baby syndrome).	**C2**
7. Diagnose hereditary vitreoretinal degenerations (e.g., Stickler syndrome, Wagner syndrome, Goldmann-Favre degeneration).	**C2**
8. Describe the treatment algorithm for each specific retinal condition, with special emphasis on pros and cons.	**C2**

B. Technical skills

1. Perform indirect ophthalmoscopy with scleral indentation in complex retinal cases (e.g., multiple holes, documented with detailed retinal drawing).	**P2**	**3**
2. Perform ophthalmoscopic examination with panfunduscopic or other lenses in complex retinal		**3**

conditions (e.g., giant retinal tears, proliferative vitreoretinopathy).		**3**
3. Interpret and apply in clinical practice the results of fluorescein and ICG angiography and OCT in complex retinal or choroidal pathology.		**3**
4. Perform posterior segment photocoagulation in more complicated retinal cases:		**3**
5. Diabetic focal/grid macular treatment (e.g., monocular patient, repeat treatment)		**3**
6. Repeat peripheral scatter photocoagulation (panretinal)		**3**
7. Laser retinopexy (demarcation) of large or multiple breaks; cryotherapy		
8. Interpret and apply in clinical practice electrophysiology (e.g., ERG, EOG, VEP, dark adaptation) in more complicated retinal pathology.		**3**
9. Interpret and apply in clinical practice ocular imaging techniques (e.g., B-scan echography) in more complex cases (e.g., choroidal osteoma).		**3**
10. Perform detailed fundus drawings of the retina with vitreoretinal relationships in the most complex retinal cases (e.g., recurrent retinal detachment, retinoschisis with and without retinal detachment).		
11. Perform laser therapy or cryotherapy of retinal holes and other more complex retinal pathologies.		**2**
12. Participate during scleral buckling and pars plana vitrectomy surgeries.		**2**

Uveitis and Ocular Inflammation

A. Cognitive Skills

1. Describe the more complex complications of common uveitis syndromes in addition to that mentioned in Year 2 (e.g., retinal vascular occlusion, retinal neovascularization and vitreous	**C2**

hemorrhage, inflammatory choroidal neovascularization, hypotony).	**C2**
2. Describe indications and contraindications for corticosteroid treatment of uveitis (e.g., topical, local, systemic), including risks and benefits of therapy.	**C2**
3. Describe the management of common uveitic syndromes.	**C2**
4. Describe the techniques of anterior chamber and vitreous tap and of intravitreal injection of antibiotics in cases of bacterial endophthalmitis.	**C2**
5. Describe more advanced examination principles for patients with more subtle signs of uveitis, such as: a. Anterior segment (e.g., conjunctival ulcer, iris transillumination defects, granuloma) b. Posterior segment (e.g., pars plana signs of inflammation [snowbanks and snowballs], retinal detachment [exudative, tractional, rhegmatogenous], retinal vasculitis [periphlebitis or arteritis, occlusive or nonocclusive], optic nerve [optic disc granuloma, optic neuritis, disc neovascularization], macula [macular edema, choroidal neovascularization])	**C2**
6. Describe in greater detail the angiographic features of retinitis, choroiditis, and vasculitis.	**C2**
7. Describe indications and contraindications for commonly used immunotherapy for uveitis in addition to corticosteroid therapy (e.g., azathioprine, cyclosporine A), including risks and benefits of therapy.	**C2**
8. Describe the clinical features and differential diagnoses for less common forms of uveitis (e.g., Whipple disease, Crohn disease).	

B. Technical skills

1. Perform a more advanced examination of the anterior and posterior segment, for example: a. Anterior segment (e.g., conjunctival ulcer, iris transillumination defects, granuloma) b. Posterior segment (e.g., pars plana signs of inflammation [snowbanks and snowballs], retinal detachment [exudative, tractional, rhegmatogenous], retinal vasculitis [periphlebitis or arteritis, occlusive or	P2	3

nonocclusive], optic nerve [optic disc granuloma, optic neuritis, disc neovascularization], macula [macular edema, choroidal neovascularization])		
2. Differentiate active from inactive disease and arterial from venous side disease.		3
3. Recognize serious infective causes from noninfective causes of uveitis.		3
4. Recognize and evaluate the typical demographic features, clinical features, and differential diagnosis of uveitis common in the region via the process of history taking, clinical examination, and the use of investigative tools (such as FA, ICG, B-scan, OCT).		3
5. Recognize and evaluate the typical demographic features, clinical features, and endophthalmitis) Masquerade syndromes, such as vitreoretinal lymphoma differential diagnosis of uveitis in: a. Immunosuppressed individuals (e.g., cytomegalovirus retinitis, endogenous		3
6. Evaluate the common complications of common uveitic syndromes (e.g., glaucoma, cataract, band keratopathy, macular edema).		3
7. Administer periocular corticosteroid injections in addition to topical corticosteroids in the treatment of uveitis.		3
8. Perform an anterior chamber and vitreous tap for diagnostic purposes and to give intravitreal injection of antibiotics in cases of bacterial endophthalmitis.		3
9. Perform cataract removal.		3
10. Perform filtration surgery with antimetabolites.		3
11. Provide patient with relevant information about possible side effects of medications and proper monitoring of medications.		3

Ocular Oncology

A. Cognitive Skills

1. Describe the applied surgical anatomy, histology, and physiology of the eye and ocular adnexa with relevance to ocular oncology.	**C2**
2. Enlist the most common conjunctival and intraocular tumors.	**C2**
3. Describe relevant pathological conditions, such as: a. Nonneoplastic tumors (e.g., hamartomas) b. Neoplastic tumors c. Benign (e.g., nevus, hemangioma) d. Malignant (e.g., melanoma, carcinoma, metastasis) e. Traumatic lesions (e.g., implantation cysts, hemorrhages) f. Degenerative lesions (e.g., disciform, sclero-choroidal calcification) g. Idiopathic disease (e.g., juvenile xanthogranuloma, vasoproliferative tumor) h. Paraneoplastic disease (e.g., Bilateral diffuse uveal melanocytic proliferation) i. Iatrogenic disease (e.g., radiation-induced disease)	**C2**
4. Describe relevant pathological techniques (e.g., fixation, histology, immunohistochemistry).	**C2**
5. Describe relevant genetic abnormalities and techniques: a. Germinal and somatic mutations relevant to oncology (e.g., retinoblastoma) b. Important genetic techniques (e.g., fluorescence in situ hybridization)	**C2**
6. Describe the relevance of staging tumors (e.g., TNM [Tumor, lymph Nodes, Metastasis] Classification of Malignant Tumors).	**C2**
7. Describe the etiology of ocular tumors, such as: a. Environmental factors (e.g., conjunctival squamous cell carcinoma) b. Genetic factors (e.g., retinoblastoma) c. Syndromes (e.g., von Hippel-Lindau disease) d. Malformations (e.g., choroidal osteoma)	**C2**
8. Describe the pathogenesis of ocular tumors (i.e., how tumors cause harm): a. Ocular effects (e.g., neovascular glaucoma) b. Systemic effects (e.g., metastatic disease)	**C2**
9. Describe the epidemiology of the more common ocular tumors (e.g., melanoma).	**C2**
10. Describe the principles of examination techniques: a. Inspection b. Transillumination c. Color photography	**C2**

d. Optical coherence tomography e. Autofluorescence f. Angiography (indocyanine green and fluorescein) g. Ultrasonography h. Magnetic resonance imaging i. Computerized tomography j. Positron emission tomography k. Biopsy i. Incisional ii. Aspiration iii. Excisional iv. Impression cytology v. Systemic investigation according to ocular tumor diagnosis vi. History vii. Clinical examination viii. Hematology and biochemistry ix. Radiography x. Ultrasonography xi. Computerized tomography xii. Magnetic resonance imaging xiii. Genetic testing	
11. Describe the clinical features of each tumor type: a. Inspection/color photography b. Investigational (i.e., angiography, echography) c. List the differential diagnosis of each tumor, and describe the investigational approach for each condition.	**C2**
12. Describe how the following therapeutic modalities and their effects are relevant to ocular tumors: a. Radiotherapy (e.g., brachytherapy, external beam radiotherapy, proton beam) b. Chemotherapy (e.g., topical, intraocular, systemic) c. Phototherapy (e.g., photocoagulation, photodynamic therapy) d. Cryotherapy (e.g., liquid nitrogen, carbon dioxide) e. Surgical resection (e.g., local resection, enucleation)	**C2**
13. Describe how statistics can be applied to ocular oncology (e.g., survival analysis).	**C2**
14. Describe the methods, risks, and benefits of tumor biopsy and how these can be avoided (e.g., biopsy of retinoblastoma, incisional biopsy of conjunctival tumor).	**C2**

B. Technical skills

1. Perform or request appropriate examinations and investigations according to differential diagnosis.	**P2**	**3**
2. Perform or refer for treatment for conjunctival or intraocular tumors, demonstrating awareness of the indications, contraindications, and complications of each treatment and having skill to administer short-term and long-term postoperative care: a. Radiotherapy (e.g., brachytherapy, external beam radiotherapy) b. Phototherapy (e.g., photodynamic therapy, transpupillary thermotherapy) c. Surgical excision (e.g., local resection, enucleation, exenteration) d. Ocular pharmacological therapy by various routes (i.e., topical, intravitreal, ophthalmic artery infusion, sub tenon, systemic) i. Chemotherapy and biological therapy ii. Antiangiogenic agents iii. Steroids		**3**
3. Interpret results of relevant laboratory tests and communicate results to patients, relatives, and health care workers; and adjust patient management accordingly.		**3**
4. Communicate prognosis with patients, relatives, and health care workers; and adjust patient management accordingly in collaboration, if necessary, with a subspecialist.		**3**
5. Use information technology and other aids to cope with lack of expert knowledge.		**4**
6. Assist patients with selecting the most appropriate management in collaboration, if necessary, with a subspecialist in ocular oncology.		**4**

7. Provide or organize appropriate psychological support, demonstrating empathy and an adequate awareness of the principles of this aspect of care (e.g., giving bad news). 8. Collaborate with subspecialists and other health care professionals to provide patient focused care. Develop protocols and infrastructure for practice-based learning and improvement (e.g., access to information, outcomes data).		**3** **4**

Low Vision Rehabilitation

A. Cognitive Skills

1. Describe significant comorbidities that impact low vision rehabilitation.	**C2**
2. Describe the role of visual processing and perception deficits (e.g., cerebral visual Impairment, acquired brain injury, stroke).	**C2**
3. Describe indications for the most complex low vision aids.	**C2**
4. Apply more complex principles of optics of low vision devices.	**C3**
5. Describe vision related quality of life measurements.	
6. Describe social or public consequences and implications of low vision.	**C2**
7. Describe the role of the electrophysiological examinations as diagnostic and prognostic tools for low vision patients.	**C2**
8. Describe the implications of low vision in the education of children.	**C2**

B. Technical skills

1. Evaluate visual acuity and visual field for determination of disability for legal and insurance purposes.	**P2**	**3**
2. Prescribe the most complex rehabilitative therapies and optical devices to help the patient meet their goals.		**3**

3. Apply and prescribe visual field enhancing techniques, including scanning training for hemianopic field loss. 4. Perform short cognitive assessment of elderly patients with visual impairments for drivers' license approval.		**3** **3**

Ethics and Professionalism in Ophthalmology

1. Recognize and use advanced medical ethics in the ophthalmic practice: a. Applicable informed consent documents (e.g., clinical research, off-label use disclosures) b. Management (offering and rendering) of second opinions c. Individual and institutional responsibilities regarding impaired physicians d. Responsibility for postoperative care, including appropriate transfer of care to other physicians e. Management of conflicts of interest (clinical and nonclinical) i. Disclosures ii. Gifts to physicians f. Appropriate advertising (and applicable laws) i. Appropriate conduct as a medical-expert witness in litigation		C2
2. Identify applicable insurance coverage responsibilities in a practice situation.		C2
3. Utilize more advanced aspects of health care reimbursement in a clinical practice (e.g., denials of claims, hospital contracting, electronic billing).		
4. Work within integrated eye care delivery systems (both within eye care specialties and within general medicine and surgery).	P2	
5. Participate in all of the foregoing aspects of practice management to the best ability with in a medical education setting.		
6. Utilize all of the foregoing ethical principles and knowledge in direct patient care.	P2	

7. Describe the responsibility of ophthalmologists to share their knowledge of clinical arts and sciences for the benefit of patients, the profession, and society.		C2

Community Eye Health

A. Cognitive Skills

Principles of prevention of blindness

1. Outline the different health service models in different countries and regions, and how eye care services might be integrated into these.	**C2**
2. Describe the components of a rapid assessment of avoidable blindness (RAAB) survey.	**C2**
3. Outline the government and nongovernment funding that are available for eye care.	**C2**
4. Describe the key practices and policies that will ensure the principles of prevention of blindness are inclusive relating to gender, disability, and other potential causes of marginalization.	**C2**

Cataract

1. Outline the components of a system for monitoring the visual acuity outcomes following cataract surgery.	**C2**
2. Outline the components of the cataract surgery costs.	**C2**

Trachoma

1. Describe the components of a rapid assessment of trachoma (RAT) survey.	**C2**

B. Psychomotor Skills

Cataract

1. Set up a system for the monitoring of the visual acuity outcomes following cataract surgery.	**P2**	

2. Calculate cataract surgery costs with recommendations for strategies to decrease unit costs.		

Refractive error

1. Evaluate the coverage and impact of school screening, and make recommendations for improvement. 2. Evaluate the services for the provision of presbyopic correction, and make recommendations for improvement.		**C3**

Low vision

1. Evaluate the coverage and impact of low-vision services.		**C3**

Childhood blindness

1. Where appropriate, set up a system for the screening and treatment of retinopathy of prematurity.	**P1**	

Trachoma

1. Where appropriate, network and advocate with agencies and communities to implement the F (facial cleanliness) and E (environmental changes) components in the SAFE strategy.	**P2**	

Planning of blindness prevention programs

1. Develop a budget for a one-year operational plan for a blindness prevention program for a health district with a population of one million.	**P2**	

4th Year Resident Goals

By the completion of their 4th year residency, the residents should be able to:

Cataract and Lens

A. Cognitive Skills

1. Describe the issues of pediatric cataract surgery, including the indications for surgery (posterior capsulotomy +/- anterior	**C2**

vitrectomy), IOL implantation, unilateral and bilateral congenital cataract, and IOL calculation in young children.	
2. Describe the management of cataract associated with aniridia.	**C2**
3. Describe the treatment options for "dropped IOL" and indications for referral to a vitreoretinal surgeon.	**C2**
4. Describe the advantages and strategies for advanced phacoemulsification techniques such as torsional or transversal ultrasound, small incision and microincision cataract surgery (MICS), biaxial MICS cataract surgery.	**C2**
5. Describe the parameters, power, and fluidics in MICS.	**C1**
6. List the indications for triple procedures or combined surgeries (e.g., Phaco plus trabeculectomy, keratoplasty, silicone-oil removal).	**C1**
7. List the Indications for "premium" IOLs (e.g., multifocal, accommodating, toric).	**C2**
8. Describe the surgical difficulties of hyper mature (Morgagnian) cataract.	**C2**
9. Describe the treatment options for eyes with shallow anterior chamber and cataract including high-degree hyperopic eyes and piggyback IOL implantation.	**C2**
10. Describe the treatment of cataract in patients with an intraocular tumor (e.g., melanoma, retinoblastoma).	**C2**
11. Describe the methods to determine typical surgically induced astigmatism and surgeon specific a-constant.	**C2**
12. Describe the etiology and management of unexpected postoperative refractive errors, including hyperopic and myopic shifts (e.g., capsular phimosis, capsular block, and upside down IOL).	**C2**
13. Describe the management strategies to reposition of decentered, tilted, subluxated, and dislocated IOLs.	**C2**

B. Technical skills

1. Perform surgery on congenital cataract, including IOL power calculation.	**P2**	**3**
2. Perform and teach small incision and MICS, torsional, or transversal ultrasound.		**4**
3. Perform and teach triple procedures or combined surgeries (e.g., phaco and		**3**

trabeculectomy, keratoplasty, silicone-oil removal). 4. Implant "premium" IOLs (e.g., multifocal, accommodating, toric) and counsel patients preoperatively and postoperatively. 5. Perform surgery on patients with complex lens issues, including: a. Aniridia, iris coloboma, iris dialysis b. Hyper mature (Morgagnian) cataract c. Eyes with shallow anterior chamber d. High-degree myopic eyes 6. Perform reposition of malpositioned IOLs and late subluxation of IOL/capsule.		**3** **3** **3**

Cornea and External Diseases

A. Cognitive Skills

1. Recognize acute and chronic blepharitis, including both infectious and noninfectious etiologies, with emphasis on microbial blepharitis, meibomian gland dysfunction, and rosacea.	**C2**
2. Recognize acute and chronic conjunctivitis, neonatal conjunctivitis, chlamydial disease, adenoviral conjunctivitis, allergic conjunctivitis, and bacterial conjunctivitis.	**C2**
3. Recognize acute and chronic infectious keratitis including bacterial, viral, fungal, and parasitic, with emphasis on herpes simplex, herpes zoster, adenovirus, acanthamoeba, and contact lens-associated problems.	**C2**
4. Recognize noninfectious keratitis including marginal keratitis, central ulcerative keratitis, epitheliopathy, endothelialitis, and interstitial keratitis.	**C2**
5. Recognize anterior segment anomalies, including various anomalies associated with specific genetic abnormalities, corneal dystrophies, and corneal degenerations.	**C2**
6. Recognize autoimmune and immunologic diseases of the anterior segment including allergy, corneal graft rejection, and cicatrizing conjunctivitis.	**C2**

7. Recognize and be familiar with oral and topical immunosuppression and anti-allergy medications.	**C2**
8. Describe fundamentals of anterior segment anatomy, chemistry, physiology, and wound healing including tear formation and function, corneal topography/tomography, endothelial cell function, and maintenance of corneal clarity.	**C2**
9. Discuss principles of anterior segment pharmacology including antimicrobial, anti-inflammatory, ocular hypotensive and immunosuppressive agents, with emphasis on bioavailability, mechanism of actions, relative efficacy, safety, and potential complications.	**C2**

Glaucoma

A. Cognitive Skills

1. List the main population-based studies in glaucoma prevalence, incidence, and risk factors (e.g., Baltimore Eye Survey, Blue Mountains Eye Study, Barbados Eye Study,Rotterdam Eye Study, Thessaloniki Eye Study, Latinos Eye Study, Singapore Malay Eye Study).	**C2**
2. Describe and critically discuss results of the above-mentioned studies on glaucoma prevalence, incidence, and risk factors.	**C2**
3. Describe rate of progression and use of special algorithms (e.g., value function iteration, PROGRESSOR, Garway-Heath map).	**C2**
4. Describe and critically discuss literature on structure-function correlation.	**C2**
5. Describe use of other tonometers (e.g., ocular response analyzer, dynamic contour tonometry, pneumotonometer).	**C2**
6. Describe mechanisms of ganglion cell damage and potential pathways for neuroprotection.	**C2**
7. Describe and know specific medical and surgical treatments in the most complex and most advanced glaucoma cases (e.g., refractory glaucoma, monocular patients, and noncompliant patients).	**C2**
8. Describe and know the specific management of complications related to the surgical intervention of the most complex and most advanced glaucoma's.	**C2**

B. Technical skills

1. Perform goniotomy, trabeculotomy, and manage complications.	**P2**	**3**
2. Medical and surgical management of hypotony from overfiltration, bleb leak, choroidals, and other causes.		**3**
3. Treat malignant glaucoma and manage complications.		**3**
4. Treat failing or leaking blebs at slit lamp and manage complications.		**4**
5. Perform advanced techniques for revisions of glaucoma surgery blebs (e.g., sliding flap, free graft, amniotic membrane) and manage complications.		**3**
6. Perform cyclodestructive procedures and manage complications.		**4**
7. Perform trabeculectomy revisions, glaucoma drainage device surgery, and manage complications.		**3**
8. Describe and manage cyclodialysis cleft.		**3**
9. Perform releasable suture techniques.		**3**
10. Perform choroidal drainage.		**3**
11. Perform Phaco trabeculectomy/combined surgery and manage surgical complications.		**3**
12. Perform laser trabeculoplasty and manage surgical complications.		
13. Manage end stage and high-risk glaucoma.		
14. Perform combined implant/phaco/penetrating keratoplasty/vitrectomy.		

Neuro-Ophthalmology

A. Cognitive Skills

1. Describe the arterial circulation in detail and know the general venous drainage along the entire anterior visual pathway (e.g., optic disc, retrobulbar optic nerve, intracranial segment of optic nerve, chiasm, and lateral geniculate body).	**C2**
2. Describe evaluation, give differential diagnosis, and outline a management plan of the most advanced and least common	**C2**

optic neuropathies (e.g., chronic recurrent inflammatory optic neuritis, posterior ischemic optic neuropathy, neuromyelitis optica, autoimmune optic neuropathy, rare toxic optic neuropathies).	
3. Describe the cortical visual syndromes and know the localization of the causative lesion (e.g., akinetopsia, prosopagnosia, simultagnosia).	**C2**
4. Describe typical and atypical features, evaluation, and management of rare eye movement disorders (e.g., differential diagnosis of monocular oscillations, localization of lesion and purported mechanism of oculopalatal myoclonus).	**C2**
5. Describe typical features, pathophysiology, evaluation, and management of rare pupillary syndromes (e.g., tadpole pupil, paradoxical pupillary constriction).	**C2**
6. Describe the advantages, disadvantages, indications, and pitfalls in special perimetric methods (e.g., blue-yellow perimetry, automated kinetic perimetry, motion perimetry, and microperimetry).	**C2**
7. Describe and differentiate among various kinds of unusual positive visual phenomena and know their possible causes (e.g., palinopsia, persistent photopsia).	**C2**
8. Know the differential diagnosis and evaluation for acute or progressive homonymous hemianopsia in a patient with a normal MRI.	**C2**
9. Describe the various prion diseases and their management.	
10. Describe the various mitochondrial syndromes that have neuro-ophthalmic manifestations, and provide appropriate genetic counseling for inherited neuroophthalmic diseases (e.g., Kearns-Sayre and related syndromes, mitochondrial encephalomyopathy, lactic acidosis, stroke-like episodes [MELAS], neuropathy, ataxia, and retinitis pigmentosa [NARP]).	**C2** **C2**
11. Describe evaluation, give differential diagnosis, and outline a management plan for patients with headache and facial pain presenting as neuro-ophthalmic manifestations.	**C1**
12. Describe the features, evaluation, and differential diagnosis of dizziness and vertigo from neuro-ophthalmic problems.	**C1**

B. Technical skills

1. Recognize pitfalls in interpretations of unusual results of pharmacologic tests used for diagnosis of pupillary disorders.	**P2**	**3**
2. Know techniques that reveal the most subtle manifestations of eye movement disorder (e.g., slow medial rectus saccade as the only sign of internuclear ophthalmoplegia, fundus photos for excyclotorsion, head shaking test).		**3**
3. Perform and interpret the complete neurologic examination.		**3**
4. Be able to detect symptomatic lesions overlooked by the neuroradiologist (e.g., small lesion in optic canal, carotid dissection).		**2**
5. Be able to perform specific maneuvers that definitively reveal nonorganic visual loss or overlay (e.g., 4-diopter prism test, rocking mirror).		**2**
6. Perform and interpret spectral-domain OCT (e.g., outer retinal disorders, detection of drusen).		**2**
7. Interpret indocyanine green angiography and autofluorescence imaging.		**3**

Ophthalmic Pathology

A. Cognitive Skills

1. Describe advanced ocular anatomy, and identify histology of the minor structures of the eye and their uncommon variants (e.g. congenital grouped pigmentation).	C2
2. Describe the more complex pathophysiology of the disease processes of the eye, and identify major histologic findings of each (e.g., inflammatory pseudotumor, lymphoma, artifacts of tissue processing, virus particles).	C2
3. Describe the histology of the less common but potentially vision or life-threatening ocular and adnexal diseases (e.g., healed giant cell arteritis, mimics and masqueraders of inflammation and neoplasm, less common benign and malignant neoplasms).	C2

4. Describe ancillary procedures for oncology (e.g., bone marrow aspiration, cerebrospinal fluid cytology).	C2

B. Technical skills

1. Manage consultation between the clinician and ophthalmic pathologist regarding indications for special stains (e.g., Gram stain for bacteria, Congo red for amyloid; Gomori methenamine silver staining for fungi; Prussian blue for hemosiderosis; von Kossa for calcium; Oil Red O or Sudan Black for sebaceous carcinoma) or processing (e.g., orientation of specimen, special handling).	**P2**	**3**
2. Participate as an observer during the microscopic examination of active ophthalmology cases, including more advanced stains and techniques.		**3**
3. Participate in subspecialty clinical pathological meetings (e.g., with corneal surgeons, infection specialists, tumor board).		**4**
4. Handle appropriately gross or cytologic specimens in the ophthalmic pathology laboratory (e.g., vitreous biopsy, exenteration specimen).		**3**
5. Prepare more advanced histologic specimens for review by the ophthalmic pathologist (e.g., special stains or fixation methods such as glutaraldehyde fixation for electron microscopy).		**3**
6. Perform microscopic examination of a paraffin-embedded specimen and a frozen-section specimen without direct supervision; provide a relevant differential diagnosis; draft a report–preferably previewing slides in advance of the pathologist–to come up with a diagnosis and to suggest special stains and immunohistochemistry, without the influence of the ophthalmic pathologist; review the report and special stain orders with the ophthalmic pathologist.		
7. Participate with the ophthalmic pathologist in tumor board and similar multidisciplinary meetings, presentations on recent advances, and journal clubs involving pathology.		**4**
		4

8. Research requirement: Publish at least one paper based on basic, translational, or clinical research involving ophthalmic pathology. The purpose of the requirement is to further the trainee's in-depth knowledge of pathophysiology and laboratory techniques relating to ophthalmic pathology.		

Oculoplastic Surgery and Orbit

A. Cognitive Skills

General

1. Describe the clinical features, evaluation, and management of congenital syndromes, inflammation, trauma, ectropion, entropion, trichiasis, blepharoptosis, eyelid retraction, epiblepharon, dermatochalasis, blepharochalasis, eyelid tumors, blepharospasm, facial nerve palsy, eyebrow, midface and lower face function; and aesthetics, histology, and pathology of the facial skin.	**C2**
2. Describe ocular surface pathology, including cicatricial processes affecting the bulbar and palpebral conjunctiva, management of corneal and conjunctival exposure, and relationship of the lids, midface, and brow to ocular exposure.	**C2**
3. Describe the assessment of eyebrow position for brow ptosis and paralysis, and determine its relation to upper eyelid dermatochalasis.	**C2**
4. Describe complex eyelid trauma.	**C2**
5. Describe complex eyelid reconstruction (e.g., Hughes flap, free tarsal grafts, local flaps, skin grafts, Cutler-Beard procedure).	**C2**

Eyelid

Lacrimal

1. Describe the etiology, evaluation, and medical and surgical treatment of congenital tearing, acquired tearing, and trauma.	**C2**

Orbital

1. Describe the etiology, evaluation, and medical and surgical treatment of orbital problems of children (e.g., congenital anomalies, cellulitis, benign and malignant tumors, and orbital inflammations).	**C2**
2. Describe the etiology, evaluation, and medical and surgical treatment of orbital disorder of adults, including orbital cellulitis, thyroid orbitopathy, idiopathic orbital inflammation, vasculitis, congenital tumors, vascular tumors, neural tumors, lacrimal gland tumors, fibro-osseous tumors, histiocytic diseases, lymphoid tumors, metastatic tumors, blunt and penetrating trauma, orbital and facial fractures, anophthalmic socket problems, and skull base disease.	**C2**
3. Describe the types of and indications for various biomaterials and orbital implants.	**C2**

Nose

1. Describe basic anatomy and physiology.	**C2**

Sinuses

1. Describe basic anatomy and physiology.	**C2**

Head and Neck as it Relates to the Orbit and Adnexa

1. Describe basic anatomy and physiology.	**C2**

B. Technical skills

Eyelid

1. Describe indications for and perform medical and surgical treatment of floppy eyelid syndrome.	**P2**	**4**
2. Perform more complicated eyelid procedures, including: a. Levator advancement b. Retractor reinsertion c. Lower eyelid elevation d. Upper eyelid recession e. Eyebrow elevation		**3**

3. Perform complex ptosis repairs (e.g., reoperations for height or contour abnormalities). 4. Perform complex lower eyelid procedures (e.g., retraction using a spacer, cicatricial entropion using a mucous membrane graft). 5. Perform midface surgery (e.g., midface lift for cicatricial and paralytic ectropion). 6. Perform advanced brow elevation techniques (e.g., endoscopic, pretrichial, coronal). 7. Perform advanced eyelid reconstruction (e.g., Hughes flap, Cutler-Beard procedure, tissue transfer, flaps, and grafts). 8. Perform cosmetic upper blepharoplasty. 9. Perform cosmetic lower blepharoplasty. 10. Excise benign and malignant tumors involving the periorbital and adjacent regions.		**3** **4** **3** **3** **3** **2** **2** **3**

Lacrimal

1. Treat lacrimal system abnormalities, including: a. Complex congenital disorders (e.g., canalicular stenosis) b. Complex trauma (i.e., requiring lacrimal intubation) 2. Describe indications for and complications of, and perform intranasal endoscopic examination. 3. Describe management of complex acquired disorders and their treatment (e.g., external and endoscopic dacryocystorhinostomy, conjunctivodacryocystorhinostomy with Jones tube).	**P2**	**4** **3** **3**

Orbital

1. perform basic orbital skills and procedures, including: a. Socket reconstructions (e.g., tissue transfers, grafts, flaps, synthetic implants)	**P2**	**2**

b. Fracture repair of bones involving the periorbital region and orbit (e.g., orbital floor, medial orbital wall, Le Fort, zygomaticomaxillary complex [ZMC], naso-orbito-ethmoid [NOE]) c. Orbitotomy for exploration, biopsy, and tumor removal using anterior, lateral, medial, and superior approaches; and orbital reconstruction d. Enucleation, evisceration, exenteration, and secondary implants of the orbit e. Complex or difficult socket-related problems and complications (e.g., extrusion of implants, contracted socket, anophthalmic enophthalmos) f. Optic nerve sheath fenestration g. Orbital decompression for thyroid eye disease		

Nasal

1. Describe nasal endoscopy as related to the management of lacrimal and periorbital processes. 2. Describe turbinectomy and nasal surgery as related to the management of lacrimal and periorbital processes.	**P2**	**2**

Head and Neck

1. Repair upper face and brow conditions, including brow ptosis repair. 2. Use neuromodulators (e.g., botulinum toxin), dermal fillers, other technologies (e.g., laser) and chemical/pharmaceutical agents for the management of contour and skin quality abnormalities (i.e., functional and aesthetic).	**P2**	**2** **3**

Pediatric Ophthalmology and Strabismus

A. Cognitive Skills

1. Describe and perform the most advanced strabismus examination techniques (e.g., complicated prism cover testing in multiple cranial neuropathies, patients with nystagmus, dissociated vertical deviation, double Maddox rod testing).	**C2**
2. Describe clinical application of the most advanced sensory adaptations (e.g., anomalous head position, anomalous retinal correspondence, methods of distance stereopsis).	**C2**
3. Describe etiologies of amblyopia (e.g., refraction noncompliance, patching failures, and pharmacologic penalization).	**C2**
4. Describe etiologies of esotropia (e.g., optical; postrefractive surgical esotrophia [ET]; prism-induced ET decompensated esophoria; postsurgical amd consecutive ET; sixth nerve palsy and paresis; thyroid eye disease, following closed head injury; Chiari malformation).	**C2**
5. Describe the etiologies of exotropia (e.g., supranuclear, paralytic pontine exotropia, consecutive).	**C2**
6. Identify complex ROP (e.g., stages, treatment indications, retinal detachment).	**C2**
7. Describe causes and testing of optic atrophy in children.	**C2**
8. Describe methods of ocular assessment of children with other disabilities.	**C2**
9. Describe ocular cysticercosis.	**C2**
10. Describe screening strategies for childhood blindness at the community level and intervention.	**C2**
11. Describe how to guide/refer parents of children with severe vision impairment.	**C2**

B. Technical skills

1. Perform more complex extraocular muscle surgery (e.g., vertical and horizontal muscle surgery, including superior oblique procedures, transpositions, and reoperations).	**P2**	**3**
2. Perform preoperative assessment, intraoperative techniques, and describe postoperative complications for more complicated strabismus surgery (e.g., reoperations, stretched scar, slipped muscle, lost muscle).		**4**
		3

3. Perform adjustable sutures in more complicated cases (e.g., thyroid ophthalmopathy).		**3**
4. Manage more complex complications of strabismus surgery (e.g., globe perforation, corneal dellen, inclusion cysts, endophthalmitis, and overcorrection undercorrection).		**3**
5. Perform surgery of congenital cataract including posterior polar cataract (PPC), vitrectomy with/without intraocular lens implantation, persistent hyperplasia of the primary vitreous (PHPV)/persistent fetal vasculature (PFV), including biometric measurements to determine aphakia contact lens or intraocular lens.		**3**
6. Perform glaucoma surgery in pediatric and congenital glaucoma.		**3**
7. Perform corrective surgery in congenital eyelid anomalies like ptosis.		**3**
8. Perform nasolacrimal surgery in children.		
9. Perform electromyography (EMG) guided or intraoperative injection of botulinum toxin for strabismus.		**3** **4**
10. Diagnose ROP and refer for treatment.		
11. Perform more complex strabismus procedures (e.g., Faden sutures, posterior myopexy, Yokoyama muscle union, "Y" splitting).		**3**

Vitreoretinal Diseases

A. Cognitive Skills

1. Diagnose, evaluate, treat (or refer) the most complex forms of retinal vascular diseases and diagnose/manage risk factors (e.g., blood dyscrasia) and systemic complications.	**C3**
2. Diagnose, evaluate, and treat inherited, congenital, and acquired macular diseases.	**C3**
3. Compare the current therapeutic retinal treatment strategies and be able to discuss the future improvements of the therapeutic armamentarium.	**C2**
4. Evaluate and treat traumatic injuries to the retina, including complex cases such as intraocular foreign body with	**C3**

rhegmatogenous retinal detachment and traumatic macular holes, and be able to manage complications to the other ocular structures.	
5. Diagnose, evaluate, and understand the genetic alterations and the possible applications of gene therapy for hereditary diseases.	**C3**
6. Develop surgical proficiency in different surgical techniques for management of retinal detachment, including complex cases (e.g., combined rhegmatogenous/tractional retinal detachments).	**C2**

B. Technical skills

1. Perform posterior photocoagulation in complicated retinal cases: a. Retinal breaks with vitreous hemorrhage b. Cases with intraocular tamponade (i.e., gas, silicone oil)	**P2**	**3**
2. Interpret and apply electrophysiology in clinical practice.		**3**
3. Interpret and apply ocular imaging techniques in clinical practice (e.g., B-scan echography) and in more complex cases (e.g., choroidal osteoma).		**4**
4. Perform detailed fundus drawings of the retina with vitreoretinal relationships in the most complex retinal cases (e.g., recurrent retinal detachment, retinoschisis with and without retinal detachment).		**4**
5. Perform laser therapy or cryotherapy of retinal holes and other more complex retinal pathology.		
6. Perform scleral buckling in complex retinal detachment.		**3**
7. Perform advanced pars plana vitrectomy.		**3**
		3

Uveitis and Ocular Inflammation

A. Cognitive Skills

1. Describe the clinical features and differential diagnoses for less common forms of uveitis (e.g., Whipple disease, Crohn disease, bilateral acute depigmentation of the iris [BADI], diffuse unilateral subacute neuroretinitis [DUSN], and onchocerciasis.	**C2**
2. Describe the global epidemiology of uveitis and relate this information to the diagnosis.	**C2**
3. Describe the management of the more complex complications of uveitis.	**C2**
4. Describe indications for ultrasound biomicroscopy (e.g., assess state of ciliary body in hypotony), laser flare photometry and electrophysiology in the evaluation of uveitis.	**C2**
5. Describe indications, contraindications, and complications for immunosuppressive therapy in uveitis (e.g., use of antimetabolites, cyclosporine, alkylating agents, biologic agents).	**C2**
6. Describe indications, contraindications, and complications of retinal laser photocoagulation in uveitis.	**C2**
7. Describe indications, contraindications, and complications of intravitreal injection of medications (e.g., corticosteroids, antiviral therapy, antibiotics, anti-VEGF, anti-mitotic agents) and drug delivery systems (e.g., for corticosteroid, ganciclovir).	**C2**

B. Technical skills

1. Integrate history, clinical examination, and investigations in order to evaluate the less common uveitis entities.	**P2**	**4**
2. Administer corticosteroids in the treatment of uveitis by various routes (e.g., topical, periocular, systemic, and intravitreal injection).		**4**
3. Perform retinal laser photocoagulation for retinal vasculitis complicated by retinal capillary nonperfusion and associated retinal or optic disc neovascularization.		**3**
4. Regulate perioperative management of the uveitic eye for cataract removal.		**4**
5. Perform intravitreal injection of medications (e.g., corticosteroids, antiviral therapy, antibiotics, anti-VEGF, antimitotic agents) and drug delivery systems (e.g., for corticosteroid, ganciclovir).		**4**

6. Co-manage with another subspecialist as appropriate: a. Biopsy of the vitreous, retina, or choroid to confirm/exclude vitreoretinal lymphoma or other tumors/infectious causes b. Immunosuppressive therapy in uveitis including biologics (with or without the aid of an immunologist) and monitor for side effects Intravitreal implants containing antiviral or corticosteroid medications. Ocular complications of uveitis (e.g., macular edema, cataract, glaucoma, retinal detachment, band keratopathy, choroidal neovascularization, hypotony).		**4**

Ocular Oncology

A. Cognitive Skills

1. Describe the applied surgical anatomy, histology, and embryology of the eye and ocular adnexa with relevance to ocular oncology.	C2
2. Describe the applied physiology of the eye and adnexa with relevance to ocular oncology.	C2
3. Describe the applied pathology of the following: 3.1 Ocular tumors and pseudotumor 3.1.1 Congenital/developmental a. Conjunctiva i. Dermoid ii. Dermo lipoma iii. Choristoma (simple and complex) b. Uvea i. Lisch nodules ii. Stromal iris cyst iii. Lacrimal gland choristoma c. Retina i. Multiple congenital hypertrophy of the retinal pigment epithelium ii. (CHRPE) iii. Astrocytic hamartoma	C2

iv. Hemangioblastoma v. Cavernous angioma vi. Dominant exudative vitreoretinopathy vii. Norrie disease viii. Incontinentia pigmenti ix. Solitary CHRPE x. Grouped pigmentation xi. Arteriovenous malformation (racemose angioma) xii. Posterior primary hyperplastic vitreous (PPHV) xiii. Glioneuroma 3.1.2 Inflammatory (infectious, noninfectious) a. Conjunctiva i. Granuloma (e.g., syphilis, sarcoid) b. Uvea i. Granuloma (e.g., tuberculosis) Uveal effusion ii. Posterior scleritis c. Retina i. Granuloma (e.g., toxocara) 3.1.3 Benign a. Conjunctiva i. Nevus ii. Papilloma iii. Oncocytoma iv. Primary acquired melanosis v. Reactive lymphoid hyperplasia vi. Other b. Uvea i. Nevus/melanocytoma ii. Hemangioma iii. Osteoma iv. Neurilemmoma v. Neurofibroma vi. Leiomyoma vii. Mesectodermal leiomyoma viii. Reactive lymphoid hyperplasia ix. Bilateral diffuse uveal melanocytic proliferation x. Other rare conditions c. Retina i. Retinoma/retinocytoma ii. Adenoma iii. Fuchs adenoma	

iv. Benign medulloepithelioma v. Other 3.1.4 Malignant a. Conjunctiva i. Melanoma ii. Squamous cell carcinoma iii. Sebaceous carcinoma iv. Kaposi sarcoma v. Lymphoma vi. Extraocular tumor spread vii. Metastasis viii. Other b. Uvea i. Melanoma ii. Lymphoma iii. Intraocular tumor spread from conjunctiva iv. Systemic lymphoma v. Systemic leukemia vi. Metastasis vii. Other c. Retina i. Retinoblastoma ii. Adenocarcinoma iii. Malignant medulloepithelioma iv. Lymphoma v. Leukemia vi. Metastasis vii. Other 3.1.5 Traumatic a. Conjunctiva i. Implantation cyst ii. Foreign body granuloma iii. Pyogenic granuloma b. Uvea i. Implantation cyst ii. Choroidal hemorrhage iii. Miotic cyst c. Retina i. Retinopathy of prematurity ii. Retinal detachment iii. Massive reactive gliosis	

3.1.6 Degenerative a. Conjunctiva i. Lacrimal retention cyst b. Uvea i. Disciform lesion ii. Sclerochoroidal calcification iii. Vortex vein ampulla c. Retina i. Vasoproliferative tumor 3.1.7 Idiopathic a. Conjunctiva i. Lymphangiectasia cyst b. Uvea i. Juvenile xanthogranuloma c. Retina ii. Coats disease iii. Combined hamartoma of retina and retinal pigment epithelium iv. Iris cyst v. Ciliary epithelial cyst 3.1.8 Paraneoplastic disease a. Bilateral diffuse uveal melanocytic proliferation b. Carcinoma-associated retinopathy c. Melanoma-associated retinopathy d. Other	
4. Describe the following pathological conditions: a. Non-neoplastic tumors i. Hamartoma ii. Choristoma iii. Granuloma iv. Cyst v. Hyperplasia vi. Metaplasia b. Neoplastic tumors i. Benign ii. Malignant c. Proliferation d. Invasion e. Seeding f. Metastasis	C2

g. Iatrogenic disease h. Radiation i. Pharmacology j. Surgery k. Phototherapy	
5. Describe relevant pathological techniques, such as: a. Fixatives b. Frozen sections c. Histology d. Immunohistochemistry e. Flow cytometry f. Other	C2
6. Describe the following genetic abnormalities and techniques: a. Germinal mutations relevant to oncology b. Somatic mutations in tumors c. Genetic techniques i. Karyotyping ii. Polymerase chain reaction iii. Fluorescence in situ hybridization iv. Multiplex ligation-dependent probe amplification v. Gene expression profiling vi. Comparative genomic hybridization vii. Other	C2
7. Describe the relevant staging and grading systems for ocular tumors (with ability to use appropriate methods as necessary, using appropriate references sources): a. TNM Classification of Malignant Tumors cancer staging system i. Uveal melanoma ii. Retinoblastoma iii. Conjunctival melanoma iv. Conjunctival carcinoma v. Ocular adnexal lymphoma b. International retinoblastoma staging system vi. Ocular adnexal lymphoma c. International retinoblastoma staging system d. Reese-Ellsworth staging system for retinoblastoma e. Other staging systems (e.g., Collaborative Ocular Melanoma Study)	C2
8. Describe the etiology of ocular tumors: a. Environmental factors	C2

b. Genetic factors c. Syndromes d. Malformations e. Other	
9. Describe the pathogenesis of ocular tumors: a. Secondary effects of uveal melanoma b. Secondary effects of retinoblastoma c. Secondary effects of other tumors (e.g., conjunctival tumors)	C2
10. Describe the epidemiology of ocular tumors: a. Principles of epidemiology	C2
11. Describe the principles of examination techniques: a. Inspection i. Slit-lamp examination ii. Gonioscopy and 3-mirror examination iii. Ophthalmoscopy b. Transillumination i. Transpupillary ii. Transscleral c. Color photography i. Standard ocular photography ii. Specialized cameras (e.g., RetCam, Optos) iii. Autofluorescence photography d. Angiography i. Fluorescein angiography ii. Indocyanine green angiography e. Ultrasonography i. A-scan ultrasonography ii. B-scan ultrasonography (including high frequency) iii. Doppler ultrasonography f. Magnetic resonance imaging g. Computerized tomography h. Positron emission tomography i. Biopsy ii. Aspiration iii. Incisional iv. Excisional v. Impression cytology i. Systemic investigation according to ocular tumor diagnosis i. History	C2

ii. Clinical examination iii. Hematology and biochemistry iv. Radiography v. Ultrasonography vi. Computerized tomography vii. Magnetic resonance imaging viii. Genetic testing	
12. Describe the clinical features of each tumor type: a. Inspection/color photography b. Investigational (i.e., angiography, echography)	C2
13. List the differential diagnosis of each tumor and describe the investigational approach for each condition.	C2
14. Describe how the following therapeutic modalities and their effects are relevant to ocular tumors: a. Radiotherapy i. Radiation ii. Radioactive sources (e.g., iodine, ruthenium) iii. Types of radiation (e.g., gamma, beta, proton) iv. Biological effects b. Chemotherapy c. Phototherapy d. Cryotherapy e. Surgical resection	C2
15. Describe how the following statistics can be applied to ocular oncology: a. Statistical correlations i. Univariate ii. Multivariate b. Survival statistics i. Kaplan-Meier analysis ii. Cox analysis iii. Neural networks iv. Accelerated failure time c. Bias d. Power calculations e. Other relevant statistical methods	C2

B. Technical skills

1. Perform or request the following examinations, interpreting and documenting any findings, demonstrating awareness of the indications, contraindications, and limitations of each investigation: a. Slit-lamp examination of conjunctiva and assessment of conjunctival fornices b. Slit-lamp examination of anterior chamber and gonioscopy c. Binocular indirect ophthalmoscopy with indentation d. Transpupillary transillumination e. A-scan and B-scan ultrasonography of anterior and posterior eye f. Color and autofluorescence photography g. Fluorescein angiography h. Indocyanine green angiography i. Magnetic resonance imaging j. Incisional and excisional conjunctival tumor biopsy k. Aspiration, incisional, or excisional biopsy of intraocular tumor l. Other relevant examinations and investigations	**P2**	**4**
2. Perform or refer for the following treatments for conjunctival tumors, demonstrating awareness of the indications, contraindications, and complications of each treatment: a. Surgical excision b. Cryotherapy c. Brachytherapy d. External beam radiotherapy, including proton beam radiotherapy e. Topical therapy (e.g., mitomycin C, 5-fluorouracil, interferon)		**4**
3. Perform or refer for the following treatments for intraocular tumors, demonstrating awareness of the indications, contraindications, and complications of each treatment: a. Radiotherapy		**4**

i. Brachytherapy (e.g., iodine, ruthenium, strontium, palladium, iridium) ii. External beam radiotherapy iii. Stereotactic radiotherapy iv. Charged particle radiotherapy (e.g., proton beam) v. Phototherapy vi. Photocoagulation vii. Transpupillary thermotherapy viii. Photodynamic therapy b. Surgical excision i. Iridectomy ii. Iridocyclectomy iii. Transscleral choroidectomy iv. Transretinal choroidectomy v. Enucleation vi. Exenteration c. Ocular pharmacological therapy by various routes (i.e., topical, intravitreal, ophthalmic artery infusion, subtenon, systemic) i. Chemotherapy and biological therapy ii. Antiangiogenic agents iii. Steroids		
4. Request the following investigations, interpreting and communicating the results to patients, relatives, and health care workers, adjusting patient management accordingly: a. Histopathological assessment of tumor samples b. Genetic assessment of tumor samples c. Laboratory investigation of vitreous samples d. Other		**4**
5. Estimate the prognosis and communicate the following implications with patients, relatives, and health care workers, adjusting patient management accordingly: a. Visual acuity		**4**

b. Local tumor control c. Possible side effects and complications of therapy d. Ocular conservation e. Systemic manifestations of disease, including metastasis f. Systemic complications and side effects of therapy g. Survival probability and chances of disease-related mortality h. Heritability i. Use information technology and other aids to enhance prognostication 6. Communicate the following to patients, relatives, and health care workers: a. Diagnosis, extent and severity of disease, including diagnostic uncertainty b. Natural history without treatment c. Therapeutic options with advantages and limitations of each therapy, including methods available elsewhere d. Logistical implications of selected treatment e. Use information technology and other aids to support this process i. Websites ii. Printed leaflets iii. Audio recordings f. Other relevant materials 7. Assist patients with selecting the most appropriate management, taking into account: a. Patient age, gender, culture, wishes, needs, and fears b. Costs and logistics c. Availability of health care resources, locally and elsewhere 8. Provide or organize appropriate psychological support, demonstrating empathy and an adequate awareness of the principles of this aspect of care, such as:		**4** **4** **4**

a. Giving bad news b. Communicating with relatives c. Enabling long-term communication and support 9. Develop and maintain a multidisciplinary team of health care professionals to provide patient focused care by activities, such as: a. Recruiting staff and coworkers b. Developing service operating procedures. c. Maintaining efficient and varied methods of communication and education i. Between multidisciplinary team members (MDT) ii. Between MDT and other practitioners (e.g., pathologists) iii. Between MDT and patient 10. Develop protocols and infrastructure for practice-based learning and improvement, including: a. Proformas and databases for storing data b. Protocols for extracting and analyzing data c. Application of study designs and statistical methods d. Adherence to clinical governance i. Informed consent ii. Confidentiality iii. Ethical committee approval		**4** **4**

Low Vision Rehabilitation

A. Cognitive Skills

1. Describe the process of complex rehabilitation, including: a. Optical rehabilitation b. Non optical aids c. Eccentric fixation training and scotoma avoidance d. Orientation and mobility e. Activities of daily living f. Vision substitution (e.g., touch, hearing) g. Psychological care	C2 C2

2. Describe the role of all of the partners and team members in the patient's care and in low vision rehabilitation (e.g., ophthalmologists, social workers, psychologists, rehabilitation trainers).	C2
3. Describe the main aims and projects of VISION 2020.	
4. Describe the effects of low vision on the general health and on the psychological wellbeing of the patient.	C2
5. Describe the concept of artificial vision and implantation of microchips for the treatment of patients with the most profound visual impairments.	C2
6. Describe a low-vision-friendly physical environment that includes easy accessibility (e.g., ergonomics, special visual signs in buildings/streets, talking elevators/traffic signs).	

B. Technical skills

1. Identify basic low vision and other surgical and medical interventions necessary to ensure the best possible visual outcome.	**P2**	**4**
2. Oversee and provide referrals to support the patient's psychological adjustment to life after acute vision loss.		**4**
3. Educate patients on use of low vision equipment.		**4**
4. Be well informed and instruct patients with low vision of comprehensive rehabilitation resources in the region and in the country, including offering provider contact details.		**4**
5. Interact with other professionals (e.g., psychologists, occupational therapists, vocational counselors, social workers) to improve the daily life of patients with low vision.		**4**

Ethics and Professionalism in Ophthalmology

1. Apply advanced medical ethics in the ophthalmic practice: a. Applicable informed consent documents (e.g., clinical research, off-label use disclosures)	C3

b. Management (offering and rendering) of second opinions c. Individual and institutional responsibilities regarding impaired physicians d. Responsibility for postoperative care, including appropriate transfer of care to other physicians e. Management of conflicts of interest (clinical and nonclinical) iii. Disclosures iv. Gifts to physicians f. Appropriate advertising (and applicable laws) ii. Appropriate conduct as a medical-expert witness in litigation	
2. Identify applicable insurance coverage responsibilities in a practice situation.	C2
3. Apply more advanced aspects of health care reimbursement in a clinical practice (e.g., denials of claims, hospital contracting, electronic billing).	C3
4. Utilize all of the foregoing ethical principles and knowledge in direct patient care.	
5. Describe the responsibility of ophthalmologists to share their knowledge of clinical arts and sciences for the benefit of patients, the profession, and society.	C2

Community Eye Health

A. Cognitive Skills

1. Describe the principles of epidemiology, as applicable to community eye health.	**C2**
2. Describe the principles of research methods, as applicable to community eye health.	**C2**
3. Describe the principles of biostatistics, as applicable to community eye health.	**C2**
4. Describe the principles of health economics, as applicable to community eye health.	**C2**
5. Describe the principles of health systems strengthening, as applicable to community eye health.	**C2**
6. Describe the principles of health education and health promotion, as applicable to community eye health.	**C2**
7. Describe the principles of project and program management, as applicable to community eye health.	**C2**

8. Describe the relevant WHO global programs (eg, millennium development goals, disability framework).	**C2**
9. Describe the relevance of the disability policy at a global level and within the health system.	**C2**
10. Describe the main concepts of habilitation, rehabilitation, and community-based rehabilitation for persons with visual disability and its integration within a health system.	**C2**

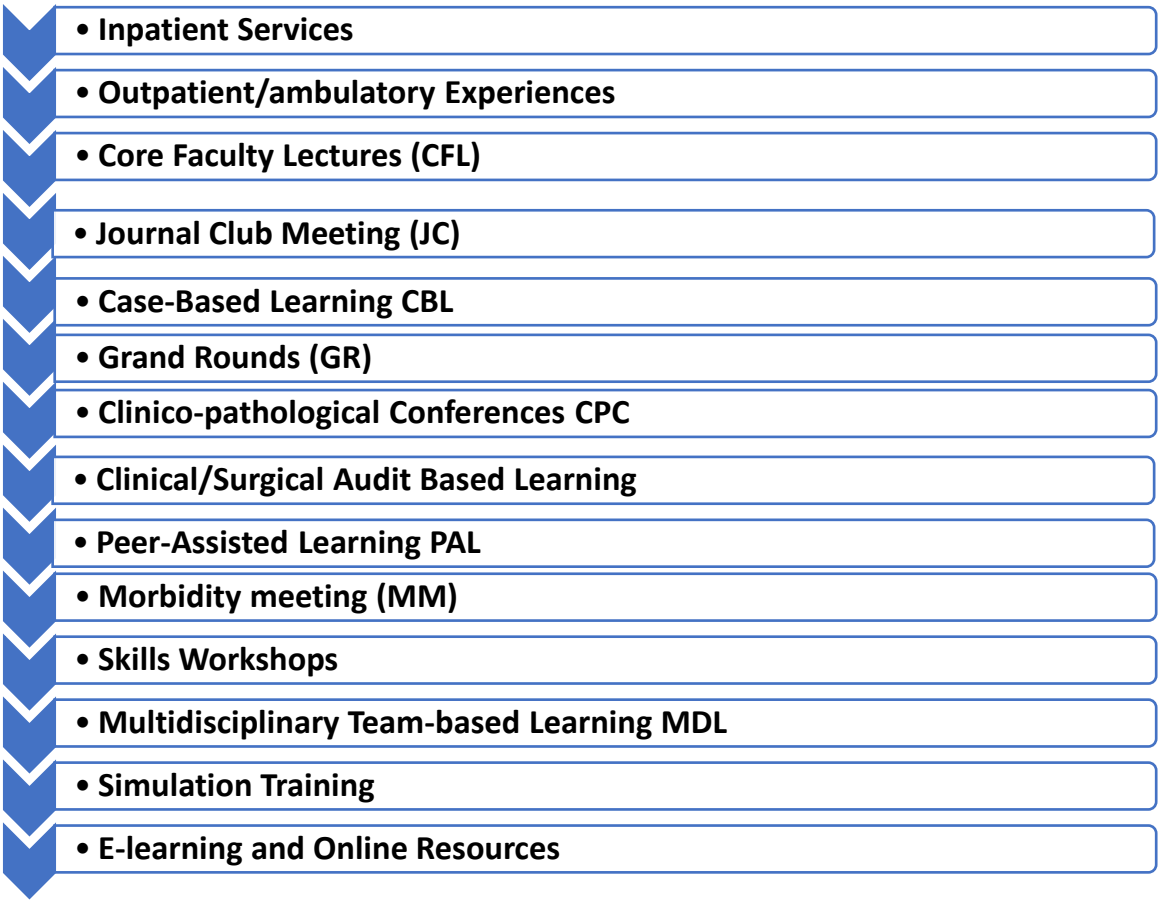
B. Technical skills

In addition to the technical skills listed for residency training, be able to*:* 1. Plan and conduct research projects to inform the planning and implementation of district and national blindness prevention programs. 2. Plan and conduct RAAB surveys. 3. Plan and conduct RAT surveys. 4. Plan, implement, and manage one-year district operational blindness prevention programs. 5. Plan, implement, and manage national three-to-five-year strategic blindness prevention programs. 6. Advocate for national policy implementation and community participation to strengthen national blindness prevention programs. 7. Provide training in community eye health to different eye care cadres. 8. Engage with public health practitioners to advocate for improvements in eye care services and the implementation of the disability framework. 9. Assess the impact of disabilities and advocate the application of global disability policy at a local level.	**P2**	**4**

SECTION IV: TEACHING AND LEARNING STRATEGIES

Overview

Teaching and learning strategies in the MS Ophthalmology program are designed to create a comprehensive and engaging educational experience that meets the diverse needs of postgraduate residents. These strategies focus on developing clinical competence, surgical skills, critical thinking, and professional attitudes essential for successful ophthalmologists. A well-defined outline of these methods in the curriculum is crucial for standardizing resident training, ensuring consistency, and providing clear expectations for both educators and learners



Outline of Different Teaching and Learning Strategies

Inpatient Services

Residents will rotate through various inpatient services to gain comprehensive experience.

Outpatient/Ambulatory Experiences

Residents will demonstrate expertise in diagnosing and managing patients in acute care clinics and longitudinal clinics, gaining experience in various subspecialties

Core Faculty Lectures (CFL)

Core faculty lectures will focus on monthly themes covering various specialty topics. Lectures will incorporate active learning techniques such as buzz groups.

Journal Club Meeting (JC)

Residents will present and critically evaluate research articles, highlighting applicable results for clinical practice.

Case-Based Learning CBL

Small groups will engage in case-based learning. This method emphasizes problem-solving skills and integrated knowledge.

Grand Rounds (GR)

Weekly grand rounds will feature speakers from local, regional, and national training programs, presenting topics from the broad spectrum of topics.

Clinico-pathological Conferences CPC

Using case methods, these conferences will involve discussing differential diagnosis, diagnostic data, and final diagnoses.

Clinical/Surgical Audit Based Learning

Residents will participate in quality improvement processes by reviewing patient care against explicit criteria and implementing necessary changes.

Peer-Assisted Learning PAL

Residents will engage in peer-assisted learning, providing opportunities for reinforcement, responsibility, self-confidence, and development of teaching and communication skills.

Morbidity meeting (MM)

Adverse outcomes, not necessarily resulting in death, will be discussed and thoroughly reviewed.

Skills Workshops

Conducting skills workshops on surgical techniques, diagnostic procedures, and equipment handling. Provide opportunities for students to practice and receive feedback on their skills.

Multidisciplinary Team-based Learning MDL

Collaborating with other healthcare professionals to simulate a multidisciplinary team approach to patient care. Encourage students to understand the roles of different team members and practice effective communication and teamwork.

Simulation Training

Utilizing simulation training tools and platforms to provide a realistic and safe environment for students to practice complex procedures like phacoemulsification. Incorporate simulation scenarios that mimic challenging clinical situations to enhance decision-making skills.

E-learning and Online Resources/Digital Library

Integrated e-learning modules, online resources, and virtual simulations to supplement traditional teaching methods providing access to online databases, journals, and educational videos to support self-directed learning.

Encourage use of digital library available at RMU.

Teaching Schedule

In addition to bedside teaching rounds, in the department there will be daily hourly sessions of formal teaching per week. The suggested time distribution of each session for department's teaching schedule as follows:

- Journal club Once a week
- Seminar once a week
- PG case discussion Twice a week
- Audit/Morbidity meeting Once a month
- Central session as per hospital schedule
- Workshop – once every 3 months

All sessions are supervised by faculty members. It is mandatory for all residents to attend the sessions except those posted in emergency.

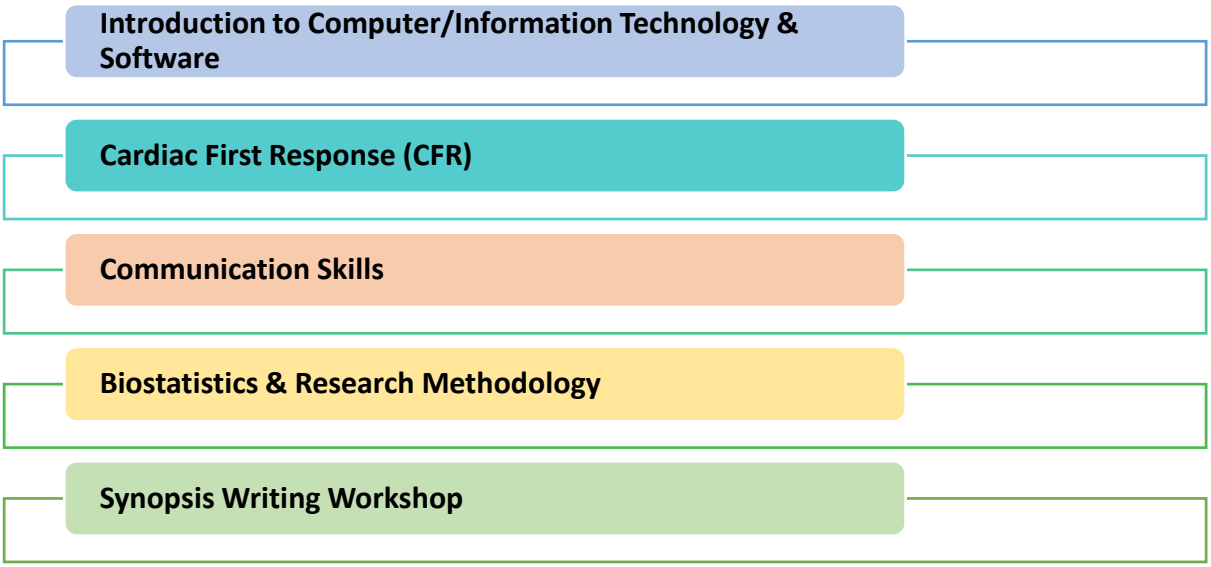
All the teaching sessions are assessed by the faculty members at the end of session and marks are given out of 10 and kept in the office for internal assessment.

Attendance of the residents at various sessions has to be at compulsory.

SECTION V: WORKSHOPS

Framework of Workshops in MS Ophthalmology Program

The MS Ophthalmology Residency Program includes a comprehensive workshop series designed to equip residents with critical skills in research methodology, computer literacy, communication, medical ethics, and emergency response. These workshops are integrated across the four-year residency to ensure incremental skill development and practical application. Each workshop has specific learning objectives and topics that address various aspects essential for clinical practice, patient interaction, research acumen, and emergency preparedness.



1. Introduction to Computer/Information Technology & Software

- **Learning Objectives**: Develop fundamental IT skills for clinical and research applications, including basic word processing, data management, and presentation creation.
- **Topics Covered**: Hardware, software basics, file management, word processing, PowerPoint, Excel, email, internet navigation, and introductory data entry in statistical software (SPSS).

2. Biostatistics & Research Methodology

- **Learning Objectives**: Grasp basic biostatistics, understand the importance of research, develop a research question, and engage in scientific presentations.
- **Topics Covered**: Introduction to biostatistics, biomedical research principles, selecting research fields, ethics, writing and presenting papers, and literature search techniques

3. Communication Skills

- **Learning Objectives**: Enhance clinical communication skills, improve counseling techniques, and understand ethical responsibilities.
- **Topics Covered**: Non-medical interventions, crisis intervention, conflict resolution, breaking bad news, informed consent, patient confidentiality, and professional ethics.

4. Cardiac First Response (CFR)

- **Learning Objectives:** Train in emergency cardiac care, including BLS, AED usage, and ALS fundamentals.
- **Topics Covered**: Cardiac emergency recognition, BLS principles, AED usage, ALS basics, scenario-based training, team dynamics, and advanced resuscitation techniques

5. Synopsis Writing Workshop

- **Learning Objectives**: Develop and structure a research synopsis, from research question formulation to reference management.
- **Topics Covered**: Synopsis components, research question development, literature review, methodology, timeline and budget planning, peer review, editing, and finalizing the synopsis.

Learning Objectives of Workshops

S.NO	NAME OF THE WORKSHOP	LEARNING OBJECTIVES	TOPICS TO BE COVERED
1.	**Biostatistics & Research Methodology (4 days)**	• To understand the basics of Bio-Statistics • To critique why research is important? • To discuss the importance of Selecting a Field for Research • To prepare oneself for Participationin National and International Research • To prepare oneself for Participationin Pharmaceutical Company Research • To interpret the importance of research ideas & Criteria for a good research topic • To discuss Ethics in Health Research • To learn to write a Scientific Paper • To learn to make a	1. Introduction to Bio-Statistics 2. Introduction to Bio- Medical Research Whyresearch is important? 3. What research to do? i. Selecting a Field for Research ii. Drivers for Health Research iii. Participation in National and International Research iv. Participation in Pharmaceutical Company Research v. Where do research ideas comefrom vi. Criteria for a good research topicEthics in Health Research 4. Writing a Scientific Paper 5. Making a Scientific Presentation & Searching theLiterature

		Scientific Presentation • To learn to make a purposefulliterature search	

2.	**Introduction to computer/Information Technology & Software(5 days)**	By the end of this workshop student shouldbe able to: • Appropriately start up and shut down your computer. • Navigate the operating system and start applications. • Perform basic functions of file management. • Perform basic functions in a word processor and spreadsheet. • Manage print settings and print documents. • Receive and send email. • Use a web browser to navigate theInternet. • work with windows, toolbars, and command menus • perform basic word processing and graphic tasks • make a Power Point presentation • explore Web browsing basics • back up files • save, copy, and organize your work • to enter data accurately in software of Statistical Package for Social Sciences	1. 2.Hardware and Software Understand the main components of a computer, including input and output devices. Understand the function of communicationdevices such as smartphones and tablets. Understand the role of Operating Systems, programs and apps. 3.Windows Turning on the computer and logging on. The Windows screen. Running programs from the Start Menu. Minimizing, maximizing, moving, resizing andclosing windows. Logging off and shutting down your computer.3.Working with Programs Running multiple programs. Desktop icons and creating a desktop shortcut. Managing programs from the taskbar. Closing programs.4.File Management Managing Windows Explorer. Creating, moving, renaming and deleting foldersand files. Understandings file extensions. Viewing storage devices and network connections. Managing USB flash drives. 5.Word Processing Creating documents in Microsoft Word. Typing text, numbers and dates into a document. Easy formatting.

			- Checking the spelling in your document. - Making and saving changes to your document. 6.Power Point Making Power Point presentation 7.Spread sheets

			• Understanding spreadsheet functionality. • Creating spreadsheets in Microsoft Excel. • Typing text numbers and dates into a worksheet. • Easy formulas. • Easy formatting. • Charting your data. • Making and saving changes to your workbook. • Printin g a worksheet. 8.Printing • Print preview. • Print settings. • Managing the print queue. 9.Using Email • The Outlook mail screen elements. • Composing and sending an email message. • Manag ing the Inbox. 10.Accessing the Internet • Going to a specific website and bookmarking. • Understanding how to search/Google effectively. • Copy and paste Internet content into your documents and emails. • Stopping and refreshing pages. • Demystifying the Cloud. • Understanding social media platforms such asFacebook and Twitter. • Computer security best practices. 11.Statistical Package for Social Sciences • general understanding for data entry ?

3.	**communication skills (3 days)**	• To learn to use Non-medicinal Interventions in Communication Skills of Clinical Practice • To discuss the importance ofcounseling • To role play as a counselor	1. Use of Non-medicinal Interventions in ClinicalPractice Communication Skills Counseling Informational Skills Crisis Intervention/Disaster Management Conflict Resolution

		• To learn to manage a conflict resolution • To learn to break bad news • To discuss the importance of Medical Ethics, Professionalism and Doctor-Patient Relationship Hippocratic Oath • To learn to take an informed consent • To illustrate the importance of confidentiality • To summarize Ethical Dilemmas in a Doctor's Life	6. Breaking Bad News 7. Medical Ethics, Professionalism and Doctor-Patient Relationship Hippocratic Oath 8. Four Pillars of Medical Ethics (Autonomy, Beneficence, Non-maleficence and Justice) 9. Informed Consent and Confidentiality 10. Ethical Dilemmas in a Doctor's Life
4.	**Synopses Writing**	• **Introduction to Synopsis Writing and Research Question Development** • Understand the purpose and structure of a research synopsis. • Learn to develop a clear and concise research question. • **Literature Review and Methodology** • Master techniques for conducting a literature review. • Understand how to design a robust research methodology	**Introduction to Synopsis Writing:** ○ Definition and importance of a research synopsis. ○ Key components of a synopsis: title, abstract, introduction, objectives, methodology, and timeline. ○ Differences between a synopsis, proposal, and full research paper. **Developing a Research Question:** ○ Characteristics of a good research question: clarity, specificity, and feasibility. ○ Techniques for formulating research questions: PICOT framework, FINER criteria. ○ Refining and narrowing down research questions.

		• **Writing the Synopsis and Managing References** • Learn to write each section of a research synopsis. • Understand the importance of proper citation and reference management. • **Peer Review and Finalizing the Synopsis** • Learn the peer-review process and its importance. • Finalize and polish the research synopsis.	**Conducting a Literature Review:** ○ Purpose and scope of a literature review. ○ Strategies for searching academic databases and identifying relevant literature. ○ Synthesizing information and identifying research gaps. ○ Referencing and citation management. **Designing the Research Methodology:** ○ Types of research designs: qualitative, quantitative, and mixed methods. ○ Selection of appropriate study design based on the research question. ○ Sampling techniques, data collection methods, and data analysis plans. ○ Ethical considerations in research design. **Writing the Synopsis:** ○ **Title and Abstract:** ▪ Crafting a clear and informative title. ▪ Writing a concise abstract that summarizes the research. ○ **Introduction:** ▪ Background and rationale for the study. ▪ Stating the research problem and objectives. ○ **Methodology:** ▪ Detailed description of the research design, data collection, and analysis. ○ **Timeline and Budget:**

			▪ Creating a realistic timeline for the research. ▪ Estimating and justifying the research budget. ○ **References:** ▪ Citing sources accurately and compiling a reference list. **Reference Management:** ○ Tools for managing references (e.g., EndNote, Mendeley, Zotero). ○ Proper citation styles (e.g., APA, MLA, Vancouver). **Peer Review Process:** ○ Importance of peer review in research. ○ How to provide constructive feedback. ○ Reviewing and critiquing peer synopses. ○ Incorporating feedback to improve the synopsis. **Finalizing the Synopsis:** ○ Editing and proofreading techniques. ○ Ensuring clarity, coherence, and conciseness in writing. ○ Checking for completeness and adherence to guidelines. ○ Preparing the final document for submission.

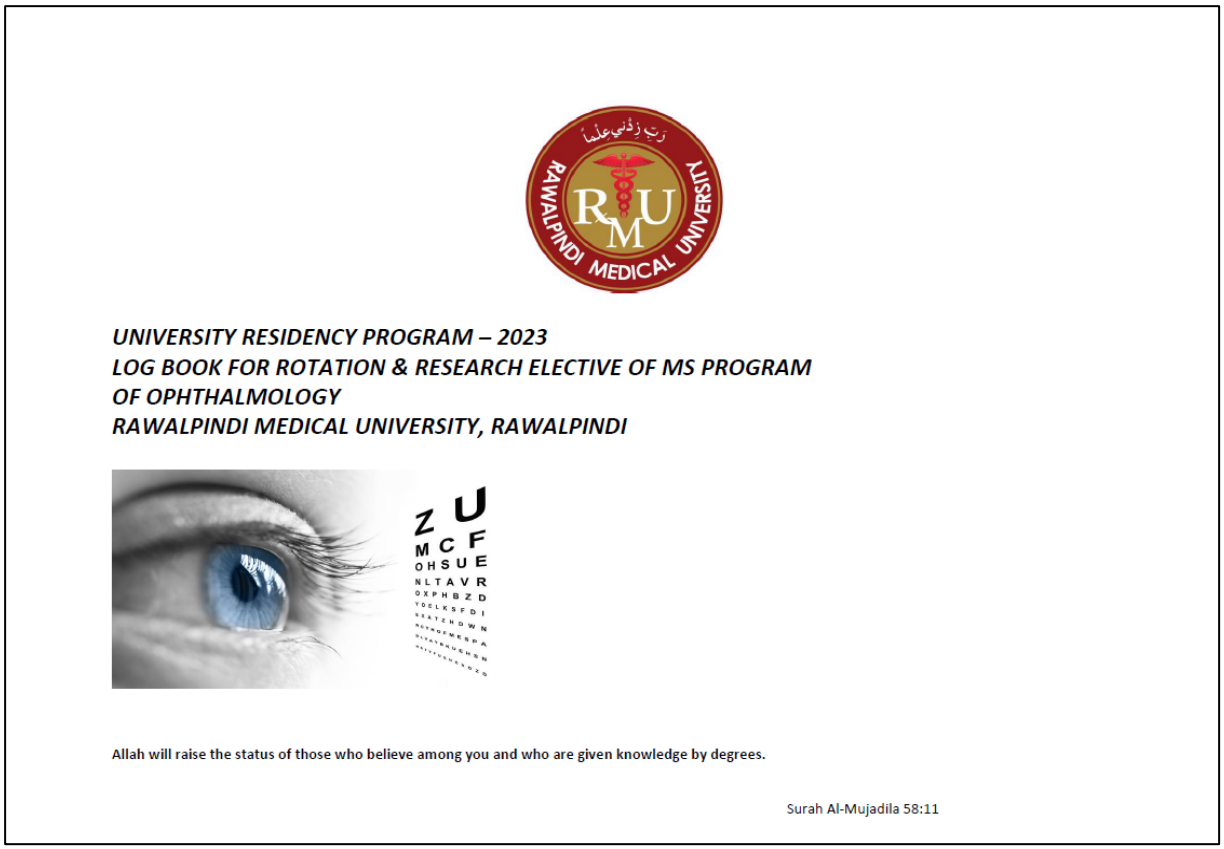
5.	Cardiac First Response	• **Introduction to Cardiac Emergencies and Basic Life Support (BLS)** • Understand the types and signs of cardiac emergencies. • Learn the fundamentals of Basic Life Support (BLS). • **Automated External Defibrillator (AED) Use and Advanced Life Support (ALS)** • Gain proficiency in the use of an Automated External Defibrillator (AED). • Understand the basics of Advanced Life Support (ALS). • **Scenario-Based Training and Team Dynamics** • Apply knowledge and skills in realistic, scenario-based training. • Understand the importance of effective team dynamics during a cardiac emergency. • **Advanced Skills and Final Assessment** • Learn advanced skills for managing cardiac emergencies.	1. **Introduction to Cardiac Emergencies:** ○ Overview of cardiac emergencies: heart attack, cardiac arrest, angina, and arrhythmias. ○ Recognizing symptoms and risk factors. ○ The importance of timely intervention and the concept of the "golden hour." 2. **Basic Life Support (BLS):** ○ Principles of BLS: ensuring scene safety, assessing responsiveness, and calling for help. ○ Steps of BLS: airway, breathing, and circulation (ABC). ○ Hands-on practice: chest compressions, rescue breaths, and using a barrier device. 3. **Automated External Defibrillator (AED):** ○ Function and importance of an AED in cardiac emergencies. ○ Step-by-step instructions on how to use an AED. ○ Safety precautions and troubleshooting common issues. ○ Hands-on practice with AED simulators. 4. **Introduction to Advanced Life Support (ALS):** ○ Overview of ALS and its components. ○ The role of medications and advanced airway management. ○ Introduction to ECG interpretation for identifying cardiac rhythms. ○ Coordination and communication in a resuscitation team. 5. **Scenario-Based Training:** ○ Simulated cardiac emergencies with real-time response.

		• Demonstrate competency through a final assessment.	○ Role-playing various scenarios: out-of-hospital cardiac arrest, in-hospital cardiac arrest, and post-resuscitation care. ○ Debriefing and feedback sessions to identify strengths and areas for improvement. 6. **Team Dynamics in Cardiac Emergencies:** ○ Importance of teamwork and clear communication. ○ Roles and responsibilities of team members during a resuscitation effort. ○ Strategies for effective leadership and coordination. ○ Hands-on practice with team drills and role assignments. 7. **Advanced Skills:** ○ Advanced airway management: intubation and supraglottic airway devices. ○ Intravenous (IV) access and medication administration. ○ Post-resuscitation care: monitoring and stabilizing the patient. ○ Review of ACLS algorithms and protocols. 8. **Final Assessment:** ○ Practical exam: simulated cardiac emergency scenarios to assess BLS, AED, and ALS skills. ○ Written exam: testing knowledge of cardiac emergency management, BLS, and ALS protocols. ○ Feedback and discussion on performance. ○ Certification for participants who meet competency standards.

SECTION VI: ROTATIONS (ELECTIVES)

Overview

The MS Ophthalmology program incorporates rotations in various medical specialties to provide residents with a well-rounded clinical perspective, which is essential in delivering comprehensive patient care. Exposure to fields like emergency medicine, dermatology, radiology, pathology, oncology, neurology, plastic surgery, and community ophthalmology equips residents with multidisciplinary knowledge and skills. This approach enhances diagnostic accuracy, broadens the understanding of systemic conditions affecting the eye, and fosters holistic treatment approaches for patients with complex ocular and systemic comorbidities.



Rotation Framework

1st Year

- **Department**: Emergency Medicine
- **Duration**: 1 Month
- **Importance**: Emergency Medicine rotation enables residents to gain experience in acute care management, including prompt evaluation and treatment of ophthalmic emergencies. This rotation is essential for developing skills in managing trauma, acute visual loss, and other time-sensitive conditions in ophthalmology.

3rd & 4th Year

Residents rotate through several subspecialties to integrate a comprehensive understanding of systemic factors influencing ocular health and to strengthen collaborative skills across specialties.

1. **Dermatology**
    - **Duration**: 2 Weeks
    - **Importance**: Dermatology provides insights into systemic skin conditions, such as rosacea, psoriasis, and lupus, which can manifest with ocular involvement. Knowledge of dermatologic conditions helps in diagnosing and managing periocular and anterior segment diseases with dermatological associations.
2. **Radiology**
    - **Duration**: 2 Weeks
    - **Importance**: Radiology rotation trains residents to interpret CT scans, MRIs, and ultrasounds relevant to the eye and orbit. Imaging skills are crucial for diagnosing orbital tumors, fractures, optic nerve disorders, and other pathologies requiring radiological evaluation.
3. **Pathology**
    - **Duration**: 2 Weeks
    - **Importance**: Pathology rotation familiarizes residents with histopathological aspects of ocular conditions. Understanding tissue pathology, especially in tumors, inflammatory diseases, and degenerative conditions, is invaluable for diagnosing and guiding treatment plans in complex cases.
4. **Oncology**
    - **Duration**: 2 Weeks
    - **Importance**: Oncology introduces residents to ocular and orbital cancers, such as retinoblastoma and melanoma. It emphasizes early detection, staging, and collaborative management, allowing ophthalmology residents to effectively coordinate care with oncologists and deliver informed counseling to patients.
5. **Neurology**
    - **Duration**: 2 Weeks
    - **Importance**: Neurology rotation provides essential training in recognizing neuro-ophthalmic conditions like optic neuritis, cranial nerve palsies, and intracranial hypertension. Residents learn to correlate neurological symptoms with ocular findings, enhancing their ability to manage neuro-ophthalmic cases.
6. **Plastic Surgery**
    - **Duration**: 2 Weeks
    - **Importance**: Plastic surgery rotation enhances skills in handling periocular trauma, reconstructive surgery, and aesthetic procedures. This training is crucial for understanding anatomy and surgical techniques that support safe, effective eyelid and orbital procedures in ophthalmology.
7. **Community Ophthalmology**
    - **Duration**: 4 Weeks
    - **Importance**: Community Ophthalmology emphasizes preventive and public health aspects of eye care, such as vision screening, outreach programs, and awareness campaigns. This rotation develops skills in managing community-level eye care and understanding the socio-economic factors affecting eye health in diverse populations

Rotation planner

Year	Departments	Duration
1st Year	**Emergency Medicine**	**1 Month**
2nd Year	**No Rotation**	**No Rotation**
3rd & 4th year	**Dermatology**	**2 weeks**
	Radiology	**2 weeks**
	Pathology	**2 weeks**
	Oncology	**2 weeks**
	Neurology	**2 weeks**
	Plastic Surgery	**2 weeks**
	Community Ophthalmology	**4 weeks**

Minimum Log Book Entries for Rotations

(This minimum number is being provided for uniformity of the training and convenience for monitoring of the resident's performance by Quality Assurance Cell & University Research Training & Monitoring Cell of RMU but resident is encouraged to show performance above this minimum required number)

SR.NO	ENTRY	Minimum cases /Time duration
01	Case presentation	02 per rotation
02	Topic presentation	01 per rotation
03	Journal club	01 per rotation
04	Bed side teaching	2 per rotation
05	Large group teaching	01 per rotation
06	Emergency cases	05 per rotation
07	OPD	10 per rotation
08	Indoor (patients allotted)	10 per rotation
09	Directly observed procedures	5 per rotation
10	CPC	01 per rotation
11	Mortality & Morbidity meetings	01 per rotation

SECTION VII: RESEARCH

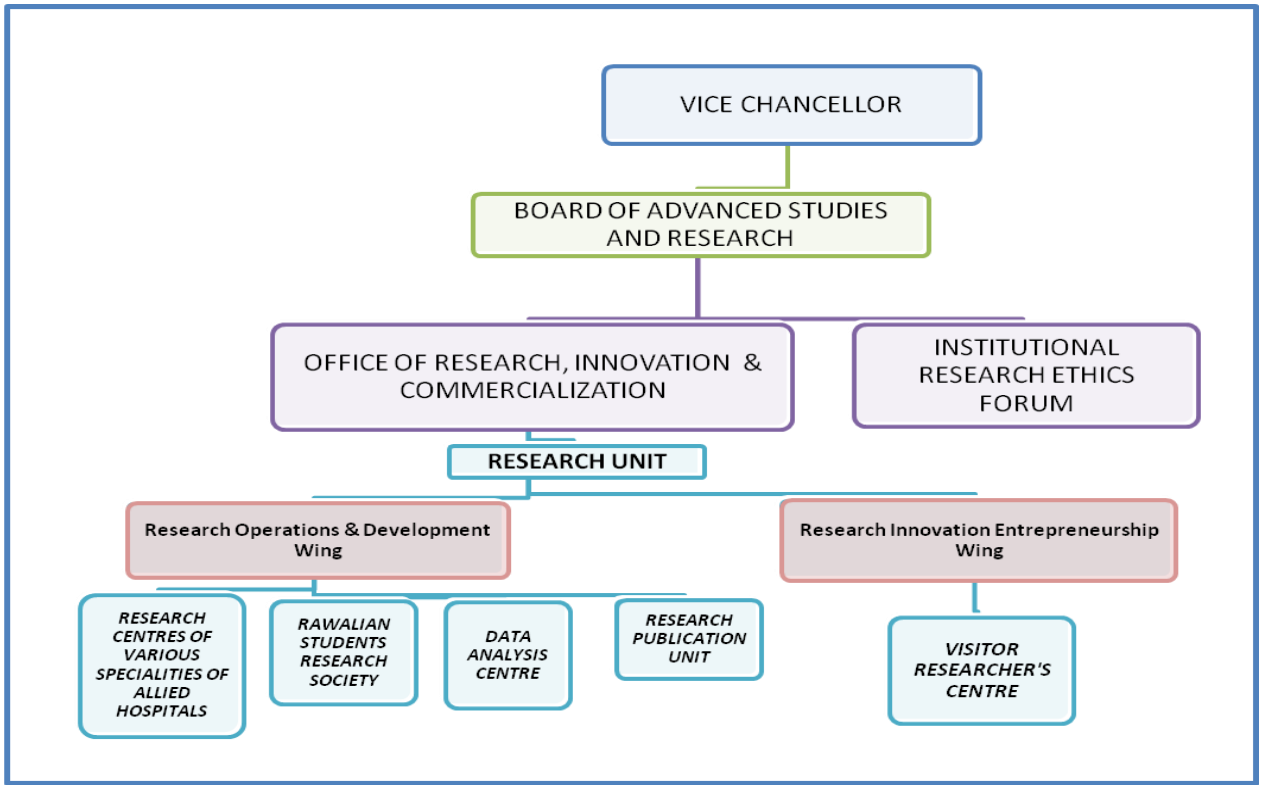
Resident research pathway

For residency program research work on synopsis and thesis writing starts from entry into university by getting registration ID number from the research unit. It has been structured in 06 monthly & annual time scale goals. Essential steps are included in eligibility criteria of yearly, midterm and final assessments. Compulsory workshops have been designed to train residents along the pathway of research conduction. The charts below show the structure and timeline description of the tasks required.

Outline of research curriculum

Component	Year
Clinical Audit /Disease Statistical Review	Y1
Basic Research Methodology	Y1
Research lectures	Y1
Synopsis Writing	Y2
Referencing Manager	Y2
Research lectures	Y2
Advance Research Methodology	Y3
Data Entry & Analysis SPSS	Y3
Thesis writing workshop	Y4
Writing an Article / Publications	Y4
Research lectures	Y4

Model of Research at Rawalpindi Medical University



2. Year 1

- **Milestones**:
  - **Research Registration ID** (1st Month): Registration establishes an official record of the resident's research participation and aligns with institutional requirements.
  - **Synopsis Topic Assignment & Submission to Research Unit** (1st 6 Months): Residents are assigned a research topic, ideally aligned with their clinical interests, which lays the foundation for their thesis.
  - **Single Disease Statistical Review or Research Paper** (Before End of Year 1): Residents complete a statistical review or publish a research paper, introducing them to data interpretation and critical analysis.
- **Training Components**:
  - **Basic Research Methodology**: A series of introductory lectures on research methodology, covering study designs, sample size calculation, and research ethics.
  - **Research Lectures**: Regular sessions to familiarize residents with foundational research principles.
  - **Synopsis Writing & Referencing Manager Training**: Workshops on writing a research synopsis and managing references using software like EndNote or Zotero.

3. Year 2

- **Milestones**:
  - **Submission of Synopsis** (1st 6 Months): Residents submit a detailed research proposal outlining their study objectives, methodology, and expected outcomes.
  - **Technical Committee Evaluation, IRF/ERB Approval, and BASAR Synopsis Approval**: These steps involve institutional and ethical approvals, ensuring the research project meets ethical standards and feasibility.
- **Training Components**:
  - **Advanced Research Methodology**: Building on the basics, this module covers complex statistical tests, bias minimization, and confounding variables.
  - **Research Lectures**: Continued educational sessions to reinforce methodological rigor and address any challenges in the research process.

4. Year 3

- **Milestones**:
  - **1 Disease Statistical Review or 1 Research Paper** (Optional): An optional review or paper to further enhance research skills.
  - **Data Collection** (1st 6 Months): Residents begin gathering data for their thesis under guidance, focusing on data quality and integrity.
  - **Data Analysis** (Last 6 Months): Residents learn to apply statistical techniques using software like SPSS, analyzing the data collected for meaningful insights.
- **Training Components**:
  - **Data Entry & Analysis with SPSS**: A workshop on using SPSS for data entry and performing essential statistical analyses, equipping residents with hands-on analytical skills.

- **Research Lectures**: Ongoing lectures addressing specific challenges in data management and analysis.

5. Year 4

- **Milestones**:
  - **Thesis Writing** (1st 6 Months): Residents draft their thesis with structured guidance on writing style, formatting, and scientific rigor.
  - **BASAR Thesis Approval** (Last 6 Months): The thesis is submitted for approval, marking the completion of the primary research requirement.
  - **Thesis Completion Certificate by DME** (Last 6 Months): Upon approval, the Department of Medical Education certifies the thesis completion, fulfilling the academic research requirement.
- **Training Components**:
  - **Thesis Writing Workshop**: A dedicated session on organizing research findings, structuring a thesis, and using appropriate academic language.
  - **Writing an Article/Publications**: Guidance on publishing research findings, including manuscript preparation, journal selection, and the peer-review process.
  - **Research Lectures**: Concluding lectures covering advanced topics in publication ethics and responding to reviewer feedback.

Research milestones

MILESTONE	TIMELINE	
Research registration id	1st Month	Y1
Synopsis topic assignment and submission to Research Unit	1st 06 Month	Y1
Single disease statistical review or 1 paper in RJRMC	Before end of year 1	Y1
Submission of synopsis	1st 06 Month	Y2
Technical committee evaluation	1st 06 Month	Y2
IRF/ERB synopsis approval	1st 06 Month	Y2
Basar synopsis approval	last 06 Month	Y2
1 disease statistical review or 1 research paper in RJRMC	optional	Y3
Data collection	1st 06 Month	Y3
Data analysis	Last 06 Month	Y3
Thesis writing	1st 06 Month	Y4
BASAR thesis approval	Last 06 Month	Y4
Thesis completion certif icate by DME	Last 06 Month	Y4

Research Work Assessment

Submission of Synopsis and Thesis

The candidates shall prepare their synopsis as per guidelines provided by the Advanced Studies & Research Board, available on RMU website.

Synopsis of research project should be submitted and approved by the end of the 1st year of MS program.

The minimum duration between approval of synopsis and submission of thesis shall be one year, but the thesis cannot be submitted later than 8 years of enrolment.

Thesis shall be submitted by the candidate duly recommended by the Supervisor.

The research thesis must be compiled and bound in accordance with the Thesis Format Guidelines approved by the University and available on website.

The research thesis will be submitted along with the fee prescribed by the University.

Thesis Assessment

All candidates admitted in MS course shall appear in thesis evaluation component of the MTA after completion of 4th years of their training course.

Only those candidates shall be eligible for thesis evaluation who have passed Midterm Examination and Oral & Practical/ Clinical component of Exit Examination.

The examination shall include thesis evaluation with defense.

The Vice Chancellor shall appoint three external examiners for thesis evaluation, preferably from other universities and from abroad, out of the panel of examiners approved by the Advanced Studies & Research Board. The examiners shall be appointed from respective specialty.

The thesis shall be sent to the external examiners for evaluation, well in time before the date of defense examination and should be approved by all the examiners.

After the approval of thesis by the evaluators, the thesis defense examination shall be held within the University on such date as may be notified by the Controller of Examinations. The Controller of Examinations shall make appropriate arrangements for the conduct of thesis defense examination in consultation with the supervisor, who will co-ordinate the defense examination.

The thesis defense examination shall be conducted by two External Examiners who shall submit a report on the suitability of the candidate for the award of degree. The supervisor shall act as coordinator.

Candidates and faculty interested in further details relating to research, please refer to the document on Research curriculum (also available on RMU website)

SECTION VIII: TRAINING MILESTONES

Charting the Road to Competence: Developmental Milestones

Remember to celebrate for the milestones as you prepare for the road ahead----Nelson Mandela.

High-quality assessment of resident performance is needed to guide individual residents' development and ensure theirpreparedness to provide patient care. To facilitate this aim, reporting milestones are now required across all Ophthalmology residency programs. Milestones promote competency-based training in internal medicine. Residency program directors may use them to track the progress of trainees in the 6 general competencies including *patient care, Medical Knowledge, Practice-Based Learning and Improvement, Interpersonal and Communication Skills, Professionalism and Systems-Based Practice.* Mile stones inform decisions regarding promotion and readiness for independent practice. In addition, the milestones may guide curriculum development, suggest specific assessment strategies, provide benchmarks for resident self-directed assessment-seeking, assist remediation by facilitating identification of specific deficits, and provide a degree of national standardization in evaluation. Finally, by explicitly enumerating the profession’s expectations for graduates, they may improve public accountability for residency training.

Table-1	Developmental Milestones for Ophthalmology Training—Patient Care		
Competency	**Developmental MilestonesInforming Competencies**	**Approximate Time FrameTrainee Should Achieve Stage (months)**	**General Evaluation StrategiesAssessment Methods/ Tools**
A. Clinical skills and reasoning	***Historical data gathering***		
• Manage patients using clinical skills of interviewing and physical examination • Demonstrate competence in the performance of procedures • Appropriately use laboratory and imaging techniques	1. Acquire accurate and relevant history from the patient in an efficiently customized, prioritized, and hypothesis driven fashion	8	• Standardized patient • Direct observation
	2. Seek and obtain appropriate, verified, and prioritized data from secondary sources (eg, family, records, pharmacy)	12	
	3. Obtain relevant historical subtleties that inform and prioritize both differential diagnoses and diagnostic plans, including sensitive, complicated, and detailed information that may not often be volunteered by the patient	24	
	4. Role model gathering subtle and reliable information from the patient for junior members of the health care team	40	
	Performing a physical examination		
	1. Perform an accurate physical examination that is appropriately targeted to the patient's complaints and medical conditions. Identify pertinent abnormalities using common maneuvers	8	• Standardized patient direct observation • Simulation

	2. Accurately track important changes in the physical examination over time in the outpatient and inpatient settings	12	
	3. Demonstrate and teach how to elicit important physical findings for junior members of the health care team	24	
	4. Routinely identify subtle or unusual physical findings that may influence clinical decision making, using advanced maneuvers where applicable	40	
	Clinical reasoning		
	1. Synthesize all available data, including interview, physical examination, and preliminary laboratory data, to define each patient's central clinical problem	16	• Chart-stimulated recall • Direct observation • Clinical vignettes
	2. Develop prioritized differential diagnoses, evidence- based diagnostic and therapeutic plan for common inpatient and ambulatory conditions	32	
	3. Modify differential diagnosis and care plan based on clinical course and data as appropriate	32	
	4.Recognize disease presentations that deviate from common patterns and that require complex decision making	48	
	Invasive procedures		
	1. Appropriately perform invasive	24	• Simulation • Direct

	procedures and provide post-procedure management for common procedures		observation
	Diagnostic tests		
B. Delivery of patient-centered clinical care • Manage patients with progressive responsibility • Manage patients across the spectrum of clinical diseases seen in the practice of general internal medicine • Manage patients in a variety of health care settings to include the inpatient ward, critical care units, the ambulatory setting, and the emergency setting • Manage undifferentiated acutely and severely ill patients • Manage patients in the prevention, counseling, detection,	1. Make appropriate clinical decisions based on the results of common diagnostic testing, including but not limited to routine blood chemistries, hematologic studies, coagulation tests, ECG, chest radiographs, Auto-refraction, Cycloplegic refraction, FFA, A-scan, B-scan, Intra-ocular pressure, Keratometry, Perimetry and Gonioscopy	16	• Chart-stimulated recall • Standardized tests • Clinical vignettes
	2. Make appropriate clinical decision based on the results of more advanced diagnostic tests	24	
	Patient management		
	1. Recognize situations with a need for urgent or emergent medical care and/or surgical care.	8	• Simulation • Chart-stimulated recall • Multisource feedback • Direct observation • Chart audit
	2. Recognize when to seek additional guidance	8	
	3. Provide appropriate preventive care and teach patient regarding self-care	`	
	4. With supervision, manage patients with common clinical disorders seen in the practice of inpatient department.	16	
	5. With minimal supervision, manage patients with common and complex clinical disorders seen in the practice.	16	

diagnosis, and treatment of gender-specific diseases Manage patients as a consultant to other physician			
	6. Initiate management and stabilize patients with emergent conditions	16	
	7. Manage patients with conditions that require intensive care	48	
	8. Independently manage patients with a broad spectrum of clinical disorders seen in the practice of ophthalmology.	48	
	9. Manage complex or rare ophthalmological conditions	48	
	10. Customize care in the context of the patient's preferences and overall health	48	
	Consultative care		
	1. Provide specific, responsive consultation to other services	32	• Simulation • Chart-stimulated recall • Multisource feedback • Direct observation • Chart audit
	2. Provide ophthalmological consultation for patients with more complex clinical problems requiring detailed risk assessment	48	

Table-2 Developmental Milestones for Ophthalmology Training— Medical Knowledge			
Competency	**Developmental MilestonesInforming Competencies**	**Approximate Time FrameTrainee Should Achieve Stage (months)**	**General Evaluation StrategiesAssessment Methods/ Tools**
A. Core knowledge of ophthalmology • Demonstrate a level of expertise in the knowledge of those areas appropriate for an internal medicine specialist • Demonstrate sufficient knowledge to treat ophthalmic conditions commonly managed by internists, provide basic preventive care, and recognize and provide initial management of emergency problems	***Knowledge of core content***		
	1. Understand the relevant pathophysiology and basic science for common conditions	8	• Direct observation • Chart audit • Chart-stimulated recall
	2. Demonstrate sufficient knowledge to diagnose and treat common conditions that require hospitalization	16	• Standardized tests
	3. Demonstrate sufficient knowledge to evaluate common conditions	24	
	4. Demonstrate sufficient knowledge to diagnose and treat undifferentiated and emergent conditions	24	
	5. Demonstrate sufficient knowledge to provide preventive care	24	
	6. Demonstrate sufficient knowledge to identify and treat conditions that require intensive care	32	
	7. Demonstrate sufficient knowledge to evaluate complex or rare conditions and multiple coexistent conditions	48	
	8. Understand the relevant pathophysiology and basic science for uncommon or complex conditions	48	
	9. Demonstrate sufficient knowledge of sociobehavioral sciences including but not limited to health care	48	

	economics, medical ethics, and medical education		
B. Common modalities used in the practice of ophthalmology & Demonstrate sufficient knowledge to interpret basic clinical tests and images, use common pharmacotherapy, and appropriately use and perform diagnostic and therapeutic procedures.	**Diagnostic tests**		
	1. Understand indications for and basic interpretation of common diagnostic testing, including but not limited to routine blood chemistries, hematologic studies, coagulation tests, ECG, chest radiographs, Auto-refraction, Cycloplegic refraction, FFA, A-scan, B-scan, Intra-ocular pressure, Keratometry, Perimetry and Gonioscopy	16	• Chart-stimulated recall • Standardized tests • Clinical vignettes
	2. Understand indications for and has basic skills in interpreting more advanced diagnostic tests	24	
	3. Understand prior probability and test performance characteristics	24	

Table-3 Developmental Milestones for Ophthalmology Training—Practice-Based Learning and Improvement			
Competency	**Developmental Milestones Informing Competencies**	**Approximate Time Frame Trainee Should Achieve Stage (months)**	**General Evaluation StrategiesAssessment Methods/ Tools**
A. Learning and improving via audit of performance & Systematically analyze practice using quality improvement methods, and implement changes with the goal of practice improvement	***Improve the quality of care for a panel of patients***		
	1. Appreciate the responsibility to assess and improve care collectively for a panel of patients	16	• Several elements of quality improvement project • Standardized tests
	2. Perform or review audit of a panel of patients using standardized, disease-specific, and evidence-based criteria	32	
	3. Reflect on audit compared with local or national benchmarks and explore possible explanations for deficiencies, including doctor-related, system-related, and patient related factors	32	
	4. Identify areas in resident's own practice and local system that can be changed to improve effect of the processes and outcomes of care	48	
	5. Engage in a quality improvement intervention	48	
B. Learning and improvement via answering	• Ask answerable questions for emerging information needs		
	1. Identify learning needs (clinical questions) as they emerge in patient	16	• Evidence-based medicine • evaluation

clinical questions from patient scenarios • Locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems; • Use information technology to optimize learning	care activities		instruments EBM mini-CEX • Chart-stimulated recall
	2. Classify and precisely articulate clinical questions	32	
	3. Develop a system to track, pursue, and reflect on clinical questions	32	
	Acquires the best evidence		
	1. Access medical information resources to answer clinical questions and support decision making	16	• Evidence-based medicine • evaluation instruments • EBM, mini-CEX, Chart-stimulated recall
	2. Effectively and efficiently search NLM database for original clinical research articles	16	
	3. Effectively and efficiently search evidence- based summary medical information resources	32	
	4. Appraise the quality of medical information resources and select among them based on the characteristics of the clinical question	48	
	Appraises the evidence for validity and usefulness		
	1. With assistance, appraise study design, conduct, and statistical analysis in clinical research papers	16	• Evidence-based medicine • evaluation instruments EBM mini-CEX • Chart-stimulated recall
	2. With assistance, appraise clinical guidelines	32	
	3. Independently appraise study design, conduct, and statistical analysis in clinical research papers	48	
	4. Independently, appraise clinical guideline recommendations	48	

	for bias and cost-benefit considerations		
	Applies the evidence to decision-making for individual patients		
	1. Determine if clinical evidence can be generalized to an individual patient	16	• Evidence-based medicine • evaluation instruments EBM mini-CEX • Chart-stimulated recall
	2. Customize clinical evidence for an individual patient	32	
	3. Communicate risks and benefits of alternatives to patients	48	
	4. Integrate clinical evidence, clinical context, and patient preferences into decision making	48	
C. Learning and improving via feedback and self-assessment • Identify strengths, deficiencies, and limits in one's knowledge and expertise • Set learning and improvement goals • Identify and perform appropriate learning activities • Incorporate formative evaluation feedback into	***Improves via feedback***		
	1. Respond welcomingly and productively to feedback from all members of the health care team including faculty, peer residents, students, nurses, allied health workers, patients, and their advocates	16	• Multisource feedback • Self-evaluation forms with action plans
	2. Actively seek feedback from all members of the health care team	24	
	3. Calibrate self-assessment with feedback and other external data	32	
	4. Reflect on feedback in developing plans for improvement	32	
	Improves via self-assessment		
	1. Maintain awareness of the situation in the moment, and	32	• Multisource feedback • Reflective

daily practice • Participate in the education of patients, families, students, residents, and other health professionals	respond to meet situational needs		practice surveys
	2. Reflect (in action) when surprised, applies new insights to future clinical scenarios, and reflects (on action) back on the process	48	
	Participates in the education of all members of the health care team		
	1. Actively participate in teaching conferences	16	• OSCE with standardized learners Direct observation • Peer evaluations
	2. Integrate teaching, feedback, and evaluation with supervision of interns' and students' patient care	32	
	3. Take a leadership role in the education of all members of the health care team.	48	

Table-4 Developmental Milestones for Ophthalmology Training—Interpersonal and Communication Skills

Competency	Developmental Milestones Informing Competencies	Approximate Time Frame Trainee Should Achieve Stage (months)	General Evaluation StrategiesAssessment Methods/ Tools
A. Communicate effectively: • Patients and family Communicate effectively with patients, families, and the public, as appropriate, across a broad range of socioeconomi	***Communicate effectively***		
	1. Provide timely and comprehensive verbal and written communication to patients/advocates	16	• Multisource feedback • Patient surveys • Direct observation • Mentored self-reflection
	2. Effectively use verbal and nonverbal skills to create rapport with patients/families	16	
	3. Use communication skills to build a therapeutic relationship		
	4. Engage patients /advocates in shared decision making for uncomplicated	32	

c and cultural backgrounds	diagnostic and therapeutic scenarios		
	5. Use patient-centered education strategies	32	
	6. Engage patients /advocates in shared decision making for difficult, ambiguous, or controversial scenarios	48	
	7. Appropriately counsel patients about the risks and benefits of tests and procedures, highlighting cost awareness and resource allocation	48	
	8. Role model effective communication skills in challenging situations	48	
	Intercultural sensitivity		
	1. Effectively use an interpreter to engage patients in the clinical setting, including patient education	8	• Multisource feedback • Direct observation • Mentored self-reflection
	2. Demonstrate sensitivity to differences in patients including but not limited to race, culture, gender, sexual orientation, socioeconomic status, literacy, and religious beliefs	16	
	3. Actively seek to understand patient differences and views and reflects this in respectful communication and shared decision-making with the patient and the healthcare team	40	
B. <u>Physicians and other health care professionals</u> • Communicate effectively with	***Transitions of care***		
	1. Effectively communicate with other caregivers in order to maintain appropriate continuity during transitions of care	16	• Multisource feedback • Direct observation • Sign-out

physicians, other health professionals, and health-related agencies Work effectively as a member or leader of a health care team or other professional	2. Role model and teach effective communication with next caregivers during transitions of care	32	form ratings • Patient surveys
	Interprofessional team		
group • Act in a consultative role to other physicians and health professionals	1. Deliver appropriate, succinct, hypothesis-driven oral presentations	8	• Multisource feedback
	2. Effectively communicate plan of care to all members of the health care team	16	
	3. Engage in collaborative communication with all members of the health care team	40	
	Consultation		
	1. Request consultative services in an effective manner	8	• Multisource feedback • Chart audit
	2. Clearly communicate the role of consultant to the patient, in support of the primary care relationship	16	
	3. Communicate consultative recommendations to the referring team in an effective manner	48	
C. Medical records • Maintain comprehensive, timely, and legible medical records	***Health records***		
	1. Provide legible, accurate, complete, and timely written communication that is congruent with medical standards	8	• Chart audit

	2. Ensure succinct, relevant,and patient-specific written communication	32	

Table-5 Developmental Milestones for Ophthalmology Training—Professionalism

Competency	Developmental Milestones Informing Competencies	Approximate Time Frame Trainee Should Achieve Stage (months)	General Evaluation StrategiesAssessment Methods/ Tools
A. Physicianship Demonstrate compassion, integrity, and respect for others responsiveness to patient needs that supersedes self-interest Accountability to patients, society, and the profession	***Adhere to basic ethical principles***		
	1. Document and report clinical information truthfully	1.5	• Multisource feedback
	2. Follow formal policies	1.5	
	3. Accept personal errors and honestly acknowledge them	8	
	4. Uphold ethical expectations of research and scholarly activity	48	
	Demonstrate compassion and respect to patients		
	1. Demonstrate empathy and compassion to all patients	4	• Multisource feedback
	2. Demonstrate a commitment to relieve pain and suffering	4	
	3. Provide support (physical, psychological, social, and spiritual) for dying patients and their	32	

	families		
	4. Provide leadership for a team that respects patient dignity and autonomy	32	
-	***Provide timely, constructive feedback to colleagues***		
	1. Communicate constructive feedback to other members of the health care team	16	• Multisource feedback • Mentored self-reflection • Direct observation
	2. Recognize, respond to, and report impairment in colleagues or substandard care via peer review process	24	
	Maintain accessibility		
	1. Respond promptly and appropriately to clinical responsibilities including but not limited to calls and pages	1.5	• Multisource feedback
	2. Carry out timely interactions with colleagues, patients, and their designated caregivers	8	
	Recognize conflicts of interest		
	1. Recognize and manage obvious conflicts of interest, such as caring for family members and professional associates as patients	8	• Multisource feedback • Mentored self-reflection • Clinical vignettes
	2. Maintain ethical relationships	40	

	with industry		
	3. Recognize and manage subtler conflicts of interest	40	
	Demonstrate personal accountability		
	1. Dress and behave appropriately	1.5	☐ Multisource feedback ☐ Direct observation
	2. Maintain appropriate professional relationships with patients, families, and staff	1.5	
	3. Ensure prompt completion of clinical, administrative, and curricular tasks	8	
	4. Recognize and address personal, psychological, and physical limitations that may affect professional performance	16	
	5. Recognize the scope of his/her abilities and ask for supervision and assistance appropriately	16	
	6. Serve as a professional role model for more junior colleagues (eg, medical students, interns)	40	
	7. Recognize the need to assist colleagues in the provision of duties	40	
	Practice individual patient advocacy		
	1. Recognize when it is necessary to	8	☐ Multisource feedback

	advocate for individual patient needs		☐ Direct observation
	2. Effectively advocate for individual patient needs	40	
			Comply with public health policies
	1. Recognize and take responsibility for situations where public health supersedes individual health (eg, reportable infectious diseases)	32	• Multisource feedback
B. Patient-centeredness • Respect for patient privacy and autonomy Sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, andsexual orientation			***Respect the dignity, culture, beliefs, values, and opinions of the patient***
	1. Treat patients with dignity, civility and respect, regardlessof race, culture, gender, ethnicity, age, or socioeconomic status	1.5	☐ Multisource feedback ☐ Direct observation
	2. Recognize and manage conflict when patient values	40	
	differ from their own		
			Confidentiality
	1. Maintain patient confidentiality	1.5	☐ Multisource feedback ☐ Chart audits
	2. Educate and hold others accountable for patient confidentiality	24	
			Recognize and address disparities in health care
	1. Recognize that disparitiesexist in health care among populations and that they may impact care of the patient	16	☐ Multisource feedback ☐ Direct observation ☐ Mentored self-reflection

	2. Embrace physicians' role in assisting the public and policy makers in understanding and addressing causes of disparity in disease and suffering	40	
	3. Advocates for appropriate allocation of limited health care resources.	40	

Table-6 Developmental Milestones for Ophthalmology Training— Systems-Based Practice

Competency	Developmental MilestonesInforming Competencies	Approximate Time Frame Trainee Should Achieve Stage (months)	General Evaluation Strategies Assessment Methods/ Tools
A. Work effectively with other care providers andsettings	***Works effectively within multiple health delivery systems***		
• Work effectively in various health care delivery settings and systems relevant to their clinical practice • Coordinate patientcare within the health care system relevant to their clinical specialty • Work in interprofession	1. Understand unique roles and services provided by local health care delivery systems.	16	• Multisource feedback • Chart-stimulated recall • Direct observation
	2. Manage and coordinate care and care transitions across multiple delivery systems, including ambulatory, subacute, acute, rehabilitation, and skilled nursing.	32	
	3. Negotiate patient-centeredcare among multiple care providers.	48	
	Works effectively within an interprofessional team		

al teams to enhance patient safety and improve patient care quality Work in teams andeffectively transmit necessary clinical information to ensure safe and proper care of patients, including the transition of care between settings	1. Appreciate roles of a variety of health care providers, including but not limited to consultants, therapists, nurses, home care workers, pharmacists, and social workers.	8	• Multisource feedback • Chart-stimulated recall • Direct observation
	2. Work effectively as a member within the interprofessional team to ensure safe patient care.	8	
	3. Consider alternative solutions provided by other teammates	16	
	4. Demonstrate how to managethe team by using the skills andcoordinating the activities of interprofessional team members.	48	
B. *Improving health caredelivery* • Advocate for quality patient careand optimal patient care systems • Participate in identifying systemerrors and implementing potential systems solutions • Recognize and function effectively in high-quality care system	***Recognizes system error and advocates for system improvement***		
	1. Recognize health system forcesthat increase the risk for error including barriers to optimal patient care	16	Multisource feedback Quality improvement project
	2. Identify, reflect on, and learnfrom critical incidents such as near misses and preventable medical errors	16	
	3. Dialogue with care team members to identify risk for and prevention of medical error	32	
	4. Understand mechanisms for analysis and correction of systems errors	32	
	5. Demonstrate ability to understand and engage in a system-level	48	

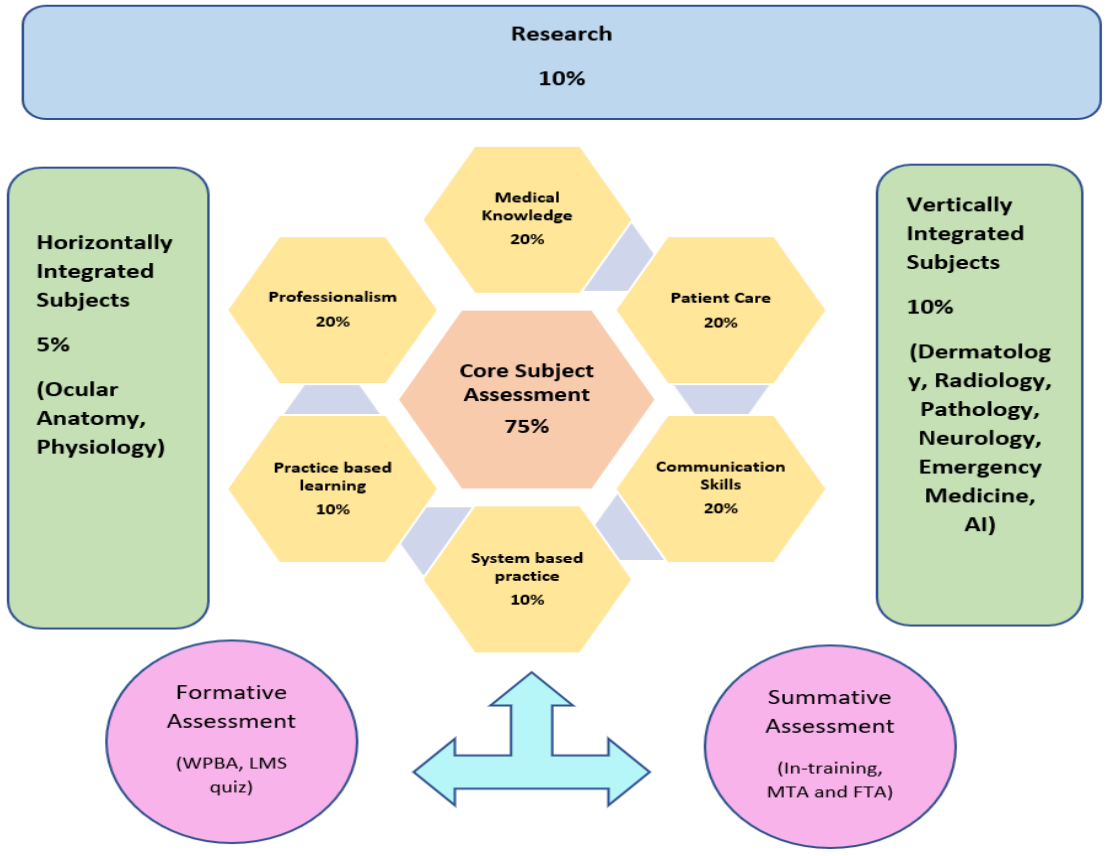
	quality improvement intervention.		
	6. Partner with other health care professionals to identify, propose improvement opportunities within the system.	48	
C. Cost-effective care for patients and populations & Incorporate considerations of cost awareness and risk-benefitanalysis in patient and/or population- based care asappropriate	***Identifies forces that impact the cost of health care and advocates for cost-effective care***		
	1. Reflect awareness of common socioeconomic barriers that impact patient care.	16	Standardized examinations Direct observation Chart-stimulated recall
	2. Understand how cost-benefit analysis is applied to patient care(ie, via principles of screening tests and the development of clinical guidelines)	16	
	3. Identify the role of various health care stakeholders including providers, suppliers, financiers, purchasers, and consumers and their varied impact on the cost of and access to health care.	32	
	4. Understand coding and reimbursement principles.	32	
	Practices cost-effective care		
	1. Identify costs for common diagnostic or therapeutic tests.	8	• Chart-stimulated recall
	2. Minimize unnecessary care including tests, procedures, therapies, and ambulatory or	8	
	3. Demonstrate the incorporationof cost-awareness principles into standard clinical judgments and	24	
	4. Demonstrate the incorporationof cost-awareness principles into complex clinical scenarios	48	

SECTION IX: ASSESSMENT AND EVALUATION

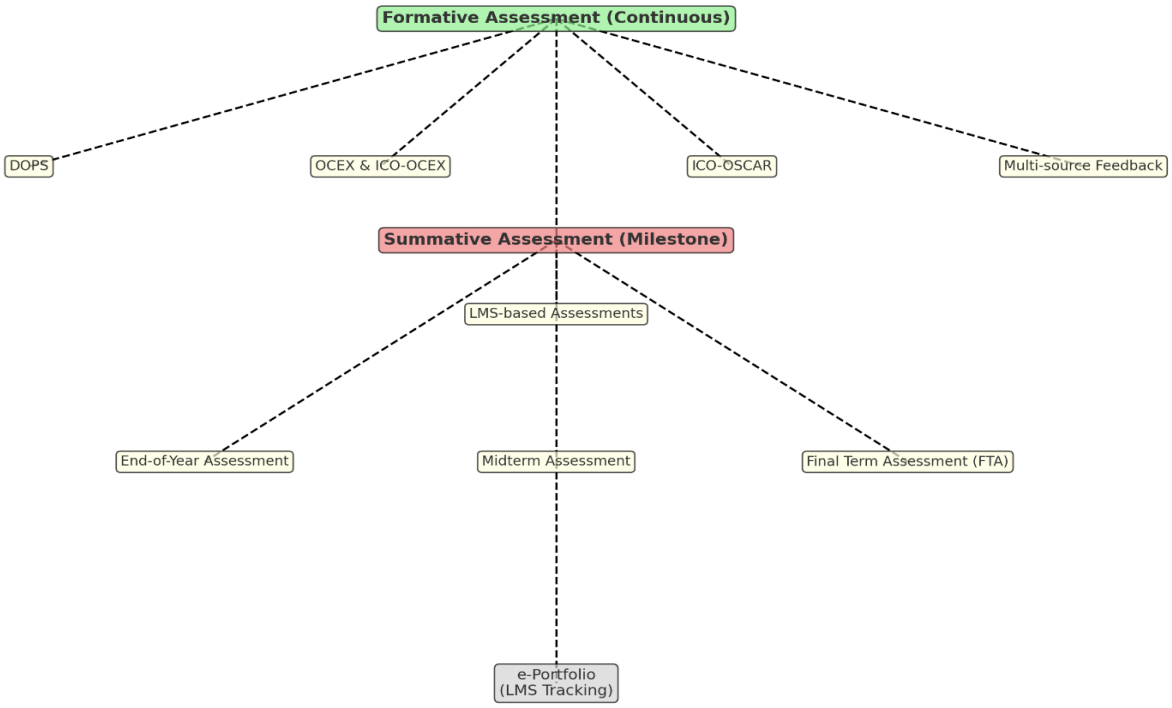
Assessment is essential to ensure that residents in the MS Ophthalmology program are progressing effectively through key competencies required for clinical and academic excellence. It enables both trainees and faculty to identify strengths and areas for improvement, fostering a structured approach to developing diagnostic, procedural, and patient management skills. Through regular formative assessments, feedback, and summative evaluations, residents gain a clear understanding of their performance. This approach not only promotes lifelong learning and professional development but also guarantees that residents meet the high standards expected in patient care, research, and medical ethics.

Framework of Assessment for MS Ophthalmology Residency Program

The MS Ophthalmology Residency Program at Rawalpindi Medical University uses a structured assessment framework to ensure residents' development in medical knowledge, procedural skills, professionalism, and patient care. Formative assessments, including WPBA and LMS quizzes, provide continuous feedback recorded in each resident's e-log book and portfolio. Summative assessments at key milestones—end-of-year, midterm, and final exams—evaluate the resident's comprehensive knowledge and skills. This approach promotes a well-rounded, independent ophthalmologist committed to high standards of patient care and lifelong learning.



Assessment Framework



Assessment Hours Allocation

Assessment hours based on the given **8:1** ratio of teaching hours to assessment hours:

Total Teaching Hours for the program = 2,112 hours. The formula for assessment hours is:

$$\text{Assessment Hours} = 2{,}112/8 = 264 \text{ hours}$$

Therefore, the MS Ophthalmology training program would include 264 assessment hours over the four years.

Formative Assessments

Formative assessments are used continuously to monitor progress and provide feedback. These include Workplace-Based Assessments (WPBAs), LMS-Based Assessments, log book and portfolio entries, and other regularly scheduled assessments.

Formative Assessment Hours Allocation:

Type of Formative Assessment	Frequency	Time per Assessment	Total Hours per Year	Total Hours over 4 Years
Workplace-Based Assessments (e.g., OCEX, mini-CEX, DOPS)	Biannual (2 per year)	1 hour each	2 hours	8 hours
LMS-Based Assessments (Quizzes)	Twice a month	30 minutes each	12 hours	48 hours
Log Book and Portfolio Review	Quarterly	1 hour each	4 hours	16 hours
Case based discussion	Twice a month after teaching	30 minutes each	12 hours	48 hours

Total Formative Assessment Hours: **8 + 48 + 16 + 48 = 120 hours**

Summative Assessments

Summative assessments are used to evaluate knowledge, skills, and competency at specific stages. These include in-training assessments, and the midterm and final term assessments

Summative Assessment Hours Allocation:

Type of Summative Assessment	Frequency	Time per Assessment	Total Hours per Year	Total Hours over 4 Years
In-Training Assessment (Year 1)	Once at year-end	5 hours	5 hours	5 hours
In-Training Assessment (Year 3)	Once at year-end	5 hours	5 hours	5 hours
Midterm Assessment	Annually	8 hours each	8 hours	8 hours
Final Term Assessment	Annually	10 hours	10 hours	10 hours

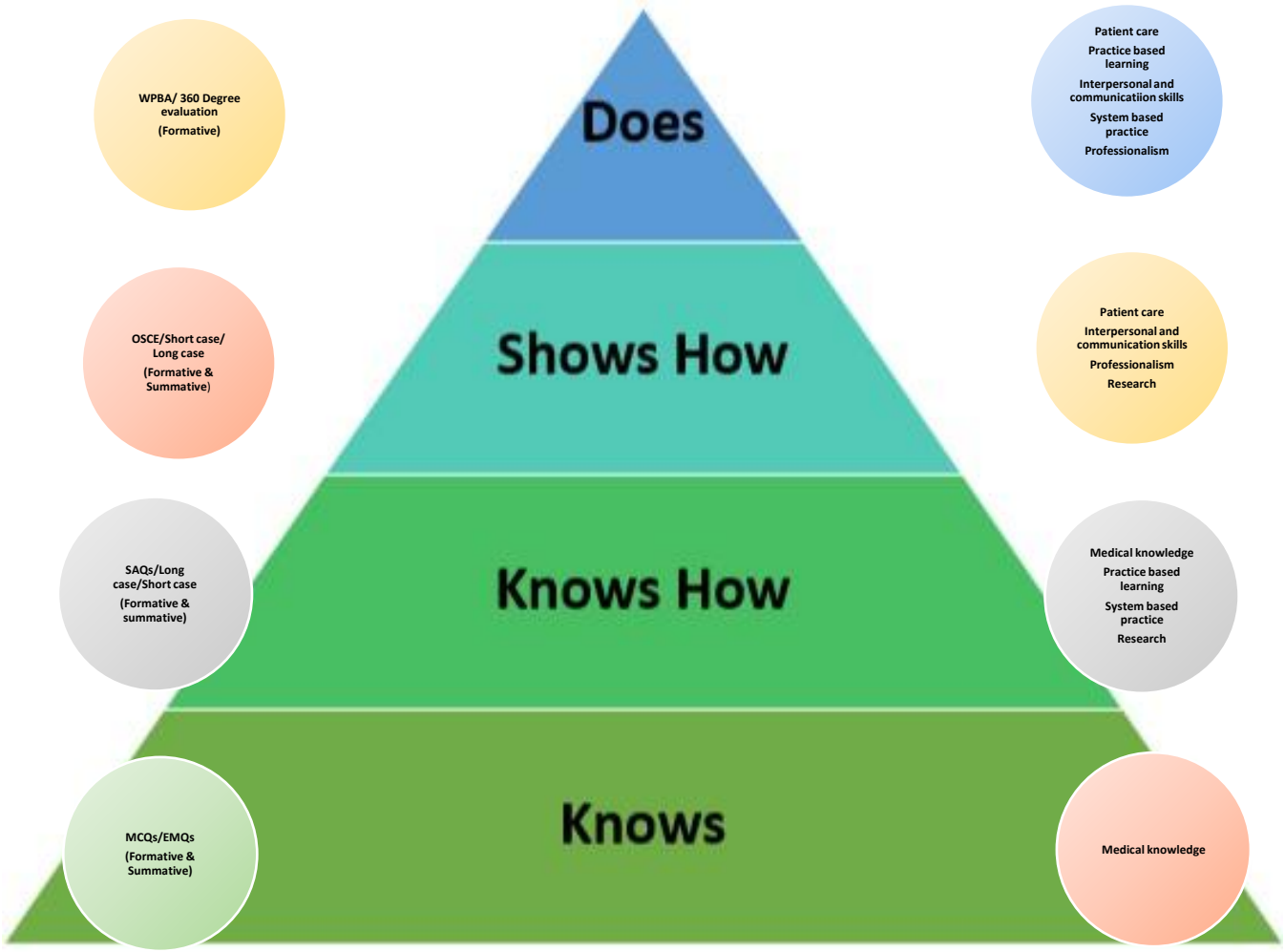
Total Summative Assessment Hours: **4 + 4 + 8 + 10 = 28 hours**

Proposed Additional Allocation of Remaining Hours

Assessment Type	Frequency (suggested)	Time per Session	Additional Hours per Year	Total Additional Hours over 4 Years
Enhanced Practical OSCEs	Biannual	1 hour each	2 hours	8 hours
Mock Examinations (Comprehensive)	Annual	6 hours each	6 hours	24 hours
Additional Case-Based Discussions	Monthly	20 minutes each	4 hours	16 hours
Focused Skills Workshops	Quarterly	2 hours each	8 hours	32 hours
WPBA sessions (External reviewers)	Biannual	30 minutes each	1 hours	4 hours
Additional Log Book & Portfolio Reviews	Quarterly	1 hour each	8 hours	32 hours

Total Additional Hours: **116 hours**

Assessment framework based on Miller's Pyramid and ACGME core competencies for the MS Ophthalmology program



Weightage of Core Competencies in Assessment

Core Competency	Weightage
Medical knowledge	40% both (106 hours)
Patient care	
Interpersonal and communication skills	40% both (106 hours)
Professionalism	
Practice based learning	10% both (26 hours)
System based practice	
Research	10% (26 hours)

Formative Assessment

1. **Workplace-Based Assessments**

Purpose: Continuous evaluation of resident performance, skills, and knowledge in real-world settings.

Assessment Tools:

Multi-Source Feedback: Collect feedback from various healthcare professionals.

OCEX/mini-CEX

ICO-OCEX

ICO-OSCAR

Direct Observation of Procedural Skills (DOPS)

The workplace-based assessment methods include feedback opportunities as an integral part of the assessment process. All assessments will be documented in the trainee's e-logbook and portfolio.

Schedule of WPBA

Frequency: Conducted biannually (internal and external evaluations).

2. **LMS-Based Assessments**:

Regularly scheduled online quizzes based on core content and designed to evaluate theoretical knowledge and understanding of ophthalmology concepts.

Schedule of LMS-based Assessments

Frequency: Conducted fortnightly (15^{th} and 30^{th} of every month).

3. **Log Book and Portfolio**:

Maintain a record of clinical experiences and skills throughout the program.

4. **Annual Evaluation**:

Assess resident performance based on:

Competence in skills.

Completion of assignments.

Attitude and behavior.

Participation in journal clubs, lectures, presentations, and clinico-pathologic conferences

Summative Assessment

1. **In-Training Assessment for First Year**

All candidates admitted in MS Ophthalmology course shall appear in an examination at end of the first calendar year.

Components: SEQs (Structured Essay Questions) and OSCE (Objective Structured Clinical Examination).

Pass Percentage: 60%.

2. **In-Training Assessment for Third Year**

All candidates admitted in MS Ophthalmology course shall appear in an examination at end of the third calendar year.

Components: SEQs and Clinical OSCE.

Pass Percentage: 60%.

3.**Midterm Assessment MTA**

All candidates admitted in MS Ophthalmology course shall appear in Midterm examination at the end of second calendar year.

The examination shall be held on biannual basis.

The candidate who fails to pass the examination in 3 consecutive attempts availed or un-availed, shall be dropped from the course.

Subjects to be examined shall be Basic Ophthalmic Medical Sciences (Anatomy, Physiology, Biochemistry, Pathology, Pharmacology), Optics & Refraction, Behavioral Sciences, Biostatistics & Research Methodology and Community Ophthalmology.

Only those candidates, who pass in theory papers, will be eligible to appear in the TOACS.

The candidates, who have passed written examination but failed in TOACS, will re-appear only in TOACS.

The maximum number of attempts to re-appear in TOACS alone shall be three, after which the candidate shall have to appear in both written and TOACS as a whole.

To be eligible to appear in midterm assessment the candidate must submit;

Duly filled, prescribed Admission Form to the Controller of Examinations duly recommended by the Principal/Head of the Institution in which he/she is enrolled.

A certificate by the Principal/Head of the Institution, that the candidate has attended at least 75% of the lectures, seminars, practical/clinical demonstrations.

Examination fee as prescribed by the University.

To be declared successful in midterm examination the candidate must secure 60% marks in each paper

Frequency: Biannual

Components:

Paper I: MCQs (Optics & Refraction) – 75 Marks

Paper II: MCQs – 75 Marks

TOACS: 150 Marks (15 interactive stations)

Eligibility:

75% attendance, submitted forms, and examination fee.

Pass Percentage: 60% in each paper.

4. Final Term Assessment (FTA)

All candidates admitted in MS Ophthalmology course shall appear in FTA at the end of structured training program (end of 4th calendar year), and having passed MTA. However, a candidate holding FCPS Ophthalmology / FRCS Ophthalmology / Diplomat American Board shall be exempted from MTA and shall be directly admitted to FTA, subject to fulfillment of requirements for the examination.

The examination shall be held on biannual basis.

To be eligible to appear in FTA the candidate must submit;

duly filled, prescribed Admission Form to the Controller of Examinations duly recommended by the Principal/Head of the Institution in which he/she is enrolled;

a certificate by the Principal/Head of the Institution, that the candidate has attended at least 75% of the lectures, seminars, practical/clinical demonstrations;

Original Log Book complete in all respect and duly signed by the Supervisor (for Oral & practical/clinical Examination);

certificate of having passed the midterm examination;

certificates of all the mandatory rotations;

Examination fee as prescribed by the University.

Only those candidates, who pass in theory papers, will be eligible to appear in the Oral & Practical/ Clinical Examination.

The candidates, who have passed written examination but failed in Clinical Examination, will re-appear only in three consecutives. Clinical examination after which the candidate shall have to appear in both written and clinical examinations as a whole.

The candidate with 80% or above marks shall be deemed to have passed with distinction.

Log Book/Assignments:

Throughout the length of the course, the work record of the candidate shall be entered on the Log Book.

The Supervisor shall certify every year that the Log Book is being maintained and signed regularly.

The performance of the candidate shall be evaluated on annual basis, e.g., 25 marks for each year in four years MS Ophthalmology course. The internal assessment shall reflect the performance of the candidate on following parameters:

Year wise record of the competence of skills.

Year wise record of the assignments.

Year wise record of the evaluation regarding attitude & behavior.

Year wise record of journal club / lectures / presentations / clinico-pathologic conferences attended & / or made by the candidate.

Eligibility: Passed midterm assessment, submitted required documentation**.**

Components:

Written Exam: 200 marks

Paper I: MCQs – 100 Marks

Paper II: MCQs – 100 Marks

Clinical Examination: 450 marks

OSCE – 150 marks (15 stations)

Long Case – 100 marks

Short Cases – 200 marks (50 marks each)

Pass Requirements: 60% in each component and 50% in each sub-component.

Re-Assessment Policies:

Re-Appears: Candidates who fail any component will have specified re-examination attempts.

Distinction: Candidates scoring 80% or above in the final examination will be deemed to have passed with distinction.

Table Of Specifications

1st Year In-House Training TOS

Year One In-Training Assessment- Total marks 200				
Exam Component	**No. of Questions/Stations**	**Marks Distribution**	**Total Marks**	**Passing Marks**
Written (MCQ)	100	1 mark each	100	60
Clinical - OSCE	10	10 marks each	100	60
AV-OSPE	10	10 marks each	100	60

Written component Table of Specifications

- Section (I) Clinical Ophthalmology
- No. of items (50)
  - Level of questions (according to Bloom's taxonomy)
  - C1
  - C2
  - C3

S. No	Topic	Impact	Frequency	I × F	Weight	No of items	Diagnosis	Investigation	Treatment	Basic knowledge
1	Eyelids	3	2	6	0.05	2.56=2	1	0	1	0
2	Lacrimal drainage system	3	2	6	0.05	2.56=2	1	0	1	0
3	Orbit	3	2	6	0.05	2.56=2	1	1	0	0
4	Dry eye disorders	2	2	4	0.034	1.70=2	1	1	0	0
5	Conjunctiva	2	2	4	0.034	1.70=2	1	0	1	0
6	Cornea	2	3	6	0.05	2.56=2	1	1	0	0
7	Corneal and Refractive surgery	2	2	4	0.034	1.70=2	1	0	1	0
8	Episclera and sclera	2	2	4	0.034	1.70=2	1	0	1	0
9	Lens	3	3	9	0.076	3.84=4	1	1	1	1
10	Glaucoma	3	3	9	0.076	3.84=4	1	1	1	1
11	Uveitis	2	3	6	0.05	2.56=2	1	1	0	0
12	Ocular Tumors	2	1	2	0.017	0.85=1	1	0	0	0
13	Retinal Vascular disease	3	3	9	0.076	3.84=4	1	1	1	1
14	Acquired Macular Disorders	2	2	4	0.034	1.70=2	1	1	0	0
15	Hereditary Fundus Dystrophies	2	3	6	0.05	2.56=2	1	1	0	0

16	Retinal Detachment	2	3	6	0.05	2.56=2	1	0	1	0
17	Strabismus	2	3	6	0.05	2.56=2	1	0	1	0
18	Vitreous Opacities	1	2	2	0.017	0.85=1	1	0	0	0
19	Neuro-Ophthalmology	2	3	6	0.05	2.56=2	1	1	0	0
20	Ocular side effects of systemic medications	1	1	1	0.008	0.407=0	0	0	0	0
21	Ocular Trauma	2	3	6	0.05	2.56=2	1	0	1	0

- Discipline Ophthalmology
- Level of exam (First Year In-house)
- Section (II) Optics and Refraction
- No. of items (50)
  - Level of questions (according to Bloom's taxonomy)
  - C1
  - C2
  - C3

S. No	Topic	Impact	Frequency	I × F	Weight	No of items	Diagnosis	Investigation	Treatment	Basic knowledge
1	Physical Optics	3	2	6	0.103	5.17=5	1	0	0	4
2	Geometrical Optics	3	2	6	0.103	5.17=5	1	0	0	4
3	Optics of human eye	3	2	6	0.103	5.17=5	1	0	0	4
4	Practical clinical refraction	2	3	6	0.103	5.17=5	1	0	2	2
5	Contact lenses	2	2	4	0.068	3.45=3	1	0	1	1
6	Visual rehabilitation	2	3	6	0.103	5.17=5	1	0	1	3
7	Intraocular lenses	2	2	4	0.068	3.45=3	1	0	1	1
8	Lasers	2	2	4	0.068	3.45=3	1	0	1	1

9	**Optical considerations in refractive surgery**	3	3	9	0.155	7.75=8	3	0	1	4
10	**Optical instruments**	3	3	9	0.155	7.75=8	2	0	1	5

Clinical Component Table of Specifications

OSCE/AV-OSPE stations- 10
Total marks- 100
Passing marks- 60
Time allowed per station- 5min
Interactive stations- 5

Topic Wise Distribution of Ophthalmology OSCE/AV-OSPE Stations

Station No.	Station Description & Topics	Skill to be assessed
1.	Clinical Methods • Pupil Evaluation • Extraocular movements	To assess the candidate's ability to perform the given examination task on a patient/simulated subject.
2.	Clinical Methods • Slit lamp examination techniques • Tonometry • Direct ophthalmoscopy	To assess the candidate's ability to perform the given examination task on a patient/simulated subject.
3.	Investigations • Fundus fluorescein angiography	Images/videos will be shown to the candidate with relevant clinical scenarios to assess the ability to interpret findings and discuss the management plan
4.	Investigations • Visual fields	Images/videos will be shown to the candidate with relevant clinical scenarios to assess the ability to interpret findings and discuss the management plan
5.	Ophthalmic Radiology • B-scan	Images/videos will be shown to the candidate with relevant clinical scenarios to assess the ability to interpret findings, make a diagnosis, and discuss the management/ complications.

6.	Clinical Problem Solutions • Cataract • Glaucoma • Cornea • Medical Retina • Surgical Retina	A clinical scenario will be given to the candidate to assess the ability to interpret the findings, make a diagnosis, and discuss the management/ complications.
7.	Retinoscopy	To assess the ability of the candidate to perform steps of procedure on patient/simulated subject.
8.	Transposition	To assess the ability of the candidate to write a refractive prescription and transpose the refractive prescription of the retinoscopy findings
9.	Instruments. • Cross-cylinder • Maddox Rods • Focimeter • Maddox Wings Low vision aids	To assess the candidate's ability to demonstrate the use of a given item on a patient/simulated subject. To assess the ability of candidate to identify the equipment and its uses
10.	Biometry • A-scan • Keratometry	To assess the ability of the candidate to perform steps of the asked procedure on the patient/simulated subject and calculate the IOL number using the appropriate formula on the data obtained.

Station No.	Station Description & Topics	Skill to be assessed
1.	**Cataract/Glaucoma/Strabismus/Neuro-Ophthalmology**	To assess the ability of the candidate to interpret findings and discuss the management plan amicably.
2.	**Trauma/Keratitis/Conjunctivitis/Uveitis**	To assess the candidate’s ability to interpret findings, make diagnosis and discuss the management plan.
3.	**Ophthalmic pathology**	To assess the candidate's ability to interpret findings, make diagnosis and discuss the management plan

4.	**Investigations** • **Fundus fluorescein angiography** • **OCT**	Images/videos will be shown to the candidate with relevant clinical scenarios to assess the ability to interpret findings and discuss the management plan
5.	**Surgical retina**	A clinical scenario will be given to the candidate to assess the ability to interpret the findings, make a diagnosis, and discuss the management/complications.
6.	**Ophthalmic Emergencies** • **Acute Congestive Glaucoma** • **Chemical burns,** • **Trauma**	To assess the ability of the candidate to amicably approach the emergency and perform steps of management.
7.	**Investigations** • **Corneal Topography/Visual Fields**	Images/videos will be shown to the candidate to assess the ability to interpret the findings, make a diagnosis, and discuss the management/ complications.
8.	**Medical retina**	A clinical scenario will be given to the candidate to assess the ability to interpret the findings, make a diagnosis, and discuss the management/complications.
9.	**Transposition**	To assess the ability of the candidate to write a refractive prescription and transpose the refractive prescription of the retinoscopy findings
10.	**Instruments.** • **Cross-cylinder** • **Maddox Rods** • **Focimeter** • **Maddox Wings** • **Low vision aids**	To assess the candidate's knowledge of principle and the use of a given item. To assess the ability of candidate to identify the equipment and its uses

Midterm Assessment TOS Calgary Model

PAPER II (Clinical Ophthalmology)

- No. of items (75)

S. No	Topic	Presentation	Impact	Frequency	I × F	Weight	No of items	Diagnosis	Investigation	Treatment	Basic knowledge
1	Eyelids	Anatomy & physiology	3	2	6	0.017	1.21=1	0	0	0	1
		Benign nodules, cysts and malignant tumors	1	2	2	0.005	0.40=0	0	0	0	0
		Bacterial and viral infections, Allergic disorders and blepharitis	1	3	3	0.008	0.6=1	0	0	1	0
		Ptosis, entropion and ectropion	2	3	6	0.017	0.75=1	0	0	1	0
2	Lacrimal drainage system	Anatomy and physiology	3	2	6	0.017	1.21=1	0	0	0	1
		Congenital and acquired obstruction	1	3	3	0.008	0.6=1	0	1	0	0
		Chronic canaliculitis	1	1	1	0.0027	0.20=0	0	0	0	0
		Dacryocystitis	2	3	6	0.017	1.21=1	1	0	0	0
3	Orbit	Anatomy	3	2	6	0.016	1.21=1	0	0	0	1
		Thyroid eye disease	2	2	4	0.010	0.75=1	0	1	0	0
		Infections and Inflammatory disease	2	3	6	0.017	1.21=1	1	0	0	0
		Vascular malformations and tumors	2	2	4	0.010	0.75=1	0	1	0	0
		Cystic lesions	1	3	3	0.008	0.6=1	1	0	0	0

4	**Dry eye disorders**	Anatomy and physiology of tear film	2	2	4	0.010	0.75=1	0	0	0	1
		Dry eye disorders	1	3	3	0.008	0.6=1	0	1	0	0
5	**Conjunctiva**	Anatomy and physiology	2	2	4	0.010	0.75=1	0	0	0	1
		Bacterial, viral and allergic conjunctivitis	1	3	3	0.008	0.6=1	0	0	1	0
		Cicatrizing conjunctivitis and degenerations	1	2	2	0.005	0.40=0	0	0	0	0
6	**Cornea**	Anatomy and physiology	2	2	4	0.010	0.75=1	0	0	0	1
		Bacterial, viral and fungal keratitis	2	3	6	0.017	1.21=1	0	0	1	0
		Interstitial and protozoan keratitis	2	2	4	0.010	0.75=1	1	0	0	0
		Rosacea, Neurotrophic and exposure keratitis, Bacterial hypersensitivity mediated corneal disease	2	2	4	0.010	0.75=1	1	0	0	0
		Corneal ectasias	2	2	4	0.008	0.6=1	0	0	1	0
		Corneal dystrophies and degenerations	1	1	1	0.0027	0.20=0	0	0	0	0

		Peripheral corneal ulceration and Metabolic keratopathies	1	1	1	0.0028	0.40=0	0	0	0	0
7	**Corneal and refractive surgery**	Keratoplasty	2	2	4	0.0011	0.8=1	0	0	1	0
		Refractive surgeries	2	2	4	0.010	0.75=1	0	0	1	0
8	**Episclera and sclera**	Anatomy	1	1	1	0.0027	0.20=0	0	0	0	0
		Episcleritis and scleritis	2	2	4	0.011	0.8=1	1	0	0	0
		Scleral discoloration	1	1	1	0.0027	0.20=0	0	0	0	0
9	**Lens**	Anatomy and physiology	2	2	4	0.010	0.75=1	0	0	0	1
		Congenital cataract	2	2	4	0.011	0.8=1	0	0	1	0
		Acquired cataract	3	3	9	0.025	1.8=2	0	1	1	0
		Ectopia lentis	2	2	4	0.010	0.75=1	1	0	0	0
10	**Glaucoma**	Anatomy and physiology	2	2	4	0.010	0.75=1	0	0	0	1
		Tonometry, gonioscopy and perimetry	2	2	4	0.010	0.75=1	0	1	0	0
		Primary openangle glaucoma	3	3	9	0.025	1.8=2	0	1	1	0
		Primary angleclosure glaucoma	2	2	4	0.011	1.21=1	0	0	1	0
		Ocular hypertension and	1	2	2	0.005	0.40=0	0	0	0	0

		Normal tension glaucoma									
		Pseudo exfoliation and Inflammatory glaucoma	2	2	4	0.010	0.75=1	1	0	0	0

		Pigment dispersion glaucoma and Iridocorneal endothelial syndrome	2	2	4	0.0028	0.4=1	0	0	1	0
		Neovascular and lens-related glaucoma	3	2	6	0.017	1.21=1	0	0	1	0
		Traumatic glaucoma and Glaucoma in intraocular tumors	1	1	1	0.0028	0.40=0	0	0	0	0
		Primary congenital glaucoma	2	2	4	0.010	0.75=1	1	0	0	0
		Phacomatosis	1	1	1	0.0028	0.40=0	0	0	0	0
11	**Uveitis**	Anatomy and physiology	2	2	4	0.010	0.75=1	0	0	0	1
		Anterior uveitis	2	3	6	0.017	1.21=1	1	0	0	0
		Intermediate uveitis	2	2	4	0.010	0.75=1	0	0	1	0
		Uveitis in spondyloarthropathies and juvenile arthritis	1	3	3	0.008	0.6=1	0	0	1	0
		Sarcoidosis and Bechet syndrome	1	2	2	0.005	0.40=0	0	0	0	0
		Vogt-koyanagi Harada syndrome	1	1	1	0.0028	0.40=0	0	0	0	0
		Bacterial and viral uveitis	2	2	4	0.010	0.75=1	1	0	0	0
		Fungal and parasitic uveitis, Uveitis in bowel and renal disease	1	1	1	0.0027	0.20=0	0	0	0	0
12	**Ocular tumors**	Benign and malignant conjunctival tumors	1	2	2	0.005	0.40=0	0	0	0	0

		Iris cysts and tumors, Ciliary body tumors	1	1	1	0.0027	0.20=0	0	0	0	0
		Tumors of the retina and choroid	2	2	4	0.010	0.75=1	1	0	0	0
		Primary intraocular lymphoma	1	1	1	0.005	0.40=0	0	0	0	0
		Paraneoplastic syndromes	1	1	1	0.0027	0.20=0	0	0	0	0
13	**Retinal vascular disease**	Diabetic retinopathy	3	3	9	0.025	1.8=2	0	1	1	0
		Retinal venous occlusive disease	3	2	6	0.017	1.21=1	0	0	1	0
		Retinal arterial occlusive disease	3	1	3	0.008	0.6=1	0	0	1	0
		Ocular ischemic syndrome and Sickle cell retinopathy	1	1	1	0.0027	0.40=0	0	0	0	0

		Hypertensive disease	2	2	4	0.010	0.75=1	0	0	1	0
		Retinopathy of prematurity	2	2	4	0.010	0.75=1	1	0	0	0
		Retinal artery macro aneurysm and Primary retinal telangiectasis	1	1	1	0.0027	0.20=0	0	0	0	0
		Eales disease	2	2	4	0.010	0.75=1	1	0	0	0
		Radiation retinopathy and Purtscher retinopathy	1	1	1	0.0027	0.20=0	0	0	0	0

		Takayasu Disease	1	1	1	0.0027	0.2=0	0	0	0	0
14	**Acquired macular disorders**	Imaging in macular disease	2	2	4	0.010	0.75=1	0	1	0	0
		Age related macular degeneration	3	2	6	0.017	1.2=1	1	0	0	0
		Age-related macular hole	2	3	6	0.017	1.2=1	0	1	0	0
		Central serous retinopathy and Cystoid macular edema	2	2	4	0.011	0.8=1	1	0	0	0
		Macular epiretinal membrane and Polypoidal	1	1	1	0.0027	0.40=0	0	0	0	0
		choroidal vasculopathy									
		Degenerative myopia	1	3	3	0.008	0.6=1	0	0	1	0
		Angioid streaks and Vitreomacular traction syndrome	1	1	1	0.0027	0.40=0	0	0	0	0
		Idiopathic choroidal neovascularization	1	1	1	0.0027	0.2=0	0	0	0	0
		Solar retinopathy	1	1	1	0.0027	0.20=0	0	0	0	0
15	**Hereditary Fundus dystrophies**	Macular dystrophies and Choroidal dystrophies	1	3	3	0.008	0.6=1	1	0	0	0
		Generalized photoreceptor dystrophies	1	3	3	0.008	0.6=1	0	1	0	0
		Albinism and Cherry red spot at macula	1	1	1	0.0027	0.2=0	0	0	0	0

16	**Retinal detachment**	Rhegmatogenous retinal detachment	3	3	9	0.024	1.82=2	0	1	1	0
		Tractional retinal detachment	2	2	4	0.010	0.75=1	0	0	1	0
		Exudative retinal detachment	1	3	3	0.008	0.6=1	0	0	1	0
		Pars plana vitrectomy	2	2	4	0.011	1.1=1	0	0	1	0
17	**Strabismus**	Amblyopia	1	2	2	0.0056	0.4=1	0	0	1	0
		Heterophoria and vergence abnormalities	1	2	2	0.0056	0.4=0	0	0	0	0
		Esotropia	1	3	3	0.008	0.6=1	0	0	1	0
		Exotropia	1	3	3	0.008	0.6=1	0	0	1	0
		Congenital cranial dysinnervation disorders	1	1	1	0.0027	0.20=0	0	0	0	0
		Monocular elevation deficiency and Brown syndrome	1	1	1	0.0028	0.20=0	0	0	0	0
		Alphabet patterns	1	2	2	0.0056	0.4=0	0	0	0	0
18	**Vitreous opactities**	Vitreous hemorrhage	2	3	6	0.017	1.21=1	0	0	1	0
19	**Neuroophthalmology**	Neuroimaging	2	2	4	0.010	0.75=1	0	1	0	0
		Optic nerve, pupil, chiasma, retro chiasmal pathways	2	3	6	0.017	1.21=1	1	0	0	0
		Ocular motor nerves	2	3	6	0.017	1.21=1	1	0	0	0
		Supranuclear disorders of ocular motility	1	1	1	0.0027	0.20=0	0	0	0	0
		Nystagmus and Facial spasm	1	1	1	0.0027	0.20=0	0	0	0	0

		Ocular myopathies and Neurofibromatosis	1	3	3	0.008	0.6=1	1	0	0	0
		Migraine and Neuralgias	1	1	1	0.0027	0.2=0	0	0	0	0
20	**Ocular side effects of systemic medications**	Cornea	1	1	1	0.0027	0.2=0	0	0	0	0
		Ciliary effusion and lens	1	1	1	0.0027	0.2=0	0	0	0	0
		Optic nerve	2	3	6	0.017	1.21=1	1	0	0	0
21	**Ocular trauma**	Eyelid trauma	1	3	3	0.008	0.6=1	0	0	1	0
		Orbital trauma	2	2	4	0.010	0.75=1	1	0	0	0
		Trauma to globe	3	2	6	0.017	1.21=1	0	0	1	0
		Chemical injuries	2	3	6	0.017	0.017=1	0	0	1	0

Level of questions (according to Bloom's taxonomy)

C1= 9 , C2 =27 , C3 = 39

MIDTERM EXAMINATION MTA

PAPER I (Refraction)

- No. of items (75)

S. No	Topic	Presentation	Impact	Frequency	I × F	Weight	No of items	Diagnosis	Investigation	Treatment	Basic knowledge
1	**Physical optics**	Interference and coherence	2	2	4	0.011	0.8=1	0	0	0	1
		Polarization	2	2	4	0.011	0.8=1	1	0	0	0
		Diffraction	2	2	4	0.011	0.8=1	1	0	0	0
		Scattering	2	2	4	0.011	0.8=1	1	0	0	0
		Reflection	2	3	6	0.016	1.2=1	1	0	0	0
		Illumination	2	2	4	0.011	0.8=1	0	0	0	1
		Transmission and absorption	2	2	4	0.011	0.8=1	0	0	0	1
		Laser fundamentals	3	2	6	0.016	1.2=1	0	0	0	1
2	**Geometrical optics**	Pinhole imaging	3	3	9	0.025	1.8=2	1	0	0	1

		Imaging with lenses and mirrors	3	3	9	0.025	1.8=2	1	0	0	1
		Image and object characteristics	3	3	9	0.025	1.8=2	1	0	0	1
		Light propagation	2	2	4	0.011	0.8=1	0	0	0	1
		Ophthalmic lenses	3	3	9	0.025	1.8=2	1	0	0	1
		Ophthalmic prisms	3	3	9	0.025	1.8=2	1	0	0	1
		Mirrors	2	2	4	0.011	0.8=1	1	0	0	0
		Optical aberrations	3	3	6	0.016	1.2=1	0	0	0	1

3	**Optics of human eye**	Human eye as an optical system	3	2	6	0.016	1.2=1	0	0	0	1
		Schematic eyes	3	2	6	0.016	1.2=1	0	0	0	1
		Visual acuity	3	3	9	0.025	1.8=2	1	0	0	1
		Contrast sensitivity	3	2	6	0.016	1.2=1	0	0	0	1
		Refractive states of eye	3	3	9	0.025	1.8=2	1	0	0	1
4	**Practical Clinical refraction**	Objective refraction	3	3	9	0.025	1.8=2	1	0	0	1
		Subjective refraction	3	3	9	0.025	1.8=2	1	0	0	1
		Cycloplegic and non-cycloplegic refraction	3	2	6	0.016	1.2=1	0	0	0	1
		Spherical and cylindrical correcting lenses	3	2	6	0.016	1.2=1	0	0	0	1
		Prescribing for children	3	2	6	0.016	1.2=1	0	0	1	0
		Clinical accommodative problems	3	2	6	0.016	1.2=1	1	0	0	0

		Prescribing multifocal lenses	3	2	6	0.016	1.2=1	0	0	1	0
		Prescribing special lenses	3	1	3	0.008	0.6=1	0	0	1	0
5	**Contact lenses**	Contact lens optics	3	2	6	0.016	1.2=1	0	0	0	1
		Contact lens materials	3	2	6	0.016	1.2=1	0	0	0	1
		Contact lens fitting	3	3	9	0.025	1.8=2	1	0	0	1
		Therapeutic lens usage	3	2	6	0.016	1.2=1	0	0	1	0
6	**Visual rehabilitation**	Low vision and legal blindness	3	2	6	0.016	1.2=1	1	0	0	0
		Optics of low vision aids, convex lens	3	2	6	0.016	1.2=1	0	0	0	1
7	**Intraocular lenses**	Optical considerations for IOLs	3	2	6	0.016	1.2=1	0	0	0	1
		Lens related visual disturbances	3	3	9	0.025	1.8=2	1	0	0	1
		Multifocal IOLs	3	1	3	0.008	0.6=1	0	0	0	1
8	**Lasers**	Types of lasers	3	2	6	0.016	1.2=1	0	0	0	1
		Laser modes	2	2	4	0.011	0.8=1	0	0	1	0
		Effects of laser energy on tissues	3	2	6	0.016	1.2=1	0	0	0	1
9	**Optical considerations in refractive surgery**	Angle kappa, corneal shape pupil size	2	1	2	0.006	0.4=0	0	0	0	0
		Surgical correction of myopia, hypermetropia and presbyopia	3	3	9	0.025	1.8=2	1	0	1	0
		Surgical corrections of astigmatism	3	3	9	0.025	1.8=2	0	1	1	0

		Vitreoretinal surgery	3	2	6	0.016	1.2=1	0	0	0	1
10	**Optical instruments**	Direct and indirect ophthalmoscope	3	3	9	0.025	1.8=2	1	0	0	1
		Retinoscope	3	3	9	0.025	1.8=2	1	0	0	1
		Instrument used to study corneal curvature	3	2	6	0.016	1.2=1	0	1	0	0
		Computerized analysis of corneal topography	2	2	4	0.011	0.8=1	0	1	0	0
		Slit lamp biomicroscope	3	3	9	0.025	1.8=2	1	0	0	1
		Lensometer	3	3	9	0.025	1.8=2	0	1	0	1
		Applanation tonometer	3	3	9	0.018	1.8=2	1	0	0	1
		Pachymeter	3	2	6	0.016	1.2=1	0	1	0	0
		Operating microscope	2	2	4	0.011	0.8=1	0	0	0	1
		Specular microscope	1	1	1	0.003	0.2=0	0	0	0	0
		Keratometer	3	3	9	0.025	1.8=2	0	1	0	1
		Macular function testing equipment	3	2	6	0.016	1.2=1	0	1	0	0
		Wavefront aberrometer	1	1	1	0.003	0.2=0	0	0	0	0
		Optical coherence tomography	3	2	6	0.016	1.2=1	0	1	0	0

Level of questions (according to Bloom's taxonomy)

C1 =38 , C2 =21 , C3 =16

TOS for OSCE in Mid-Training Assessment

1. Total number of stations – 15 (All Interactive)
2. Time Allocation for each station – 5 Minutes
3. Marks Allocation for each station – 10 Minutes

Topic Wise Distribution of Ophthalmology OSCE Stations

Station No.	Station Description & Topics	Skill to be assessed
1.	Counseling (Scenario Based) • Retinoblastoma • Diabetic Retinopathy • Cataract • Glaucoma	In a given scenario the candidate's ability to counsel the family about diagnosis, its implications, and management options.
2.	Retinoscopy	To assess the ability of the candidate to perform steps of procedure on patient/simulated subject.
3.	Transposition	To assess the ability of the candidate to write a refractive prescription and transpose the refractive prescription of the retinoscopy findings
4.	Instruments. • Cross-cylinder • Maddox Rods • Focimeter • Maddox Wings • Low vision aids	To assess the candidate's ability to demonstrate the use of a given item on a patient/simulated subject. To assess the ability of candidate to identify the equipment and its uses
5.	Clinical Methods • Pupil Evaluation • Extraocular movements • Cover- Uncover Test	To assess the candidate's ability to perform the given examination task on a patient/simulated subject.
6.	Clinical Methods • Optic Nerve function test • Visual fields • Macular function test	To assess the candidate's ability to perform the given examination task on a patient/simulated subject.

7.	Clinical Methods
	• Slit Lamp Examination
	  ○ Different illumination techniques
	  ○ Tests for dry eye
		To assess the ability of the candidate to perform steps of the asked procedure on the patient/simulated subject.

8.	Surgical Skills	To assess the ability of the

	• Eyelid Laceration Repair • Cystotome formation • Partial thickness Incision for extracapsular cataract extraction • Full-thickness incision for extracapsular cataract extraction • Sutures • Ophthalmic drops • Intravitreal Injections	candidate to perform steps of the asked procedure on a goat eye/provided specimen.
9.	Investigations • Fundus fluorescein angiography • Visual fields	Images/videos will be shown to the candidate with relevant clinical scenarios to assess the ability to interpret findings and discuss a management plan
10.	Ophthalmic Radiology • B-scan • CT Scan • MRI	Images/videos will be shown to the candidate with relevant clinical scenario to assess the ability to interpret findings, make a diagnosis and discuss management with complication.
11.	Clinical Problem Solutions • Anterior Segment	The candidate will be required to assess the ability to examine the patient interpret the findings, make a diagnosis and discuss management with complication.
12.	Clinical Problem Solutions • Posterior Segment	The candidate will be required to assess the ability to examine the patient interpret the findings, make a diagnosis and discuss management with complication.
13.	Ophthalmic Emergencies • Acute Congestive Glaucoma • Central Retinal artery Occlusion • Chemical burns, • Trauma	To assess the ability of the candidate to amicably approach the emergency and perform steps of management.

14.	Biometry • A-scan • Keratometer	To assess the ability of the candidate to perform steps of the asked procedure on the patient/simulated subject and calculate the IOL number using the appropriate formula on the data obtained.
15.	General Surgery Or Emergency Medicine	To assess the ability of candidate to perform steps of asked procedure on patient/simulated subject/mannequin

3rd Year In-House Training Assessment TOS

Third Year In-Training Assessment- Total marks 200				
Exam Component	**No. of Questions/stations**	**Marks Distribution**	**Total Marks**	**Passing Marks**
Written (MCQs)	100	1 mark each	100	60
Clinical - OSCE	10	10 marks each	100	60
AV-OSPE	10	10 marks each	100	60

THEORY TABLE OF SPECIFICATIONS

- **Section (I) Clinical Ophthalmology**
- **No. of items (50)**
  - **Level of questions (according to Bloom's taxonomy)**
  - **C2**
  - **C3**

S. No	Topic	Impact	Frequency	I × F	Weight	No of items	Diagnosis	Investigation	Treatment	Basic knowledge
1	Eyelids	3	2	6	0.103	5.17=5	2	1	2	0
2	Lacrimal drainage system	3	2	6	0.103	5.17=5	2	1	2	0
3	Orbit	3	2	6	0.103	5.17=5	2	1	2	0
4	Dry eye disorders	2	2	4	0.068	3.45=3	1	1	1	0
5	Conjunctiva	2	3	6	0.103	5.17=5	2	1	2	0
6	Cornea	2	3	6	0.103	5.17=5	2	1	2	0
7	Corneal and Refractive surgery	2	2	4	0.068	3.45=3	2	0	1	0

8	Episclera and sclera	2	2	4	0.068	3.45=3	1	1	1	0
9	Lens	3	3	9	0.155	7.75=8	3	2	3	0
10	Glaucoma	3	3	9	0.155	7.75=8	3	2	3	0

- Discipline Ophthalmology
- Level of exam (Third Year In-house)
- Section (II) Clinical Ophthalmology
- No. of items (50)
  - Level of questions (according to Bloom's taxonomy)
  - C2
  - C3

S. No	Topic	Impact	Frequency	I × F	Weight	No of items	Diagnosis	Investigation	Treatment	Basic knowledge
1	Uveitis	2	3	6	0.096	4.83=5	2	1	2	4
2	Ocular Tumors	2	1	2	0.032	1.612=2	1	0	1	0
3	Retinal Vascular disease	3	3	9	0.145	7.25=7	3	1	3	0
4	Acquired Macular Disorders	2	2	4	0.064	3.22=3	1	1	1	0
5	Hereditary Fundus Dystrophies	2	3	6	0.096	4.83=5	3	1	1	0
6	Retinal Detachment	3	3	9	0.145	7.25=7	3	1	3	0
7	Strabismus	2	3	6	0.096	4.83=5	2	1	2	0
8	Vitreous Opacities	2	2	4	0.064	3.22=3	2	0	1	0
9	Neuro-Ophthalmology	2	3	6	0.096	4.83=5	3	1	1	0
10	Ocular side effects of systemic medications	1	1	1	0.016	0.806=1	1	0	0	0
11	Ocular Trauma	3	3	9	0.145	7.25=7	3	1	3	0

CLINICAL COMPONENT TABLE OF SPECIFICATIONS

OSCE stations- 10
Total marks- 100
Passing marks- 60
Time allowed per station- 5min
Interactive stations- 5

Topic Wise Distribution of Ophthalmology OSCE/AV-OSPE Stations

No of Stations	Station Description & Topics	Competence to be assessed
3	**Ophthalmic Investigations** **Fundus fluorescein angiography, OCT, Visual fields, Corneal topography, Hess chart**	To assess the ability of the candidate to interpret the investigation and answer the questions (Critical thinking & Problem solving)
1	**Clinical Methods** • **Pupil Evaluation** • **Extraocular movements** • **Squint assessment** • **Visual fields by confrontation**	To assess the candidate's ability to perform the given examination task on a patient/simulated subject.
1	**Clinical Methods** • **Slit lamp examination techniques** • **Tonometry** • **Indirect ophthalmoscopy** • **Gonioscopy**	To assess the candidate's ability to perform the given examination task on a patient/simulated subject.
1	**Ophthalmic procedures**	Images/videos will be shown to the candidate with relevant clinical scenarios to assess the ability to interpret findings and discuss the management plan (Critical thinking & Problem solving)
1	**Ophthalmic Radiology** • **B-scan** • **A-scan** • **CT-Scan/MRI**	Images/videos will be shown to the candidate with relevant clinical scenarios to assess the ability to interpret findings, make a diagnosis, and discuss the management/

		complications.
1	**Clinical Problem Solutions** • **Cataract** • **Glaucoma** • **Cornea** • **Uveitis** • **Strabismus**	A clinical scenario will be given to the candidate to assess the ability to interpret the findings, make a diagnosis, and discuss the management/ complications. (Clinical reasoning and problem solving)
1	**Clinical Problem Solutions** • **Medical retina**	A clinical scenario will be given to the candidate to assess the ability to interpret the findings, make a diagnosis, and discuss the management/complications. (Clinical reasoning and problem solving)
1	**Clinical Problem Solutions** • **Surgical retina**	A clinical scenario will be given to the candidate to assess the ability to interpret the findings, make a diagnosis, and discuss the management/complications. (Clinical reasoning and problem solving)

AV-OSPE stations- 10
Total marks- 100
Passing marks- 60
Time allowed per station- 5min

Topic Wise Distribution of Ophthalmology AV-OSPE Stations

Station No:	Station Description & Topics	Competence to be assessed
1	**Ophthalmic Investigations** **Fundus fluorescein angiography, OCT**	To assess the ability of the candidate to interpret the investigation and answer the questions (Critical thinking & Problem solving)
2	**Ophthalmic Investigations** **Visual fields**	To assess the ability of the candidate to interpret the investigation and answer the questions (Critical thinking & Problem solving)

3	**Ophthalmic Investigations** **Corneal topography**	To assess the ability of the candidate to interpret the investigation and answer the questions (Critical thinking & Problem solving)
4	**Ophthalmic Investigations** **Hess chart**	To assess the ability of the candidate to interpret the investigation and answer the questions (Critical thinking & Problem solving)
5	**Ophthalmic Radiology** • **B-scan** • **A-scan** • **CT-Scan/MRI**	Images/videos will be shown to the candidate with relevant clinical scenarios to assess the ability to interpret findings, make a diagnosis, and discuss the management/ complications.
6	**Clinical Problem Solutions** • **Cataract** • **Glaucoma**	A clinical scenario will be given to the candidate to assess the ability to interpret the findings, make a diagnosis, and discuss the management/ complications. (Clinical reasoning and problem solving)
7	**Clinical Problem Solutions** • **Medical retina**	A clinical scenario will be given to the candidate to assess the ability to interpret the findings, make a diagnosis, and discuss the management/complications. (Clinical reasoning and problem solving)
8	**Clinical Problem Solutions** • **Surgical retina**	A clinical scenario will be given to the candidate to assess the ability to interpret the findings, make a diagnosis, and discuss the management/complications. (Clinical reasoning and problem solving)
9	**Clinical Problem Solutions** • **Cornea** • **Uveitis**	Images/videos will be shown to the candidate with relevant clinical scenarios to assess the ability to interpret findings and discuss the

		management plan (Critical thinking & Problem solving)
10	**Clinical Problem Solutions** • **Strabismus** • **Neuro-Ophthalmology**	Images/videos will be shown to the candidate with relevant clinical scenarios to assess the ability to interpret findings and discuss the management plan (Critical thinking & Problem solving)

Final Term Assessment TOS Calgary Model

- **Paper (I)**
- **No. of items (100)**

S. No	Topic	Presentation	Impact	Frequency	I × F	Weight	No of items	Diagnosis	Investigation	Treatment	Basic knowledge
1	**Eyelids**	Benign nodules and cysts	1	3	3	0.024	2.4=2	1	0	1	0
		Malignant tumors	2	2	4	0.03	3=3	1	1	1	0
		Bacterial and viral infections, Allergic disorders and blepharitis	1	3	3	0.024	2.4=2	1	0	1	0
		Ptosis, entropion and ectropion	2	3	6	0.048	4.8=5	02	0	2	1
2	**Lacrimal drainage system**	Congenital and acquired obstruction	1	3	3	0.024	2.40=2	0	1	1	0
		Chronic canaliculitis	1	1	1	0.007	0.7=1	1	0	0	0
		Dacryocystitis	2	3	6	0.048	4.8=5	0	2	3	0
3	**Orbit**	Thyroid eye disease	3	2	6	0.048	4.8=5	0	2	2	1
		Infections and Inflammatory disease	2	2	4	0.03	3=3	1	1	1	0
		Vascular malformations and tumors	1	1	1	0.007	0.7=1	0	0	1	0

		Cystic lesions	1	1	1	0.007	0.7=1	0	0	1	0

4	**Dry eye disorders**	Tear film	2	3	6	0.048	4.8=5	1	2	2	0
		Dry eye disorders	1	3	3	0.024	2.4=2	0	1	1	0
5	**Conjunctiva**	Bacterial, viral and allergic conjunctivitis	1	3	3	0.024	2.40=2	0	1	1	0
		Cicatrizing conjunctivitis and degenerations	1	2	2	0.016	1.60=2	0	1	1	0
6	**Cornea**	Bacterial, viral and fungal keratitis	2	3	6	0.048	4.8=5	1	1	3	0
		Interstitial and protozoan keratitis	2	1	2	0.016	1.6=2	1	0	1	0
		Rosacea, Neurotrophic and exposure keratitis, Bacterial hypersensitivity mediated corneal disease	2	1	2	0.016	1.6=2	1	0	1	0
		Corneal ectasias	1	3	3	0.024	2.4=2	0	1	1	0
		Corneal dystrophies and degenerations	2	1	2	0.016	1.6=2	1	1	0	0
		Peripheral corneal ulceration and Metabolic keratopathies	1	1	1	0.007	0.7=1	0	0	1	0
7	**Corneal and refractive surgery**	Keratoplasty	2	2	4	0.03	3=3	0	1	2	0

		Refractive surgeries	2	2	4	0.03	3=3	0	1	2	0

8	**Episclera and sclera**	Episcleritis and scleritis	1	2	2	0.016	1.6=2	1	0	1	0
		Scleral discoloration	1	1	1	0.007	0.7=1	1	0	0	0
9	**Lens**	Congenital cataract	2	2	4	0.03	3=3	1	0	2	0
		Acquired cataract	2	3	6	0.048	4.8=5	1	1	3	0
		Ectopia lentis	2	2	4	0.030	3.0=3	1	0	2	0
10	**Glaucoma**	Tonometry, gonioscopy and perimetry	2	2	4	0.030	3.0=3	1	2	0	0
		Primary openangle glaucoma	2	3	6	0.048	4.8=5	0	2	3	0
		Primary angleclosure glaucoma	2	2	4	0.03	3=3	1	1	1	0
		Ocular hypertension and Normal tension glaucoma	1	2	2	0.016	1.6=2	1	0	1	0
		Pseudo exfoliation and Inflammatory glaucoma	2	2	4	0.030	3.0=3	1	0	2	0
		Pigment dispersion glaucoma and Iridocorneal endothelial syndrome	1	2	2	0.016	1.60=2	1	0	1	0
		Neovascular and lens-related glaucoma	2	2	4	0.03	3.0=3	2	0	1	0
		Traumatic glaucoma and Glaucoma in intraocular tumors	1	2	2	0.016	1.6=2	1	0	1	0
		Primary congenital glaucoma	2	1	2	0.016	1.6=2	1	0	1	0

Level of questions (according to Bloom's taxonomy)

C2 26
C3 74

- **Discipline Ophthalmology**
- **Level of exam (FTA)**
- **Paper (II)**
- **No. of items (100)**

S. No	Topic	Presentation	Impact	Frequency	I × F	Weight	No of items	Diagnosis	Investigation	Treatment	Basic knowledge
1	**Uveitis**	Anterior uveitis	2	3	6	0.042	4.2=4	0	2	2	0
		Intermediate uveitis	2	1	2	0.014	1.4=1	0	0	1	0
		Uveitis in spondyloarthropathies and juvenile arthritis	1	1	1	0.007	0.7=1	0	0	1	0
		Sarcoidosis and Bechet syndrome	1	1	1	0.007	0.7=1	0	0	1	0
		Vogt-koyanagi Harada syndrome	1	1	1	0.007	0.7=1	0	0	1	0
		Bacterial and viral uveitis	1	1	1	0.007	0.7=1	0	0	1	0
		Fungal and parasitic uveitis, Uveitis in bowel and renal disease	1	1	1	0.007	0.7=1	1	0	0	0
2	**Ocular tumors**	Benign and malignant conjunctival tumors	1	2	2	0.014	1.4=1	0	0	1	0
		Iris cysts and tumors, Ciliary body tumors	1	1	1	0.007	0.7=1	1	0	0	0
		Tumors of the retina and choroid	1	1	1	0.007	0.7=1	0	0	1	0
		Primary intraocular lymphoma	1	1	1	0.007	0.7=1	0	0	1	0

		Paraneoplastic syndromes	1	1	1	0.007	0.7=1	1	0	0	0
3	**Retinal vascular disease**	Diabetic retinopathy	3	2	6	0.042	4.2=4	0	2	2	0
		Retinal venous occlusive disease	3	2	6	0.042	4.2=4	0	2	2	0
		Retinal arterial occlusive disease	2	1	2	0.014	1.4=1	0	1	0	0
		Ocular ischemic syndrome and Sickle cell retinopathy	1	1	1	0.007	0.7=1	1	0	0	0
		Hypertensive disease	2	3	6	0.042	4.2=4	0	2	2	0
		Retinopathy of prematurity	3	1	3	0.021	2.1=2	1	0	1	0
		Retinal artery macro aneurysm and Primary retinal telangiectasis	1	1	1	0.007	0.7=1	0	0	1	0
		Eales disease	1	1	1	0.007	0.7=1	0	0	1	0
		Radiation retinopathy and Purtscher retinopathy	1	1	1	0.007	0.7=1	1	0	0	0

		Valsalva retinopathy	1	1	1	0.007	0.7=1	0	0	1	0
4	**Acquired macular disorders**	Imaging in macular disease	3	2	6	0.042	4.2=4	0	2	2	0
		Age related macular degeneration	2	2	4	0.028	2.8=3	0	1	2	0
		Age-related macular hole	2	1	2	0.014	1.4=1	0	1	0	0

		Central serous retinopathy and Cystoid macular edema	1	2	2	0.014	1.4=1	0	0	1	0
		Macular epiretinal membrane and Polypoidal choroidal vasculopathy	1	1	1	0.007	0.7=1	0	0	1	0
		Degenerative myopia	1	2	2	0.014	1.4=1	0	0	1	0
		Angioid streaks and Vitreomacular traction syndrome	1	1	1	0.007	0.7=1	0	0	1	0
		Idiopathic choroidal neovascularization	1	1	1	0.007	0.7=1	0	0	1	0
		Solar retinopathy	1	1	1	0.007	0.7=1	0	0	1	0
5	**Hereditary Fundus dystrophies**	Macular dystrophies and Choroidal dystrophies	1	2	2	0.014	1.4=1	1	0	0	0
		Generalized photoreceptor dystrophies	1	2	2	0.014	1.4=1	0	1	0	0
		Albinism and Cherry red spot at macula	1	1	1	0.007	0.7=1	1	0	0	0
6	**Retinal detachment**	Rhegmatogenous retinal detachment	3	2	6	0.042	4.2=4	0	1	3	0
		Tractional retinal detachment	2	2	4	0.028	2.8=3	1	0	2	0
		Exudative retinal detachment	1	1	1	0.007	0.7=1	0	0	1	0
		Pars plana vitrectomy	3	2	6	0.042	4.2=4	0	1	3	0
7	**Strabismus**	Amblyopia	1	3	3	0.021	2.1=2	0	1	1	0
		Heterophoria and vergence abnormalities	1	2	2	0.014	1.4=1	0	0	1	0
		Esotropia	1	2	2	0.014	1.4=1	0	0	1	0
		Exotropia	1	1	1	0.007	0.7=1	0	0	1	0

		Congenital cranial dysinnervation disorders	1	1	1	0.007	0.7=1	1	0	0	0
		Monocular elevation deficiency and Brown syndrome	1	1	1	0.007	0.7=1	0	0	1	0
		Alphabet patterns	1	1	1	0.007	0.7=1	0	0	1	0
8	**Vitreous opactities**	Vitreous hemorrhage	2	2	4	0.028	2.8=3	1	0	2	0
9		Neuroimaging	2	2	4	0.028	2.8=3	0	2	1	0
	Neuroophthalmology	Optic nerve, pupil, chiasma, retro chiasmal pathways	2	3	6	0.042	4.2=4	1	1	2	0
		Ocular motor nerves	2	1	2	0.014	1.4=1	1	0	0	0
		Supranuclear disorders of ocular motility	1	1	1	0.007	0.7=1	1	0	0	0
		Nystagmus and Facial spasm	1	1	1	0.007	0.7=1	0	0	1	0
		Ocular myopathies and Neurofibromatosis	1	2	2	0.014	1.4=1	0	0	1	0
		Migraine and Neuralgias	1	1	1	0.007	0.7=1	0	0	1	0
10	**Ocular side effects of systemic medications**	Cornea	1	1	1	0.007	0.7=1	1	0	0	0
		Ciliary effusion and lens	1	1	1	0.007	0.7=1	1	0	0	0
		Optic nerve	1	1	1	0.007	0.7=1	1	0	0	0
11	**Ocular trauma**	Eyelid trauma	1	2	2	0.014	1.4=1	0	0	1	0
		Orbital trauma	2	2	4	0.028	2.8=3	0	1	2	0
		Trauma to globe	2	2	4	0.028	2.8=3	0	1	2	0
		Chemical injuries	2	2	4	0.028	2.8=3	2	0	1	0

Level of questions (according to Bloom's taxonomy)

C2 25
C3 75

Table of Specification for OSCE FTA

Serial #	Station Type	Clinical Competence	Task
1	Observed (Interactive)	Interpretation of investigation and clinical reasoning	MRI interpretation, diagnosis, management and complications
2	Observed (Interactive)	History taking and clinical reasoning	Patient of sudden /gradual painful/painless loss of vision (Real or SP)
3	Observed (Interactive)	Communication skills	Counselling of a patient of DR, Glaucoma, retinoblastoma, retinitis pigmentosa, ROP (Real or SP)
4	Observed (Interactive)	Performance of task	Examination of patient of squint, pupils, EOM, Visual fields, ptosis, proptosis
5	Observed (Interactive)	Interpretation of investigation and problem solving	OCT interpretation, diagnosis and treatment
6	Observed (Interactive)	Interpretation of investigation and problem solving	Fundus picture interpretation, diagnosis and treatment
7	Observed (Interactive)	Interpretation of investigations and critical thinking	CT-scan interpretation and treatment options of diagnosis
8	Observed (Interactive)	Critical thinking and problem solving based on investigation	Hess chart interpretation and critical thinking
9	Observed (Interactive)	Video interpretation and critical thinking	Glaucoma, Cataract, RD videos interpretation and treatment options of disease
10	Observed (Interactive)	Interpretation of investigation and clinical reasoning	Corneal topography interpretation and justifications for management
11	Observed (Interactive)	Interpretation of investigation and problem solving	FFA interpretation, diagnosis and treatment
12	Observed (Interactive)	Interpretation of investigation and problem solving	B-scan interpretation, diagnosis and treatment
13	Observed (Interactive)	Interpretation of investigation and critical thinking	Visual fields interpretation, diagnosis, management and complications
14	Observed (Interactive)	Performance of task and problem solving	Slit lamp examination techniques, Tonometry, Indirect ophthalmoscopy, Gonioscopy
15	Observed	Performance of task	Ophthalmic procedures

	(Interactive)		Intravitreal injection, Lid stitching, corneal laceration repair, fortified antibiotic prep, probing and syringing

Research Assessment

Submission of Synopsis and Thesis

1. The candidates shall prepare their synopsis as per guidelines provided by the Advanced Studies & Research Board, available on RMU website.
2. Synopsis of research project should be submitted and approved by the end of the 1st year of MS program.
3. The minimum duration between approval of synopsis and submission of thesis shall be one year, but the thesis cannot be submitted later than 8 years of enrolment.
4. Thesis shall be submitted by the candidate duly recommended by the Supervisor.
5. The research thesis must be compiled and bound in accordance with the Thesis Format Guidelines approved by the University and available on website.
6. The research thesis will be submitted along with the fee prescribed by the University.

Thesis Defense

1. All candidates admitted in MS course shall appear in thesis evaluation component of the MTA after completion of 4th years of their training course.
2. Only those candidates shall be eligible for thesis evaluation who have passed Midterm Examination and Oral & Practical/ Clinical component of Exit Examination.
3. The examination shall include thesis evaluation with defense.
4. The Vice Chancellor shall appoint three external examiners for thesis evaluation, preferably from other universities and from abroad, out of the panel of examiners approved by the Advanced Studies & Research Board. The examiners shall be appointed from respective specialty.
5. The thesis shall be sent to the external examiners for evaluation, well in time before the date of defense examination and should be approved by all the examiners.
6. After the approval of thesis by the evaluators, the thesis defense examination shall be held within the University on such date as may be notified by the Controller of Examinations. The Controller of Examinations shall make appropriate arrangements for the conduct of thesis defense examination in consultation with the supervisor, who will co-ordinate the defense examination.
7. The thesis defense examination shall be conducted by two External Examiners who shall submit a report on the suitability of the candidate for the award of degree. The supervisor shall act as coordinator.

SECTION X: ENTRUSTABLE PROFESSIONAL ACTIVITY (EPA)

Overview

Entrustable Professional Activities (EPAs) for a four-year ophthalmology residency program are essential in defining the specific tasks residents should be able to perform independently by the end of their training. These EPAs are aligned with clinical core competencies and are designed to ensure that residents progressively develop their skills and knowledge throughout their residency.

Levels of EPA

1)Be present and observe or Assist

2)Direct pro-active Supervision: The supervisor is physically present with the resident and the patient.

3) Indirect re-active Supervision is broken down into two levels: Direct Supervision Immediately Available: The supervisor is physically within the hospital or other site of patient care and is immediately available to provide direct supervision. Direct Supervision not readily Available: The supervisor is not physically present within the hospital or other site of patient care, but is immediately available by means of telephonic and/or electronic modalities, and is available to provide direct supervision.

4) Can supervise other junior residents

EPA (Clinical Competencies)	RY-1		RY-2		RY-3		RY-4	
	EPA Level	No	EPA Level	No	EPA Level	No	EPA Level	No
Conducting a Comprehensive Patient Evaluation and History Taking for Common Ophthalmic Presentations	2	20	2-3	20	4	20	4	20
Performing Essential Ophthalmic Examinations.	2	20	2-3	20	3-4	20	4	20
Recognizing Life- and Vision-Threatening Findings in Basic Ophthalmic Diagnostic Investigations	2	20	2-3	20	3-4	20	4	20
Developing an initial management plan for patients with an acute ophthalmic condition or presentation	2	20	2-3	20	3-4	20	4	20
Performing basic Ophthalmic surgical Procedures	2	20	2-3	20	3-4	20	4	20
Effectively Communicating Clinical Findings and Management Plans to Patients	2	20	2-3	20	3-4	20	4	20
Performing Cataract Extraction Surgeries	2	20	2-3	10	3-4	20	4	20
Performing anterior segment laser procedures	2	10	2-3	10	3-4	20	4	20
Performing Retinal Procedures, Including Laser Treatments and Injections	2	20	2-3	20	3-4	20	4	20
Performing orbit, oculoplastic and strabismus surgical procedures	2	10	2-3	10	3	10	3-4	10
Managing Ocular Trauma and Its Complications	2	20	2-3	20	3-4	20	4	20

EPA of MS Ophthalmology Training Program

SECTION XI: LOGBOOK

Introduction to Logbook

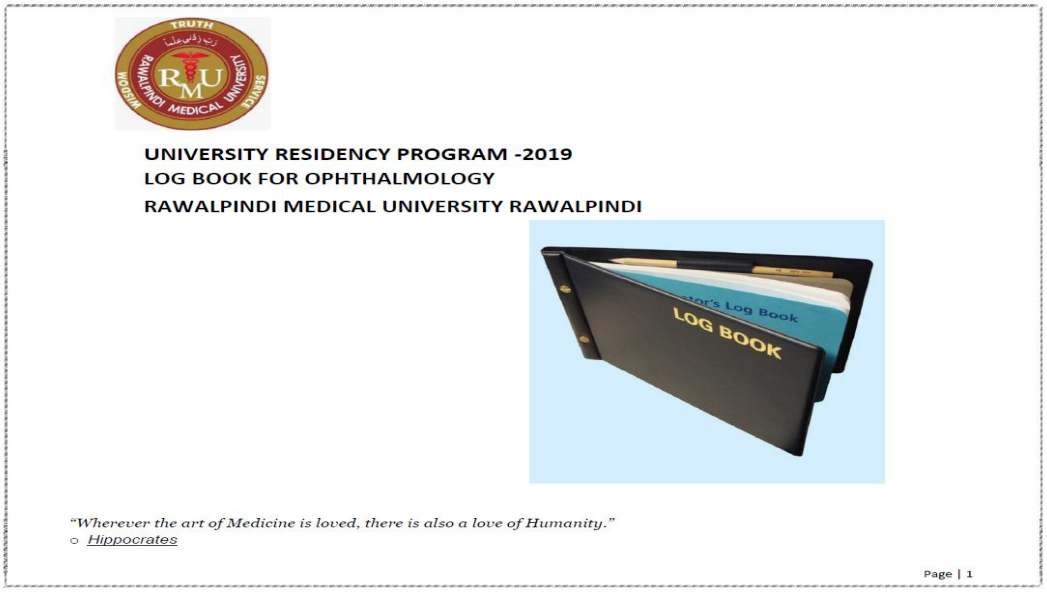
It is a structured book in which certain types of educational activities and patient related information is recorded, usually by hand. Logbooks are used all over the world from undergraduate to postgraduate training, in human, veterinary and dental medicine, nursing schools and pharmacy, either in paper or electronic format.

Logbooks provide a clear setting of learning objectives and give trainees and clinical teachers a quick overview of the requirements of training and an idea of the learning progress. Logbooks are especially useful if different sites are involved in the training to set a (minimum) standard of training. Logbooks assist supervisors and trainees to see at one glance which learning objectives have not yet been accomplished and to set a learning plan. The analysis of logbooks can reveal weak points of training and can evaluate whether trainees have fulfilled the minimum requirements of training.

Logbooks facilitate communication between the trainee and clinical teacher. Logbooks help to structure and standardize learning in clinical settings. In contrast to portfolios, which focus on students' documentation and self-reflection of their learning activities, logbooks set clear learning objectives and help to structure the learning process in clinical settings and to ease communication between trainee and clinical teacher. To implement logbooks in clinical training successfully, logbooks have to be an integrated part of the curriculum and the daily routine on the ward. Continuous measures of quality management are necessary.

Reference

Brauns KS,Narciss E, Schneyinck C, Böhme K, Brüstle P, Holzmann UM, etal. Twelve tips for successfully implementing logbooks in clinical training. Med Teach. 2016 Jun 2; 38(6): 564–569.



UNIVERSITY RESIDENCY PROGRAM -2019
LOG BOOK FOR OPHTHALMOLOGY
RAWALPINDI MEDICAL UNIVERSITY RAWALPINDI

"Wherever the art of Medicine is loved, there is also a love of Humanity."
○ Hippocrates

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Logbook Entry Map

Procedures	First Year	Second Year	Third Year	Fourth Year
Visual Acuity	10	10	05	05
Refraction	10	10	05	05
Optic Nerve function test	10	10	05	05
Slit Lamp Examination	10	10	15	15
Tonometry	10	10	15	15
Visual Fields Examination	10	10	00	00
Cover Uncover test	10	05	05	00
Direct Ophthalmoscopy	05	05	05	05
Indirect Fundoscopy	04	05	05	05
Biometry	10	05	05	00
B-scan ultrasonography	05	05	05	05
Pre-op management of eye surgeries	05	05	00	00
Post op management of eye surgeries	05	05	00	00
Facial block	05	05	00	00
Retrobulbar block	02	02	03	03
Gonioscopy	02	00	05	03
Corneal ROS	02	02	03	03
Orthoptic Assessment	02	00	04	03
Visual Field Interpretation	02	00	03	05
OCT Interpretation	02	05	06	05
FFA interpretation	02	00	03	05
Ptosis Examination	05	05	00	00
Proptosis Examination	01	02	03	04
Intravitreal antibiotics	02	03	02	03
Chalazion I&D	05	05	00	00
Pterygium excision	02	03	05	00
Nd: YAG Laser capsulotomy	00	00	00	05
Nd: YAG Laser iridotomy	00	00	00	03
Argon Laser photocoagulation	00	00	02	03
Intravitreal anti VEGF	02	02	03	03
ECCE	03	03	06	07
Phacoemulsification	00	04	06	07
Trabeculectomy	00	00	02	03
Squint surgery	00	00	02	03
Retinal detachment surgery	00	00	02	03
Oculoplastic procedures	00	00	03	02
Trauma repair	02	02	03	03
Ptosis surgery	00	01	02	02
Orbital surgery	00	01	02	02
Orbital tumors	00	01	01	01
Keratoplasty	00	01	02	02
Dermoid cyst	01	02	03	00
Scleral buckling	00	00	02	03
MPTCPC	00	02	02	01
Probing & Syringing	03	02	00	00
Dacryocystorhinostomy	02	02	01	00
Pars Plana Vitrectomy	00	00	01	03
Total	150	150	150	150

SECTION XII: PORTFOLIO

Introduction to Portfolio

What is a portfolio?

A collection of a learner's various documents and assessments throughout residency that reflect their professional development over time. May include referral letters and procedure logs (Rider et al., 2007). Portfolios also frequently include self-assessments, learning plans, and reflective essays (Epstein, 2007).

Portfolio Components and Expectations by Training Year

Year 1 Portfolio: Foundational Year

Focus: Developing foundational medical knowledge, basic clinical skills, and understanding professional behavior.

Key Components:

Academic Activities:

Attendance in didactic lectures, journal clubs, and seminars (≥80% attendance required).

Performance in LMS-based assessments and mid-module/end-module examinations.

Case-based discussions and participation in SDLs.

Clinical Skills:

Log of cases observed and assisted (e.g., cataract surgeries, slit-lamp exams).

Initial DOPS evaluations for basic procedures (e.g., retinoscopy, IOP measurement).

Research Activities:

Participation in research methodology workshops.

Selection of a thesis topic and development of a research proposal.

Professionalism and Ethics:

Documentation of adherence to ethical standards and professional behavior.

Feedback from supervisors and peers on interpersonal skills and teamwork.

Reflection and Feedback:

Resident's reflections on learning experiences and goals for improvement.

Year 2 Portfolio: Intermediate Skills Development

Focus: Gaining competency in intermediate diagnostic and therapeutic procedures and starting independent patient care.

Key Components:

Academic Activities:

Performance in block exams, OSCEs, and viva voce assessments.

Continued participation in journal clubs and case presentations.

Clinical Skills:

Log of independently performed diagnostic procedures (e.g., slit-lamp exams, gonioscopy).

Progress in minor surgical skills (e.g., chalazion excision, pterygium surgery).

DOPS and mini-CEX evaluations reflecting growth in patient care competencies.

Research Activities:

Submission of a literature review related to the thesis topic.

Regular updates on research progress and data collection.

Professionalism and Ethics:

Multi-source feedback (MSF) evaluations from faculty, peers, and patients.

Documentation of ethical challenges encountered and how they were managed.

Reflection and Feedback:

Self-assessment of skills and learning, with updated learning objectives.

Year 3 Portfolio: Advanced Clinical Competence

Focus: Mastering advanced clinical and surgical skills, managing complex cases, and conducting research independently.

Key Components:

Academic Activities:

Continued high performance in assessments, including SEQs and mock exams.

Leadership in journal clubs, seminars, and interdepartmental conferences.

Clinical Skills:

Log of advanced diagnostic and surgical procedures performed independently (e.g., phacoemulsification, trabeculectomy).

Evaluations through ICO-OCEX, ICO-OSCAR, and mini-CEX tools.

Detailed documentation of cases managed independently.

Research Activities:

Thesis completion, submission, and preparation for defense.

Presentation of findings at conferences or surgical audits.

Professionalism and Ethics:

Multi-source feedback from patients and staff assessing communication and professionalism.

Documentation of contributions to team-based practice and patient safety initiatives.

Reflection and Feedback:

Critical analysis of strengths and areas needing improvement.

Year 4 Portfolio: Competency and Leadership

Focus: Transitioning to independent practice, teaching juniors, and finalizing research contributions.

Key Components:

Academic Activities:

Demonstrating mastery in final assessments and case presentations.

Active mentoring of junior residents during clinical and academic sessions.

Clinical Skills:

Log of all advanced surgeries performed as a primary surgeon.

Final WPBA evaluations, focusing on readiness for independent practice.

Research Activities:

Successful thesis defense and publication of research findings in peer-reviewed journals.

Participation in surgical audits and contribution to program improvements.

Professionalism and Ethics:

Leadership roles in clinical teams and patient care.

Multi-source feedback evaluating readiness for independent, ethical practice.

Reflection and Feedback:

Comprehensive self-reflection on the residency journey, with feedback from faculty.

Assessment and Feedback

Portfolio Grading:
Each portfolio is graded on a structured rubric covering:

Completeness of documentation (20%)

Quality of work in each competency area (40%)

Feedback and reflection quality (20%)

Adherence to timelines and participation (20%)

Feedback Sessions:
Residents receive individualized feedback after each review to guide future improvements and ensure alignment with program milestones.

Promotion Criteria:
Satisfactory portfolio review is required for promotion to the next year of training. Deficiencies must be addressed in a remediation plan.

What to be included in a portfolio?

Resident may include the following components in his or her portfolio:

1. Curriculum Vitae (CV)
2. Personal Publications
3. Research abstracts presented at professional conferences
4. Presentations at teaching units/departmental meetings and teaching sessions
5. Patient (case) presentations
6. Log of clinical procedures
7. Copies of written feedback received (direct observations, field notes, daily evaluations)
8. Quality improvement project plan and report of results
9. Summaries of ethical dilemmas (and how they were handled)
10. Chart notes of particular interest
11. Photographs and logs of medical procedures performed
12. Consult/referral letters of particular interest
13. Monthly faculty evaluations
14. 360-degree evaluations
15. Copies of written instructions for patients and families
16. Case presentations, lectures, logs of medical students mentored

SECTION XIII: REFERENCES

Teaching Methods

Kolb, D. Experiential Learning. Englewood Cliffs, NJ: Prentice Hall. 1984

Maudsley G. Do we all mean the same thing by "PBL"? Academic Medicine 1999; 74:178-85

Hill W. Learning Thru Discussion 2nd edition. London: Sage Publications. 1977.

Cook D. Web-based learning: pros, cons and controversies. Clinical Medicine 2007; 7(1):37-42.

Greenhalgh T. Computer assisted learning in undergraduate medical education. BMJ 2001; 322:40-4.

Chumley-Jones HS *et al* Web-based learning: Sound educational method or Hype? A review of the evaluationliterature. Academic Medicine 2002;77(10):S86-S93.

Schon D. Educating the reflective practitioner. San Francisco: Jossey Bass. 1984

Lockyer J *et al* Knowledge translation: the role and practice of reflection. Journal of Continuing Education. 2004;24:50-56

Assessment methods

Van der Vleuten, CPM and Swanson, D. Assessment of clinical skills with standardized patients: State of theart. *Teach Learn Med*. 1990; 2: 58-76.

Haladyna TM. *Developing and validating multiple-choice test items*. Hillsdale, New Jersey: L. Erlbaum Associates.1994.

Case SM, Swanson DB. *Constructing written test questions for the basic and clinical sciences.* Philadelphia, PA:National Board of Medical Examiners, 1996 (www.nbme.org)

Case SM, Swanson DB. *Constructing written test questions for the basic and clinical sciences*. Philadelphia, PA:National Board of Medical Examiners, 1996 (www.nbme.org)

Center for Creative Leadership, Greensboro, North Carolina (http://www.ccl.org).

Challis M. AMEE medical education guide no. 11 (revised): Portfolio-based learning and assessment in medicaleducation. *Med Teach.* 1999; 21: 370-86.

Gray, J. Global rating scales in residency education. *Acad Med*. 1996; 71: S55-63.

Haladyna TM. *Developing and validating multiple-choice test items*. Hillsdale, New Jersey: L. Erlbaum Associates.1994.

Kaplan SH, Ware JE. The patient's role in health care and quality assessment. In: Goldfield N and Nash D (eds). *Providing quality care (2nd ed): Future Challenge.* Ann Arbor, MI: Health Administration Press, 1995: 25-52.

Matthews DA, Feinstein AR. A new instrument for patients' ratings of physician performance in the hospital setting. *J Gen Intern Med*. 1989:4:14-22.

Mancall EL, Bashook PG. (eds.) *Assessing clinical reasoning: the oral examination and alternative methods*. Evanston, Illinois: American Board of Medical Specialties, 1995.

Munger, BS. Oral examinations. In Mancall EL, Bashook PG. (editors) *Recertification: new evaluation methods and strategies*. Evanston, Illinois: American Board of Medical Specialties, 1995: 39-42.

Noel G, Herbers JE, Caplow M et al. How well do Internal Medicine faculty members evaluate the clinical skills ofresidents? *Ann Int Med*. 1992; 117: 757-65.

Norman, Geoffrey. *Evaluation Methods: A resource handbook*. Hamilton, Ontario, Canada: Program for EducationalDevelopment, McMaster University, 1995: 71-77.Tekian A, McGuire CH, et al (eds.) *Innovative simulations for assessing professional competence*. Chicago, Illinois:University of Illinois at Chicago, Dept. Med. Educ. 1999

Tugwell P, Dok, C. Medical record review. In: Neufeld V and Norman G (ed). *Assessing clinical competence.* NewYork: Springer Publishing Company, 1985: 142-82.

Van der Vleuten, CPM and Swanson, D. Assessment of clinical skills with standardized patients: State of the art.*Teach Learn Med*. 1990; 2: 58-76.

Watts J, Feldman WB. Assessment of technical skills. In: Neufeld V and Norman G (ed). *Assessing clinical competence.* New York: Springer Publishing Company, 1985, 259-74.

Winckel CP, Reznick RK, Cohen R, Taylor B. Reliability and construct validity of a structured technical skillsassessment form. *Am J Surg*. 1994; 167: 423-27.

Milestones

https://www.acgme.org/Portals/0/PDFs/Milestones/Ophthalmology Milestones.pdf

http://education.med.ufl.edu/files/2010/10/Ophthalmology Milestones.pdf

http://www.upstate.edu/medresidency/current/competencies.php

SECTION XIV: APPENDICES

List of Appendices

RMU راولپنڈی میڈیکل یونیورسٹی
Rawalpindi Medical University

1

RAWALPINDI MEDICAL UNIVERSITY

MENTOR / SUPERVISOR EVALUATION OF TRAINEE

Resident's Name: _____

Evaluator's Name(s): _____

Hospital Name: _____

Date of Evaluation: _____

☐ **Traditional Track (10% Clinic)** ☐ **Primary Care Track (20% Clinic)**

1	Unsatisfactory
2	Below Average
3	Average
4	Good
5	Superior

Please circle the appropriate number for each item using the scale above.

Patient Care	Scale				
1. Demonstrates sound clinical judgment	1	2	3	4	5
2. Presents patient information case concisely without significant omissions or digressions	1	2	3	4	5
3. Able to integrate the history and physical findings with the clinical data and identify all of the patient's major problems using a logical thought process	1	2	3	4	5
4. Develops a logical sequence in planning for diagnostic tests and procedures and Formulates an appropriate treatment plan to deal with the patient's major problems	1	2	3	4	5
5. Able to perform commonly used office procedures	1	2	3	4	5
6. Follows age appropriate preventative medicine guidelines in patient care	1	2	3	4	5
Medical Knowledge	**Scale**				
1. Uses current terminology	1	2	3	4	5
2. Understands the meaning of the patient's abnormal findings	1	2	3	4	5
3. Utilizes the appropriate techniques of physical examination	1	2	3	4	5
4. Develops a pertinent and appropriate differential diagnosis for each patient	1	2	3	4	5
5. Demonstrates a solid base of knowledge of ambulatory medicine	1	2	3	4	5
6. Can discuss and apply the applicable basic and clinically supportive sciences	1	2	3	4	5
Professionalism	**Scale**				
1. Demonstrates consideration for the patient' s comfort and modesty	1	2	3	4	5
2. Arrives to clinic on time and follows clinic policies and procedures	1	2	3	4	5
3. Works effectively with clinic staff and other health professionals	1	2	3	4	5
4. Able to gain the patient's cooperation and respect	1	2	3	4	5
5. Demonstrates compassion and empathy for the patient	1	2	3	4	5
6. Demonstrates sensitivity to patient's culture, age, gender, and disabilities	1	2	3	4	5
7. Discusses end-of-life issues (DPOA, advanced directives, etc.) when appropriate	1	2	3	4	5

2

RAWALPINDI MEDICAL UNIVERSITY

Patient Medical Record / Chart Evaluation Proforma

Name of Resident

Location of Care or Interaction
(OPD/Ward/Emergency/Endoscopy Department)

S#		Poor	Fair	Good	V. Good	Excellent
1.	Basic Data on Front Page Recorded	O	O	O	O	O
2.	Presenting Complaints written in chronological order	O	O	O	O	O
3.	Presenting Complaints Evaluation Done	O	O	O	O	O
4.	Systemic review Documented	O	O	O	O	O
5.	All Components of History Documented	O	O	O	O	O
6.	Complete General Physical Examination done	O	O	O	O	O
7.	Examination of all systems documented	O	O	O	O	O
8.	Differential Diagnosis framed	O	O	O	O	O
9.	Relevant and required investigations documented	O	O	O	O	O
10.	Management Plan framed	O	O	O	O	O
11.	Notes are properly written and eligible	O	O	O	O	O
12.	Progress notes written in organized manner	O	O	O	O	O
13.	Daily progress is written	O	O	O	O	O
14.	Chart is organized no loose paper	O	O	O	O	O
15.	Investigations properly pasted	O	O	O	O	O
16.	Abnormal findings in investigations encircled.	O	O	O	O	O
17.	Procedures done on patient documented properly	O	O	O	O	O
18.	Medicine written in capital letter	O	O	O	O	O
19.	I/v fluids orders are proper with rate of infusion mentioned	O	O	O	O	O
20.	All columns of chart complete	O	O	O	O	O

Poor: 0, Fair: 1, Good: 2, V.Good: 3, Excellent: 4

RAWALPINDI MEDICAL UNIVERSITY

3

Preview Form

RESIDENT EVALUATION BY NURSE / STAFF

Please take a few minutes to complete this evaluation form. All information is confidential and will be used constructively. You need not answer all the questions

Name of Resident*

Location of care or interaction: *(OPD/Ward/Emergency/Endoscopy Department)*

Your position (Nurse, Ward Servant, Endoscopy Attendant)

S#	PROFESSIONALISM	Poor	Fair	Good	V Good	Excellent	Insufficient Contact
1.	Resident is Honest and Trustworthy	❍	❍	❍	❍	❍	❍
2.	Resident treats patients and families with courtesy, compassion and respect	❍	❍	❍	❍	❍	❍
3.	Resident treats me and other member of the team with courtesy and respect	❍	❍	❍	❍	❍	❍
4.	Resident shows regard for my opinions	❍	❍	❍	❍	❍	❍
5.	Resident maintains a professional manner and appearance	❍	❍	❍	❍	❍	❍
	INTERPERSONAL AND COMMUNICATIONS SKILLS						
6.	Resident communicates well with patients, families, and members of the healthcare team	❍	❍	❍	❍	❍	❍
7.	Resident provides legible and timely documentation	❍	❍	❍	❍	❍	❍
8.	Resident respect differences in religion, culture age, gender sexual orientation and disability	❍	❍	❍	❍	❍	❍
	SYSTEMS BASED PRACTICE						
9.	Resident works effectively with nurses and other professionals to improve patient care.	❍	❍	❍	❍	❍	❍
	PATIENT CARE						
10.	Resident respects patient preferences	❍	❍	❍	❍	❍	❍
11.	Resident is reasonable accessible to patients	❍	❍	❍	❍	❍	❍
12.	Resident take care of patient comfort and dignity during procedures.	❍	❍	❍	❍	❍	❍
	PRACTICE BASED LEARNING AND IMPROVEMENT						
13.	Resident facilitates the learning of students and other professionals	❍	❍	❍	❍	❍	❍
	COMMENTS						
14.	Please describe any praises or concerns or information about specific incidents	❍	❍	❍	❍	❍	❍

THANK YOU for your time and thoughtful input. You play a vital role in the education and training of the internal medicine residents.

Poor: 0, Fair: 1, Good: 2, V. Good: 3, Excellent: 4

Total Score _____/56

RAWALPINDI MEDICAL UNIVERSITY

4

Patient Evaluation of Trainee

Trainee Name: _____

Date of Evaluation: _____

1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

Please circle the appropriate number for each item using this scale. Please provide any relevant comments on the back of this form.

	This Trainee:	Scale				
1.	Introduces him/herself and greets me in a way that makes me feel comfortable. ڈاکٹر صاحب نے خود کو متعارف کرایا اور خوش اسلوبی سے پیش آئے	1	2	3	4	5
2.	Manages his/her time well and is respectful of my time. ڈاکٹر صاحب نے میرے اور اپنے وقت کا خیال رکھا۔	1	2	3	4	5
3.	Is truthful, upfront, and does not keep things from me that I believe I should know. ڈاکٹر صاحب نے میرے مرض کی صورتحال پوری سچائی سے بیان کی۔	1	2	3	4	5
4.	Talks to me in a way that I can understand, while also being respectful. ڈاکٹر صاحب نے میرے احساسات کا خیال رکھا اور عزت سے میرا علاج کیا۔	1	2	3	4	5
5.	Understands how my health affects me, based on his/her understanding of the details of my life. ڈاکٹر صاحب نے میرے علاج میں میری صحت پر ذاتی زندگی کو مدنظر رکھا۔	1	2	3	4	5
6.	Takes time to explain my treatment options, including benefits and risks. ڈاکٹر صاحب نے میرے مرض کے علاج کے فوائد اور نقصانات کو تفصیلاً بیان کیا۔	1	2	3	4	5

Total Score _____/30

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Rawalpindi Medical University

RAWALPINDI MEDICAL UNIVERSITY

5

Resident/Fellow Evaluation of Faculty Teaching

Evaluator: _____

Evaluation of: _____

Date:_____

Evaluation information entered here will be anonymous and made available only in aggregated form.

S#		Strongly Disagree	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Strongly Agree
	PATIENT CARE						
1.	Teaches current scientific evidence for daily patient management*						
2.	Explains rationale behind clinical judgements/decisions*						
3.	Teaches clear diagnostic algorithms*						
4.	Teaches clear treatment algorithms*						
	PATIENT CARE - OPERATIVE AND PROCEDURAL SKILLS						
5.	Teaches operative/procedural skills during cases*						
6.	Allows learners to perform operative/procedural skills when appropriate*						
	MEDICAL KNOWLEDGE						
7.	Teaches relevant pathophysiology needed to evaluate patient medical conditions*						
8.	Teaches how/when to use-order-perform procedures/tests*						
9.	Teaching content adds significantly to my medical knowledge						
10.	Teaches the use of literature / evidence based medicine to support clinical decisions/teaching points*						

6

RAWALPINDI MEDICAL UNIVERSITY

FINAL Evaluation Scoring Sheet

Name of Resident	Name of Supervisor	Year of Training

Date _____

Duration of Assessment _____
Specialty _____
Hospital _____
Unit _____

	Faculty #1 (165)	Faculty #2 (165)	Faculty #3 (165)	Average Score
Medical Patient Care (30)				___/30
Medical Knowledge (30)				___/30
Professionalism (35)				___/35
Interpersonal and Communication Skills (20)				___/20
System Based Practice (35)				___/35
Practice Based Learning and Improvement (15)				___/15
Overall Rating				
Average:				___/165

Patient # 1 (30)	Patient # 2 (30)	Patient # 3 (30)	Medical Record Performa #1 (80)	Medical Record Performa #2 (80)	Medical Record Performa #3 (80)	Staff # 1 (56)	Staff #2 (56)	Staff #3 (56)
___/30			___/80			___/56		

Grand Total
_____/331

RAWALPINDI MEDICAL UNIVERSITY

Logbook *complete* ☐ *incomplete* ☐

Portfolio *complete* ☐ *incomplete* ☐

Leave /absentees: _____

Comments

_____

_____

_____

_____

Supervisor Name (1) _____ *Supervisor Name (2)* _____ *Head of Unit* _____

Sign & Stamp _____ *Sign & Stamp* _____ *Sign & Stamp* _____

7

RAWALPINDI MEDICAL UNIVERSITY

RESIDENT SELF-ASSESSMENT PROFORMA

Resident Name_____ **Date** _____

Year of Training _____ **Hospital Name**_____ **Unit** _____

❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Not Applicable	I rarely demonstrates (<25% of the time)	I do this Sometimes (25-50% of the time)	I do this most of the time (50-75% of the time)	I do this all the time (>75% of time)

1.	I am able to acquire accurate and relevant histories from my patients in an efficient, prioritized and hypothesis driven fashion.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
2.	I am able to seek and obtain appropriate, verified, and prioritized data from secondary sources (e.g. family, records and pharmacy)	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
3.	I am able to perform accurate physical examinations that are appropriately targeted to the patient's complaints.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
4.	I am able to synthesize all available data, including interview, physical exam, and preliminary lab data to define each patient's central clinical problem.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
5.	I am able to develop prioritized differential diagnoses, evidence based diagnostic and therapeutic plans for common conditions in Internal Medicine patients.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
6.	I am able to recognize situations with a need for urgent or emergent medical care, including life threatening conditions.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
7.	I am able to recognize when to seek additional guidance.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
8.	I am able to provide appropriate preventive care.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
9.	I am able to manage patients with common clinical disorders in the practice of outpatient internal medicine with minimal supervision.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
10.	I have performed several invasive procedures and documented them in my New Innovations log.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
11.	I demonstrate sufficient knowledge to diagnose and treat common conditions that require hospitalization.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
12.	I understand the indications for and the basic interpretation of common diagnostic tests.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
13.	I have reviewed my in service exam scores and believe my medical knowledge is where it should be for my level of training.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
14.	I am able to identify clinical questions as they emerge	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4

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DIRECT OBSERVATION OF PROCEDURAL SKILLS (DOPS)

Please complete the questions using a cross ☒ Please use black ink and CAPITAL LETTERS

Doctor's Name: _____

PMDC Number: _____

Clinical setting: A&E ☐ OPD ☐ In-patient ☐ Acute Admission ☐ Other

Procedure number ☐☐

Assessors position: Consultant ☐ SpSR ☐ SpR ☐ Specialty doctor ☐ Nurse ☐ Other

Number of previous DOPS observed by assessor with any trainee: 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5-9 ☐ >9 ☐

Number of times procedure performed by trainee: 0 ☐ 1-4 ☐ 5-9 ☐ >10 ☐

Difficulty of procedure: Low ☐ Average ☐ High ☐

Please grade the following areas	Well below expectations	Below Expectations	Borderline	Meets Expectations	Above Expectations	Well above expectations	U/C*
	1	2	3	4	5	6	
1 Demonstrate understanding of indications, relevant anatomy, technique of procedure	☐	☐	☐	☐	☐	☐	☐
2 Obtains informed consent	☐	☐	☐	☐	☐	☐	☐
3 Demonstrates appropriate preparation pre-procedure	☐	☐	☐	☐	☐	☐	☐
4 Appropriate analgesia or preparation pre-procedure	☐	☐	☐	☐	☐	☐	☐
5 Technical ability safe sedation	☐	☐	☐	☐	☐	☐	☐
6 Aseptic technique	☐	☐	☐	☐	☐	☐	☐
7 Seeks help where appropriate	☐	☐	☐	☐	☐	☐	☐
8 Post procedure management	☐						
9 Communication skills	☐	☐	☐	☐	☐	☐	☐
10 Consideration of Patient/professionalism	☐	☐	☐	☐	☐	☐	☐
11 Overall ability to perform procedure	☐	☐	☐	☐	☐	☐	☐

* U/C Please mark this if you have not observed the behaviour and therefore feel unable to comment.

Please use this space to record areas of strength or any suggested development

Anything especially good?

Suggestions for development:

Have you had training in the use of this assessment tool? ☐ Face to face ☐ Have read guidelines ☐ Web/ CD-Rom

Time taken for observation: (in minutes) ☐☐

Assessors signature:

Date (mm/yy) ☐☐ / ☐☐

Time taken for feedback ☐☐

Assessor's Name: _____

*if appropriate

Please note failure of return of all completed forms to your administrator is a probity issue

Acknowledgement: Adapted with permission of the American Board of internal Medicine

SpSR - Specialty Senior Registrar

SpR - Specialty Registrar

Workplace Based Assessments - Guidelines for Supervisors for Assessment of Generic & SpecialtySpecific Competency

The Candidates of all MD programs will be trained and assessed in the following five generic competencies and also specialty specificcompetencies.

A. Generic Competencies:

i. Patient Care.

a. Patient Care competency will include skills of history taking, examination, diagnosis, counseling Plan care through ward teachingdepartmental conferences, morbidity and mortality meetings core curriculum lectures and training in procedures and operations.
b. The candidate shall learn patient care through ward teaching departmental conferences, morbidity and mortality meetings, carecurriculum lectures and training in procedures and operations.
c. The Candidate will be assessed by the supervisor during presentation of cases on clinical ward rounds, scenario based discussions onpatients management multisource feedback evaluation, Direct observation of Procedures (DOPS) and operating room assessments
d. These methods of assessments will have equal weightage.

ii. Medical knowledge and Research

a. The candidate will learn basic factual knowledge of illnesses relevant to the specialty through lectures/discussions on topics selectedfrom the syllabus, small group tutorials and bed side rounds
b. The medical knowledge/skill will be assessed by the teacher during
c. The candidate will be trained in designing research project, data collection data analysis and presentation of results by the supervisor.
d. The acquisition of research skill will be assessed as per regulations governing thesis evaluation and its acceptance.

iii. Practice and System Based Learning

a. This competency will be learnt from journal clubs, review of literature policies and guidelines, audit projects medical error investigation,root cause analysis and awareness of health care facilities,.
b. The assessment methods will include case studies, personation in mobility and mortality review meetings and presentation of auditprojects if any.
c. These methods of assessment shall have equal weight-age

iv. Communication Skills

a. These will be learn it from role models, supervisor and workshops.
b. They will be assessed by direct observation of the candidate whilst interacting with the patients, relatives, colleagues and withmultisource feedback evaluation.

v. Professionalism as per Hippocratic oath

a. This competency is learnt from supervisor acting as a role model ethical case conferences and lectures on ethical issues such asconfidentially informed consent end of life decisions, conflict of interest, harassment and use of human subjects in research.
b. The assessment of residents will be through multisource feedback evaluation according to preforms of evaluation and its scoring method.

B. Specialty Specific Competences.

i. The candidates will be trained in operative and procedural skills according to a quarterly based schedule.
ii. The level of procedural Competency will be according to a competency table to be developed by each specialty
iii. The following key will be used for assessing operative and procedural competencies:
   a. Level 1 Observer status
   b. The candidate physically present and observing the supervisor and senior colleagues
   c. **Level 2 Assistant status**
   The candidate assisting procedures andoperations
   d. **Level 3 Performed under supervision**
   The candidate operating or performing aprocedure under direct supervision
   e. **Level 4 Performed independently**
   The candidate operating or performing aprocedure without any supervision

vi. Procedure Based Assessments (PBA)

a. Procedural competency will assess the skill of consent taking, preoperative preparation and planning, intraoperative general andspecific tasks and postoperative management
b. Procedure Based assessments will be carried out during teaching and training of each procedure.
c. The assessors may be supervisors, consultant colleagues and senior residents.
d. The standardized forms will be filled in by the assessor after direct observation.
e. The resident's evaluation will be graded as satisfactory, deficient requiring further training and not assessed at all.
f. Assessment report will be submitted
g. A satisfactory score will be required to be eligible for taking final examination.

Appendix "E"

Supervisor's Annual Review Report.

This report will consist of the following components: -

I. Verification and validation of Log Book of operations & procedures according to the expected number of operations and proceduresperformed (as per levels of competence) determined by relevant board of studies.
II. A 90% attendance in academic activities is expected. The academic activities will include: Lectures, Workshops other than mandatoryworkshops, journal Clubs Morbidity & Mortality Review Meetings and Other presentations.
III. Assessment report of presentations and lectures
IV. Compliance Report to meet timeline for completion of research project.
V. Compliance report on personal Development Plan.
VI. Multisource Feedback Report, on relationship with colleagues, patients.
VII. Supervisor will produce an annual report based on assessments as per proforma in appendix-G and submit it to the ExaminationDepartment.
VIII. 75% score will be required to pass the Continuous Internal Assessment on annual review.

*

Guidelines for program Evaluation

Appendix "L"

Program Evaluation Committee (PEC)

Background

The purpose of this committee is to conduct and document a formal, systematic evaluation of the program & curriculum on an annualbasis.

Membership

The chair and membership of the committee are appointed by the Program Director. The membership of the committee consists of atleast two members of the program faculty, and at least one resident/subspecialty resident.

Meeting Frequency

The committee meets, at a minimum, annually.

Responsibilities of the PEC

- The PEC actively participates in planning, developing, implementing and evaluating the educational activities of the program.
- The PEC reviews and makes recommendations for revision of competency-based goals and objectives.
- Addresses areas of non-compliance with the standards; and reviews the program annually using written evaluations of faculty,residents, and others.

Required Documentation of PEC Activities

The PEC provides the GMEC with a written Annual Program Evaluation (APE) in the format that is appended to this document. Thisdocument details a written plan of action to document initiatives to improve performance based on monitoring of activities described below.

The APE document provides evidence that the PEC is monitoring the following areas, at a minimum:

1. Resident performance

2. Faculty development

3. Graduate performance, including performance of program graduates on the certifying examination

4. Assessment of program quality through:

. **A n n u a l confidential and formal feedback** from residents and faculty about the program quality;

b. **A s s e s s m e n t of improvements needed based on program evaluation feedback** from faculty,residents, and others

5. Continuation of progress made on prior year's action plan

6. **Prepare and submit a written plan of action to**

   a. **document initiatives to improve performance in one of more of the areas identified,**

   b. **D e l i n e a t e how they will be measured and monitored**

   c. **Document continuation of progress made on the prior year's action plan**

Template for Documentation of Annual Program Evaluation and Improvement

Date of annual program evaluation meeting: _____

Attendees:

i. Program Director:

ii. Program Coordinator:

iii. Associate/Assistant PD:

iv. Faculty Members:

v. Residents:

	Reviewed √	Discussion, Followup, Action Plan
1. Current Program Requirements & Institutional Requirements		
2. Most recent Internal Review Summary to ensure all recommendations are addressed		
3. Review Curriculum a. effective mechanism in place to distribute Goals & Objectives (G&O) to residents and faculty b. overall program educational goals c. up-to-date competency-based G&O for each assignment d. up-to-date competency-based G&O for each level of training e. G&O contain delineation of resident responsibilities for patient care, progressive responsibility for patient management, and supervision of residents		
4. Evaluation System		

a. Resident formative evaluation meets or exceeds program requirement b. Resident summative evaluation meets or exceeds program requirement c. Faculty evaluation meets or exceeds program requirement d. program evaluation meets or exceeds program requirement.		
5. Didactic Curriculum a. includes recognizing the signs of fatigue and sleep deprivation b. the didactic curriculum meets program requirements c. the didactic curriculum meets residents needs		
6. Clinical Curriculum – the effectiveness of in-patient and ambulatory teaching experience (structure, case mix, meets resident's needs)		
7. Volume and variety of patients and procedures (case log data) meets requirements and residents' needs		
8. Summary of written program evaluations completed by both faculty and residents		
9. Resident supervision complies with Program Requirement		
10. Recruiting results		
11. Duty hour monitoring results		
12. Track all research and scholarly activities of faculty and residents/fellows		
13. Educational outcomes: is the program achieving its educational objectives? What aggregate data (residents as a group)can be used to show the program is achieving its objectives? Board scores, in-service training exam scores, graduate surveys, employer surveys, etc.		

15. Clinical outcomes – specialty-specific metrics aligned with dept./division QI initiatives, disease outcomes, patientsafety initiatives (describe resident involvement), QI projects (describe resident involvement)		

Note:

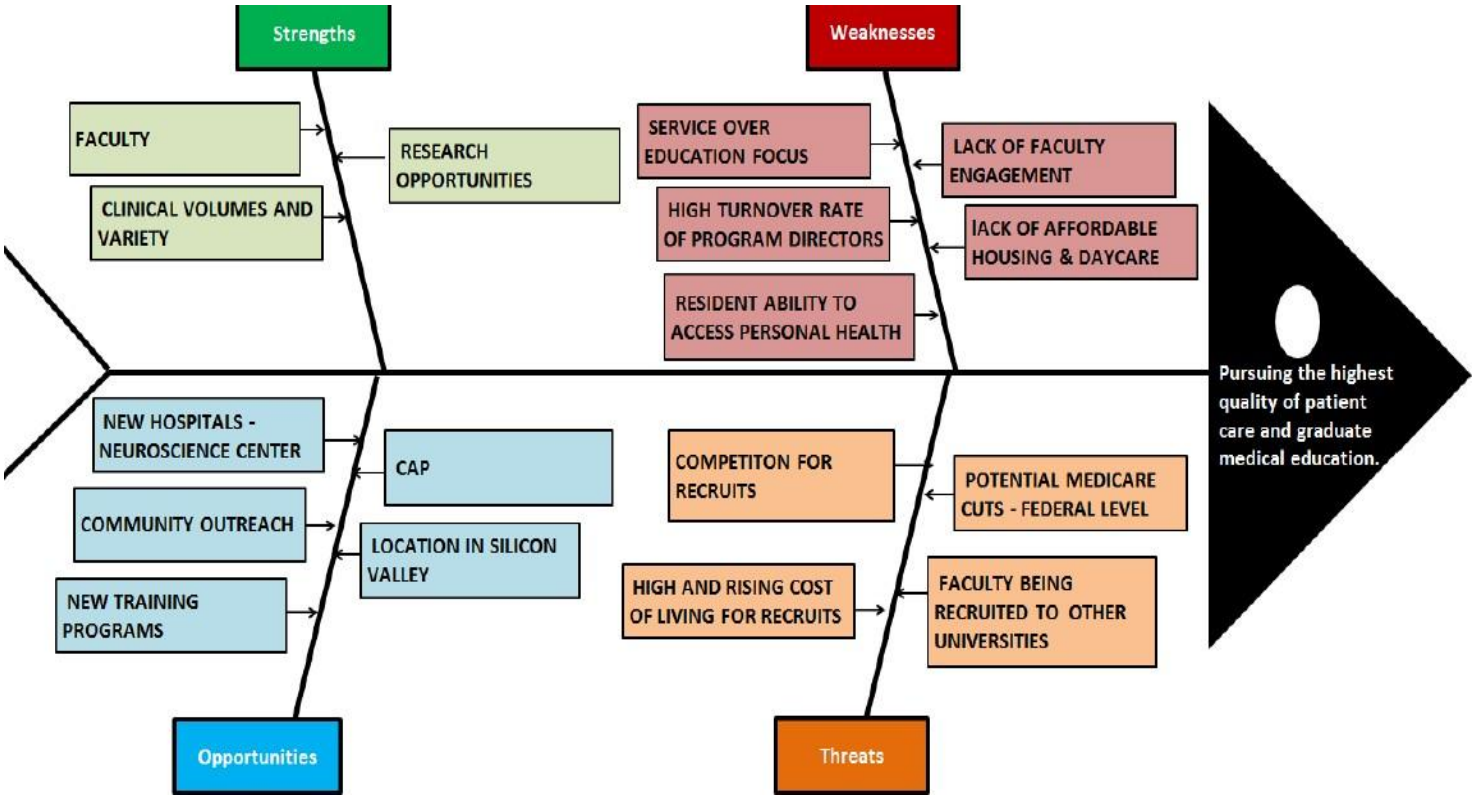
If deficiencies are found during this process, the program should prepare a written plan of action to document initiatives to improve performance in the areasthat have been identified. The action plan should be reviewed and approved by the teaching faculty and documented in meeting minutes.

Annual Program Evaluation (APE)

SWOT Analysis

- **S**: Strengths
- **W**: Weaknesses
- **O**: Opportunities
- **T**: Threats

SOWT Analysis (Fishbone – Ishikawa Diagram)



Action Plan

Item	Strategy	Resources	Timeline	Evaluation
Preservation Goals (Strengths)				
Elimination Goals (Weaknesses)				
Achievement Goals (Opportunities)				
Avoidance Goals (Threats)				

1. SECTION –X

Miscellaneous attached documents


1.pdf


2.pdf


3.pdf


4.pdf


5.pdf


6.pdf


7.pdf


8.pdf


9.pdf


OCEX form-2790.pdf


Annexure - A - ICO-OCEX form.docx


Annexure - B - DOPS form.docx


Annexure - C - OSCAR form.docx

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RMU
Rawalpindi Medical University

Registration and Enrolment

ENROLMENT DETAILS

Program of Admission

_____

Session

_____

Registration / Training Number

_____

Name of Candidate _____

Father's Name _____

Date of Birth _____ / _____ / _____ CNIC No. _____

Present Address

_____

_____

Permanent Address

_____

_____

E-mail Address

_____

Cell Phone

_____

Date of Start of Training

_____

Date of Completion of Training

_____

Name of Supervisor

_____

Designation of Supervisor

_____

Qualification of Supervisor

_____

Title of department / Unit

_____

Faculty Contributors

SR. NO.	NAME & DESIGNATION	SIGNATURE
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