



PRAVARA INSTITUTE OF MEDICAL SCIENCES
(DEEMED TO BE UNIVERSITY)
 Loni, Tal. Rahata, Dist. Ahmednagar 413736
 NAAC Re-accredited with 'A' Grade

SYLLABUS

PG Programme- DIPLOMA (OPHTHALMOLOGY)

(As per MCI Regulations Governing PG Programme 2000 Amended up to May, 2018)

Introduction:-

The purpose of PG education in ophthalmology is to create specialists who would provide high quality Eye care and advance the cause of science through research & training.

The purpose of this programme is to create competent ophthalmic surgeons with appropriate expertise

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by Expert members of BOS as per MCI guidelines. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

SPECIFIC LEARNING OBJECTIVES

Programme objectives

The clinical post graduate training programmes are intended at developing in a student a blend of qualities that of a clinical specialist, a teacher and a researcher. These programmes are organized such that a post graduate should possess the following qualities, knowledge and skills:

- a. The student should possess basic knowledge of the structure, function and development of the human body as related to ophthalmology, of the factors which may disturb these mechanisms and the disorders of structure and function which may result thereafter.
- b. The student should be able to practice and handle most day-to-day problems independently in ophthalmology. The student should recognize the limitations of his/her own clinical knowledge and know when to seek further help.
- c. The student should understand the effects of environment on health and be familiar with the epidemiology of at least the more common diseases in the field of ophthalmology.
- d. The student should be able to integrate the preventive methods with the curative and rehabilitative measures in the comprehensive management of the disease.
- e. The student should be familiar with common eye problems occurring in rural areas and be able to deal with them effectively.
- f. The student should also be made aware of Mobile Ophthalmic Unit and its working and components.
- g. The student should be familiar with the current developments in Ophthalmic Sciences. Student should recognize the ocular health needs of the community and

- carry out professional obligations in keeping with the principles of National Health Policies.
- h. The student should be able to plan educational programmes in Ophthalmology in association with senior colleagues and be familiar with the modern methods of teaching and evaluation.
 - i. The student should be able to identify a problem for research, plan a rational approach to its solution, execute it and critically evaluate his/her data in the light of existing knowledge.
 - j. The student should reach the conclusions by logical deduction and should be able to assess evidence both as to its reliability and its relevance.
 - k. The student should have basic knowledge of medico-legal aspects of medicine.
 - l. The student should be familiar with patient counseling and proper consent taking.
 - m. Student should have mastered most of the competencies and pertaining to Ophthalmology that are required to be practiced ethically.
 - n. Student should be aware of the advances and recent developments in Ophthalmology.
 - o. Student should have acquired skills in educating medical and paramedical professionals.

SUBJECT SPECIFIC COMPETENCIES

A post graduate student upon successfully qualifying in the Diploma (Ophthalmology) examination should be able to:

- a) Offer to the community, the current quality of 'standard of care' in ophthalmic diagnosis as well as therapeutics, medical or surgical, in most of the common situations encountered at the level of health services.
- b) Periodically self assess his or her performance and keep abreast with ongoing advances in the field and apply the same in his/her practice.
- c) Be aware of her/his own limitations to the application of the specialty in situations, which warrant referral to more qualified centers or individuals.
- d) Apply research and epidemiological methods during his/her practice. The post graduate student should be able to present or publish work done by him/her.
- e) Contribute as an individual/group towards the fulfillment of national objectives with regard to prevention of blindness.
- f) Effectively communicate with patients or relatives so as to educate them sufficiently and give them the full benefit of informed consent to treatment and ensure compliance.

At the end of the course, the student should have acquired knowledge in the following:

A. Cognitive domain

Basic Medical Sciences:

- Attain understanding of the structure and function of the eye and its parts in health and disease.
- Attain understanding and application of knowledge of the structure and function of the parts of Central Nervous System and other parts of the body with influence or control on the structure and function of the eye.

- Attain understanding of and develop competence in executing common general laboratory procedures employed in diagnosis and research in Ophthalmology.

1. Clinical Ophthalmology:

Given adequate opportunity to work on the basis of graded responsibilities in outpatients, inpatient and operation theatres on a rational basis in the clinical sections from the day of entry to the completion of the training programme, the students should be able to:

- Acquire scientific and rational approach to the diagnosis of ophthalmic cases presented. To take detailed history, perform complete physical examination including anterior and posterior segment of the eye and to diagnose and manage majority of the conditions in Ophthalmology on the basis of clinical assessment and appropriate investigations.
- Acquire understanding of and develop inquisitiveness to investigate to establish cause and effect of the disease.
- To manage and treat all types of ophthalmic cases.
- To competently handle and execute safely all routine surgical procedures on lens, glaucoma, lid, sac, adnexa, retina and muscle anomalies.
- To competently handle all ophthalmic medical and surgical emergencies.
- To be familiar with micro-surgery and special surgical techniques.
- To demonstrate the knowledge of the pharmacological (including toxic) aspects of drugs used in ophthalmic practice and drugs commonly used in general diseases affecting the eyes.

2. Refraction:

- Acquire competence in assessment of refractive errors and prescription of glasses for all types of refraction problems.
- Acquire basic knowledge of manufacture and fitting of glasses and competence of judging the accuracy and defects of the dispensed glasses.

- Ophthalmic super-specialties:

Given an opportunity to work on a rotational basis in various special clinics of sub-specialties of ophthalmology, if possible, the student should be able to:

- Examine, diagnose and demonstrate understanding of management of the problems of neuro-ophthalmology and refer appropriate cases to neurology and neuro-surgery.
- Examine, diagnose and demonstrate understanding of management of (medical and surgical) complicated problems in the field of (a) lens, (b) glaucoma, (c) cornea, (d) retina, (e) pediatric ophthalmology, (f) oculoplasty, (g) uvea, and (I) genetic problems in ophthalmology.
- To demonstrate understanding of the manufacture and competence in prescription and dispensing of contact lenses and ocular prosthesis.

- Ophthalmic pathological/microbiological/biochemical sciences

- Be able to interpret the diagnosis in correlation with the clinical data and routine materials received in such cases.

- Community and Preventive Ophthalmology

- Eye camps: Eye camps may be conducted where the PG students are posted for imparting training to according to a set methodology. The community and school surveys may also be conducted by the post graduate students.

The post graduate students are given an opportunity to participate in surveys, eye camps.

- Eye Banking: PG student should be able to perform enucleation & assist transplant Surgeries. He should be familiar with SOP of the eye banking.

B. Affective Domain:

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
2. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
3. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

C. Psychomotor domain

At the end of the course, the student should acquire following clinical skills:

Essential diagnostic skills:

I. Examination techniques along with interpretation

1. Slit lamp Examination

- Diffuse examination
- Focal examination
- Retroillumination - direct and indirect
- Sclerotic scatter
- Specular reflection
- Staining modalities and interpretation

2. Fundus evaluation

- Direct/Indirect ophthalmoscopy
- Fundus drawing
- 3-mirror examination of the fundus
- 78-D/90-D/60-D examination
- Amsler's charting

II. Basic investigations along with their interpretation

1. Tonometry

- Tonometry - Applanation/Indentation/Non-contact
- Gonioscopy - grading of the angle

2. Tear/Lacrimal function tests

- Staining- fluorescein Rose Bengal
- Schirmer /Break up time
- Syringing
- Dacrocystography

3. Corneal

- Corneal scraping and cauterization
- Smear preparation and interpretation (Gram's stain /KOH)

- Media inoculation
- Keratometry - performance & interpretation
- Pachymetry
- Corneal topography - if available

4. Colour Vision evaluation

- Ishihara pseudoisochromatic plates
- Farnsworth Munsell, if available

5. Refraction

- Retinoscopy- streak/Priestley Smith
- Use of Jackson's cross-cylinder
- Subjective and objective refraction
- Prescription of glasses

6. Diagnosis and assessment of Squint

- Ocular position and motility examination
- Synoptophore usage
- Diplopia charting
- Assessment of strabismus - cover tests/prisms bars/synoptophore
- Amblyopia diagnosis and treatment
- Assessment of convergence, accommodation, stereopsis, suppression

7. Exophthalmometry

Usage of Hertel's exophthalmometer - proptosis measure

8. Contact lenses CL

- Fitting and assessment of RGP and soft lenses
- Complications arising of contact lens use
- Educating the patient regarding CL usage and imparting relevant knowledge of the complications arising thereon

9. Low Vision Aids

- Knowledge of basic optical devices available and relative advantages and disadvantages of each.
- The basics of fitting with knowledge of availability and cost

10. Community ophthalmology

- ability to organize institutional screening
- ability to organize peripheral eye screening camps
- knowledge and ability to execute guidelines of the National programme for prevention of Blindness

III. The diploma student must be well versed with the following investigative modalities although she/he may not perform it himself. But she/ he should be able to interpret the reports of the following tests:

- a. Fundus photography
- b. Fluorescein angiography
- c. Ophthalmic ultrasound A-scan/B scan
- d. Automated perimetry for glaucoma and neurological lesions

- e. Radiological tests - X rays - Antero posterior/Lateral view
PNS (Water's view) Optic canal views
Localisation of intra-ocular and intra-orbital FBs
Interpretations of CT scan/ MRI
- 6. OCT and UBM :- if available

IV. Minor surgical procedures - Must know and perform independently

- Conjunctival and corneal foreign body removal on the slit lamp
- Chalazion incision and curettage
- Pterygium excision
- Biopsy of small lid and tumours
- Suture removal - skin/conjunctival/corneal/corneoscleral
- Tarsorrhaphy
- Subconjunctival injection
- Retrobulbar, parabolbar anaesthesia
- Posterior sub-Tenon's injections
- Artificial eye fitting

V. Surgical procedures

1. Must know and can perform independently a. Ocular anaesthesia:

- Retrobulbar anaesthesia
- Peribulbar anaesthesia
- Facial blocks- O'Brein/Atkinson/Van lint and modifications
- Frontal blocks
- Infra orbital blocks
- Blocks for sac surgery

2. Must be able to independently perform and deal with complications arising from the following surgeries :

- Lid Surgery- Tarsorrhaphy Ectropion and entropion Lid repair following trauma Epilation
- Destructive procedures
Evisceration with or without implant
Enucleation with or without implant
- Sac surgery
 1. Dacryocystectomy
 2. Dacryocystorhinostomy
 3. Probing for congenital obstruction of nasolacrimal duct
- Strabismus surgery
Recession and resection procedures on the horizontal recti.
- Orbit surgery
Incision and drainage via anterior orbitotomy for abscess
- Cyclocryotherapy

3. Well conversant with use of Operating microscope and must be able to perform the surgeries given below competently under the same:

- Cataract surgery
 - i. Standard conventional Extra Capsular Extract Extraction with or without IOL implantation (first year)
 - ii. Small incision ECCE with or without IOL implantation (second year)

- iii. Secondary AC or PC IOL implantation
 - Vitrectomy
 - i. Intra-vitreous and intra-cameral (anterior chamber) injection techniques and dosages, particularly for endophthalmitis management
 - ii. Needs to know the basis of open sky vitrectomy (anterior segment) as management of cataract surgery complication
 - Surface ocular procedures
 - Pterygium excision with modifications
 - Conjunctival cyst excision/foreign body removal
 - Corneal foreign body removal
 - Conjunctival flap/peritomy
 - Corneal
 - Repair of corneo - scleral perforations
 - Corneal suture removal
- 4. Should have assisted in the following microscopic surgeries
 - 5. Keratoplasty
 - Therapeutic and optical
 - 6. Glaucoma surgery Trabeculectomy
 - Pharmacological modulation of trabeculectomy
 - 7. Phacoemulsification
- 5. Should have assisted in the following laser procedures:
 - Yag Capsulotomy
 - Laser iridotomy
 - Focal and panretinal photocoagulation
- f. Should have assisted /knowledge of Kerato-refractive procedures

Syllabus

Course contents:

These are only broad guidelines and are illustrative, there may be overlap between sections.

I. The Basic Sciences

1. Orbital and ocular anatomy Gross anatomy
Histology
Embryology
2. Ocular Physiology
3. Ocular pathology:
Gross pathology, Histopathology, basics of general pathology
4. Biochemistry
General biochemistry, biochemistry applicable to ocular function
5. Microbiology
General Microbiology, Specific microbiology applicable to the eye
6. Immunology with particular reference to ocular immunology

II. Optics

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

III. Clinical Ophthalmology

1. Disorders of the lids
2. Disorders of the lacrimal system
3. Disorders of the Conjunctiva
4. Disorders of the Sclera
5. Disorders of the Cornea
6. Disorders of the Uveal Tract
7. Disorders of the Lens
8. Disorders of the Retina
9. Disorders of the Optic Nerve and Visual Pathway
10. Disorders of the Orbit
11. Glaucoma
12. Neuro-ophthalmology
13. Paediatric ophthalmology
14. Ocular involvement in systemic disease
15. Immune ocular disorders
16. Strabismus & Amblyopia

TEACHING AND LEARNING METHODS

Teaching methodology

First year:

1. Theoretical knowledge

- Basic sciences should be addressed during this period
- It is useful to have an internal examination of the basic sciences at the end of the first year, which will decide appearance at the final examination.

2. Clinical ophthalmology

- The basics of history taking, order and correct methods of examination and recording have to be learnt during this time.
- Clinical and surgical decision-making is encouraged under supervision.
- Diagnostics.
- All students should be fairly conversant with most of the techniques.

3. Surgery - independently performed

- Subconjunctival injections
- Local anaesthesia (retrobulbar and peribulbar blocks)
- Chalazion and pterygium surgery
- Lid and corneal foreign body removal, suture removal on the slit lamp etc.
- Tarsorrhaphy
- Destructive procedures - independently with /without assistance
- Assisting for squint surgery
- Assisting for lid surgery and simpler oculoplastic procedures
- Enucleation for eye donation
- Cataract surgery

a) Cataract surgery done in stages, emphasis on use of microscope

b) By the end of the first year, the student should be able to do standard extra-capsular cataract extraction /small incision cataract surgery, at least under guidance.

Second year:

1. Theoretical knowledge:

Here stress will be laid on clinical ophthalmology.

2. Diagnostics:

The student is encouraged to take diagnostic, investigational and therapeutic decisions on his own. She/he should be able to manage most of the common problems without guidance. However, the degree of freedom allowed in decision making is left to the confidence of the teacher in the student's abilities. The student should be conversant and at ease with all the diagnostic procedures outlined in the section on 'Essential diagnostic skills - instrumentation'.

3. Surgical skills

- a. At the end of the second year, the student should be capable of operating without assistance, but under supervision, all varieties of cataract except congenital cataract. She/he should also know the management of cataract-induced complications and cataract surgical complications (management of vitreous loss).
- b. The student should have performed the basic anti-glaucoma procedures such as trabeculectomy either with assistance or under supervision.
- c. Extra-ocular surgery such as squint surgery could be performed with assistance.
- d. In addition, lacrimal sac surgery such as dacryocystectomy, dacryocystorhinostomy should be possible with assistance or under supervision.

4. Conference and workshops

- a. The post graduate student should have attended one or two regional workshops and one national conference if possible. Presentation of a free paper at these venues is to be encouraged.

5. Clinical Case discussion

- a. Bedside discussion on the rounds and outpatient teaching take their toll with patient management. Therefore, in addition to these, clinical case discussions should form part of a department's schedule at a fixed time every week. This could range from 1-2 hours and could be held at least once a week. The choice and manner of presentation and discussion varies widely and is left to the discretion of the department. Every effort should be made to include as wide a variety of cases as possible over two years with multiple repetitions. Problem oriented approach is better as it aids in decision making skills.
- b. Consultant case presentation is another approach, which should be encouraged as it aids in solving complex problems and also is forum for discussion of interesting cases.
- c. Case discussions on the patient's records written by the student is to be encouraged as it helps exercise the student's diagnostic and decision making skills. It also helps the consultant in critical evaluation of the student's progress academically.
- d. Case presentation at other in-hospital multidisciplinary forums.

6. Seminars

- a. Seminars should be conducted at least once weekly. The duration should be at least one hour. The topics selected should be repeated once in 2 years so as to cover as wide a range of topics as possible.
- b. A postgraduate student of a postgraduate degree course in broad specialities/superspecialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.
 - a) Seminars could be individual presentations or a continuum (large topic) with many residents participating.

7. Journal clubs

- a. This should be a once-in-two week exercise. The topics selected should be appropriate. It could be done topic-wise or journal-wise; ideally, indexed journals are recommended.

8. Lectures

- a. Lectures to residents should be in the form of instructional courses at the beginning of the academic term. These would include topics such as dark room techniques, tonometry, evaluation of perimetry, squint evaluation and management, slit lamp examination with accessories such as gonioscopy, fundus fluorescein angiography, ultrasonography, OCT and corneal topography.
- b. Lectures could also be arranged round the year on sub-specialty topics.
- c. The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
- d. Department should encourage e-learning activities.

9. Posting

All PG students shall be posted in OPD, ward and OT as per their units.

PG students should be posted in emergency to deal with any ocular emergency in casualty.

Effort should be made to expose PG students to the latest techniques even though they may have to be sent for sometime to the centers performing and using latest instruments or surgeries.

- 10. Maintenance of log book:** The Log books shall be checked and assessed periodically by the faculty members imparting the training.

ASSESSMENT

FORMATIVE ASSESSMENT, ie., during the training

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

Assessment is held at the end of each year for two years.

Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and clinical examination.

Internal assessment

The performance of the Postgraduate student during the training period should be monitored throughout the course and duly recorded in the logbooks as evidence of the ability and daily work.

Annual theory examination: Written test conducted at end of each year.

Annual practical/oral examination: Practical exam and viva examination at end of each year.

SUMMATIVE ASSESSMENT, ie., assessment at the end of training

The pass percentage will be 50%

Candidate will have to pass theory and practical examinations separately.

Eligibility criteria to appear for examination

1. 80% attendance
2. Completed logbooks
3. Publications of Research article
4. Presentation – Paper / Poster in conference

Six monthly assessment during the Diploma training should be based on following

educational activities:

1. **Journal based / recent advances learning**
2. **Patient based /Laboratory or Skill based learning**
3. **Self directed learning and teaching**
4. **Departmental and interdepartmental learning activity**
5. **External and Outreach Activities / CMEs**

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I)

SUMMATIVE ASSESSMENT, ie., assessment at the end of training

The summative examination would be carried out as per the Rules given in **POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.**

The diploma examination shall be in two parts:

1. Theory Examination:

The examinations shall be organised on the basis of 'Grading' or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for Diploma shall be held at the end of 2nd academic year. An academic term shall mean six month's training period.

Scheme of theory examination for D. O.

There shall be three theory papers.(100 marks each x 3 papers = 300 marks)

Paper I: Basic Sciences related to Ophthalmology

Paper II: Clinical Ophthalmology

Paper III: Principals and Practice of Surgery of Eye and related topics

Question paper pattern

Q. No.1	Long Answer Question	20 Marks
Q. No.2	Long Answer Question	20 Marks
Q. No.3	Short Answer Question (10 marks each x 6)	60 Marks
	Total	100 Marks

Recommended Reading:

Books (latest edition)

1. Principles & Practice of Ophthalmology. Gholam A Paymen
2. Basic and Clinical Science Courses, American Academy of Ophthalmology
3. Text book of Ophthalmology. Yanoff and Duker
4. Retina. Stephen J Ryan
5. Cornea. Smolin & Thoft Kraechmer
6. Glaucoma. Shields Text book of Glaucoma
7. Lens. Steinert's Cataract surgery
8. Ophthalmic Ultrasound. Sandra Byrne and Ronald Green
9. Uvea. Nussenblatt and Whitcup Smith and Nozik
10. Uveitis: Text and Imaging. Amod Gupta, Vishali Gupta, Carl P Harbort, Moncef Khairallah
11. Neuroophthalmology. Walsh and Hoyt
12. Orbital disease. Rootman's diseases of the orbit
13. Diseases of the orbit. Jakobiec and Snow
14. Diagnosis and management of orbital tumours. Jerry Shields
15. Diagnosis and management of ocular tumours. Jerry Shields –
16. Strabismus. Gunter von Noorden
17. Ophthalmic Pathology. Yanoff and Fine
18. Pharmacology. Havener
19. Anatomy. Wolff
20. Physiology. Adler's Physiology of the Eye
21. Biochemistry. Standard text books
22. Paediatric Ophthalmology. Keneth Wright
23. Refraction. Duke Elder's practice of refraction

Journals

03-05 international Journals and 02 national (all indexed) journals
 American Journal of Ophthalmology
 British Journal of Ophthalmology
 Archives in Ophthalmology
 Ophthalmology
 Indian Journal of Ophthalmology

Annexure I

**Postgraduate Students Appraisal Form
Pre / Para /Clinical Disciplines**

Name of the Department/Unit :
 Name of the PG Student :
 Period of Training : FROM.....TO.....

Sr. No.	PARTICULARS	Not Satisfactory			Satisfactory			More Than Satisfactory			Remarks
		1	2	3	4	5	6	7	8	9	
1.	Journal based / recent advances learning										
2.	Patient based/Laboratory or Skill based learning										
3.	Self directed learning and teaching										
4.	Departmental and interdepartmental learning activity										
5.	External and Outreach Activities / CMEs										
6.	Thesis / Research work										
7.	Log Book Maintenance										

Publications Yes/ No

Remarks* _____

***REMARKS:** Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.

SIGNATURE OF ASSESSEE


SIGNATURE OF CONSULTANT

SIGNATURE OF HOD

Scheme of Practical Examination for D.O.

Seat No.	Practical (200 Marks)				Viva (100 Marks)				Total (300 Marks)
	Long Case (1x75)	Short Cases (2x35=70)	Fundus Case (1x35)	Refraction Case (1x20)	Instruments (25 Marks)	Pathology Specimens (25 Marks)	Drugs & X-ray USG/OCT/ CT/MRI/ Etc. (25 Marks)	Visual Fields & other Ophthalmic Charts (25 Marks)	




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