

Program and Course Structure

School of Medical Science and Research

**MS (Ophthalmology)
Session:2021-24**

Program Code:SMS1701

1. Standard Structure of the Program at University Level

1.1 Vision, Mission and Core Values of the University

Vision of the University

To serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship.

Mission of the University

1. Transformative educational experience
2. Enrichment by educational initiatives that encourage global outlook
3. Develop research, support disruptive innovations and accelerate entrepreneurship
4. Seeking beyond boundaries

Core Values

- Integrity
- Leadership
- Diversity
- Community

1.2 Vision and Mission of the School

Vision of the School

To serve the society by being a premier institute that promotes a comprehensive approach to human health through excellence in academics, research and clinical care

Mission of the School

- Provide a transformative educational experience in Medical Science
- Develop skills and competencies to create global leaders in clinical care
- Promote innovative and collaborative research through intellectual and technological advancement
- Establish a center for excellence in preventive, promotive and curative health care

Core Values

- Integrity
- Leadership
- Ethics
- Community Health

1.3 Programme Educational Objectives (PEO)

1.3.1 Writing Programme Educational Objectives (PEO)

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

A post graduate student having qualified the MS(Ophthalmology) examination should be able to:

- **PEO1.** 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.
- **PEO2** 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.
- **PEO3**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. The student should be able to integrate the preventive methods with the curative and rehabilitative measures in the comprehensive management of the disease.
- **PEO4** The student should be familiar with common eye problems occurring in rural areas and be able to deal with them effectively.
- **PEO5**The student should also be made aware of Mobile Ophthalmic Unit and its working and components. The student should be familiar with the current developments in Ophthalmic Sciences.
- **PEO6** 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.
- **PEO7**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.
- **PEO8**The student should have basic knowledge of medico-legal aspects of medicine.
- **PEO9**The student should be familiar with patient counseling and proper consent taking.

1.3.2 Map PEOs with Mission Statements:

PEO Statements	School Mission 1	School Mission 2	School Mission 3	School Mission 4
PEO1:	3	3	2	3
PEO2:	3	3	2	3
PEO3:	3	3	“_“	“_“
PEO4:	3	3	“_“	“_“
PEO5	3	3	“_“	“_“
PEO6	3	3	“_“	3
PEO7	1	1	3	1
PEO8	1	1	3	3
PEO9	1	1	3	3

1.3.3 Program Outcomes (PO's)

A post graduate student having qualified the MS (Ophthalmology) examination should be able to

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.

PO1. 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. – 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.

PO2. 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.

PO3. 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.

PO4. Ophthalmic pathological/microbiological/biochemical sciences - Be able to interpret the diagnosis in correlation with the clinical data and routine materials received in such cases.

PO5. Community Ophthalmology 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. They should be able to guide rehabilitation workers in the organisation and training of the blinds in art of daily living and in the vocational training of the blind leading to gainful employment.

PO6. Research : - Recognise a research problem. - State the objectives in terms of what is expected to be achieved in the end.

- Plan a rational approach with appropriate controls with full awareness of the statistical validity of the size of the material.
- Spell out the methodology and carry out most of the technical procedures required for the study.
- Accurately and objectively record on systematic lines results and observation made. - Analyze the data with the aid of an appropriate statistical analysis.
- Interpret the observations in the light of existing knowledge and highlight in what ways the study has advanced existing knowledge on the subject and what further remains to be done.
- Write a thesis in accordance with the prescribed instructions.
- Write at least one scientific paper as expected of International Standards from the material of this thesis.

B. Affective Domain:

PO7. 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.

PO8. 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.

PO9. 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:

PO10. Examination techniques along with interpretation

1. Slit lamp Examination i. Diffuse examination ii. Focal examination iii. Retroillumination – direct and indirect iv. Sclerotic scatter v. Specular reflection vi. 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•

PO11. Basic investigations along with their interpretation

1. Tonometry Tonometry - Applanation/Indentation/Non-contact
2. Gonioscopy Gonioscopy grading of the anterior chamber angle
3. Tear/ Lacrimal function tests i. Staining- fluorescein and Rose Bengal ii. Schirmer test/tear film break up time iii. Syringing iv. Dacrocystography
4. Corneal Corneal scraping and cauterization• Smear preparation and interpretation (Gram’s stain /KOH)• Media inoculation• Keratometry - performance and interpretation• Pachymetry• Corneal topography - if available•
5. Colour Vision evaluation Ishihara pseudoisochromatic plates• Farnsworth Munsell, if available•
6. Refraction i. Retinoscopy- Streak/ Priestley Smith ii. Use of Jackson’s cross-cylinder iii. Subjective and objective refraction iv. Prescription of glasses
7. Diagnosis and assessment of Squint i. Ocular position and motility examination ii. Synoptophore usage iii. Lees screen usage iv. Diplopia charting v. Assessment of strabismus - cover tests/prisms bars vi. Amblyopia diagnosis and treatment vii. Assessment of convergence, accommodation, stereopsis, suppression
8. Exophthalmometry Usage of Hertel’s exophthalmometer - proptosis measurement
9. Contact lenses Fitting and assessment of RGP and soft lenses• Subjective verification of over refraction• Complications arising of contact lens use• Educating the patient regarding CL usage and imparting relevant• knowledge of the complications arising thereon
10. Low Vision Aids Knowledge of basic optical devices available and relative advantages• and disadvantages of each. The basics of fitting with knowledge of availability• & cost

PO12.The post graduate must be well versed with the following investigative modalities although the student may or may not perform it individually. But, she/he should be able to interpret results of the following tests:

1. Fundus photography
2. Fluorescein angiography
3. Ophthalmic ultrasound A-scan/B scan
4. Automated perimetry for glaucoma and neurological lesions
5. 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 -USG/ CT/ MRI Scans
6. OCT and UBM 7. ERG, EOG, and VEP

PO13. Minor surgical procedures – Must know and perform independently Conjunctival and corneal foreign body removal on the slit lamp

1. Chalazion incision and curettage
2. Pterygium excision
3. Biopsy of small lid tumours
4. Suture removal- skin/conjunctival/corneal/ corneoscleral
5. Tarsorrhaphy
6. Subconjunctival injection
7. Retrobulbar, parabolbar anaesthesia
8. Posterior Sub-Tenon's injections
9. Artificial eye fitting

PO14. 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• i. Dacryocystectomy ii. Dacryocystorhinostomy iii. 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/Cyclophotocoagulation
3. PG Students should be well conversant with use of operating microscope and must be able to perform the surgeries listed below competently under the same: Cataract surgery• i. Standard ECCE (extracapsular cataract extraction; first year) with or without IOL implantation 9 ii. Small incision ECCE with or without IOL implantation and/or Phacoemulsification with PC IOL implantation iii. Intracapsular cataract extraction (second year) iv. Cataract with Phacoemulsification (third year) v. Secondary AC or PC IOL implantation Vitrectomy/Scleral buckling• Intra-vitreous and intra-cameral (anterior chamber) injection• techniques and doses of drugs for the same Needs to know the basis of open sky vitrectomy (anterior segment)• as well as management of cataract surgery complications. Assisting vitrectomy and scleral buckling procedures• Ocular surface procedures• Pterygium excision with modifications Conjunctival cyst excision/foreign body removal Corneal foreign body removal Conjunctival flap/ peritomy Glaucoma• Trabeculectomy Corneal• Repair of corneo - scleral perforations Corneal suture removal Application of glue and bandage contact lens
4. Should have performed/assisted the following microscopic surgeries i. Keratoplasty Therapeutic and optical ii Glaucoma surgery Pharmacological modulation of trabeculectomy Trabeculectomy Goniotomy Glaucoma valve implant surgery
5. Desirable to be able to perform following laser procedures Yag Capsulotomy• Laser

- iridotomy• Focal and panretinal photocoagulation•
6. Should have assisted/knowledge of Keratorefractive procedures

Operations: The PG is provided with an opportunity to perform operations both extra-ocular and intra-ocular with the assistance of the senior post graduate students and/or under the direct supervision of a faculty member. The student is provided with an opportunity 10 to learn special and complex operations by assisting the senior post graduate student or the faculty in operations of cases of the specialty and be responsible for the postoperative care of these cases. In first phase, the post graduate student is given training in preparations of cases for operation, pre-medication and regional anaesthetic blocks. In the next phase, the post graduate student assists the operating surgeon during the operations. In the third phase, the post graduate student operates independently assisted by senior post graduate student or a faculty member. She/he is required to be proficient in some operations and show familiarity with others.

1.3.4 Mapping of Program Outcome Vs Program Educational Objectives

	PEO1	PEO2	PEO3	PEO4	PEO5	PEO6	PEO7	PEO8	PEO9
PO1	3	3	3	3	3	3	“_“	“_“	“_“
PO2	3	3	3	3	3	3	“_“	“_“	“_“
PO3	3	3	3	3	3	3	“_“	“_“	“_“
PO4	3	3	3	3	3	3	“_“	“_“	“_“
PO5	3	3	3	3	3	3	“_“	“_“	“_“
PO6	3	3	3	3	3	3	“_“	2	2
PO7	3	3	2	3	2	2	3	3	3
PO8	“_“	“_“	“_“	“_“	“_“	“_“	“_“	3	3
PO9	“_“	“_“	“_“	“_“	“_“	“_“	“_“	3	3
PO10	3	3	3	3	3	3	“_“	“_“	“_“
PO11	3	3	“_“	“_“	“_“	1	1	“_“	“_“
PO12	3	3	“_“	“_“	“_“	1	1	“_“	“_“
PO13	1	1	“_“	“_“	“_“	1	1	“_“	“_“
PO14	1	1	“_“	“_“	“_“	1	1	“_“	“_“

School: SMSR		Batch:
Program: MS Anatomy		Current Academic Year: 2019-20
1	Programme Code	SMS1701

Syllabus

Course contents:

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

I. Basic Sciences:

1. Orbital and ocular anatomy
 - i. Gross anatomy
 - ii. Histology
 - iii. Embryology
2. Ocular Physiology
3. Ocular Pathology
4. Ocular Biochemistry

General biochemistry, biochemistry applicable to ocular function

5. Ocular Microbiology

General Microbiology, specific microbiology applicable to the eye

6. Immunology with particular reference to ocular immunology
7. Genetics in ophthalmology
8. Community Eye Health

II. Optics

- a. Basic physics of optics
- b. Applied ophthalmic optics
- c. Applied optics including optical devices
- d. Disorders of Refraction

III. Clinical Ophthalmology

- i. Disorders of the lids
- ii. Disorders of the lacrimal system
- iii. Disorders of the Conjunctiva
- iv. Disorders of the Sclera
- v. Disorders of the Cornea
- vi. Disorders of the Uveal Tract
- vii. Disorders of the Lens
- viii. Disorders of the Retina
- ix. Disorders of the Optic Nerve and Visual Pathway
- x. Disorders of the Orbit
- xi. Glaucoma

- xii. Neuro-ophthalmology
- xiii. Paediatric ophthalmology
- xiv. Ocular involvement in systemic disease
- xv. Immune ocular disorders
- xvi. Strabismus and Amblyopia
- xvii. Ocular oncology

ASSESSMENT

FORMATIVE ASSESSMENT:

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

During the three year training period,

A record of all theoretical, practical and experimental work done by the post graduate student and its assessment will be kept and shall be available for examiners at the time of the final practical and viva voce examination and

There will be periodical examinations during the course of training. The prefinal theory and practical examination will be conducted by the faculty of the concerned college. During last six months the post graduate student will have weekly assessment tutorials conducted by the faculty. All activities will be evaluated.

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 practical/clinical examination.

Quarterly assessment during the MD training should be based on:

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

The Post Graduate examination will be in three parts:

1. **Thesis:** Every post graduate student shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the post graduate student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature. Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the

examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory 12 and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. Theory 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 M.D./MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period.

There shall be four theory papers.

Paper I: Basic Sciences related to Ophthalmology, Refraction & Optics

Paper II: Clinical Ophthalmology

Paper III: Systemic Diseases in Relation to Ophthalmology

Paper IV: Recent Advances in Ophthalmology and Community Ophthalmology

3. Clinical/Practical and oral/viva voce examination

Clinical

1 long case

2 short cases with different problems

2 fundus Cases

1 refraction case .

Oral/Viva voce Examination shall be comprehensive enough to test the post graduate student's overall knowledge of the subject and shall include:

i. Instruments ii. Pathology specimens iii. Drugs, X-rays, USG/OCT/CT/MRI Scans, etc. iv. Visual fields and other ophthalmic diagnostic charts

Recommended Reading:

Books (latest edition) 1. Ophthalmic Surgery: Principles and Techniques. Blackwell Science. Albert DM. 2. Principles and Practice of Ophthalmology. Albert DM, Jakobiec. W B Saunders 3. Principles & Practice of Ophthalmology. Gholam A Paymen 4. The Current American Academy of Ophthalmology Basic and Clinical Science Course (13 volumes) 5. Duke Elder's Practice of Refraction. Abrams D. Churchill Livingstone. 6. Text book of Ophthalmology. Yanoff and Duker 7. Retina. Stephen J Ryan: 8. Ophthalmic Ultrasound: Sandra Byrne and Ronald Green. 9. Cornea: Fundamentals, Diagnosis, and Management. Krachmer JH, Mannis MJ, Holland EJ. Mosby Elsevier. 10. Ophthalmology. Yanoff N, Duker JS. Mosby Elsevier. 11. Review of Ophthalmology. Friedman NJ, Kaiser PK, Trattler WB. Elsevier Saunders, Philadelphia. 12. Corneal Transplantation. Vajpayee RB. Jaypee Brothers Medical Publishers (P) Ltd, New Delhi. 13. Fundamentals of Clinical Ophthalmology Series. Coster D. Cornea. Blackwell Publishing Limited. 14. The Contact Lens Manual. A practical guide to fitting. Gasson A, Morris A J. Butterworth Heinemann Elsevier. 15. Steinert's cataract surgery. 16. Shields Text book of glaucoma 17. Smith and Nozik : Uvea 18. Rootman's diseases of the orbit 19. Eyelid, conjunctival and orbital tumors. An atlas and textbook. Shields JA, Shields CL.

Philadelphia: Lippincott Williams & Wilkins. 20. Intraocular tumors. An atlas and textbook. Shields JA, Shields CL. 21. Pediatric Ophthalmology. Taylor and Hoyt: Saunders Ltd. 22. Management of Strabismus and Amblyopia. Pratt-Johnson and Tilson: Thieme Verlag. 23. Handbook of Pediatric Eye and Systemic disease. Wright, Spiegel and Thompson. 24. Binocular Vision and Ocular Motility. Theory and Management of Strabismus. Von Noorden GK. Mosby. 25. Surgical Management of Strabismus. Helveston: 26. Strabismus: A Decision Making Approach. Von Noorden and Helveston: 27. Thyroid Eye Diseases. Char DR. Williams and Wilkins, Baltimore. 28. A Manual of Systematic Eyelid Surgery. Collin JRO (ed). Churchill Livingstone, Edinburgh. 29. Refractive Surgery. Agarwal A, Agarwal A, Jacob Soosan. Jaypee. 30. LASIK Complications, Prevention and management. Gimbel HV, Penno EEA. Slack Inc. 31. Management of Complications of Refractive Surgery. Alio JL, Azar DT. Springer. 32. Quality of Vision: Essential Optics for the Cataract and Refractive Surgeon. Holladay JT. Slack Inc. 33. Ocular Pharmacology: Havener 34. Anatomy: Wolff 's Anatomy of the Eye and Orbit 35. Physiology: Adler's Physiology of the Eye 36. Textbook of Ophthalmology (2 volumes). Easty DL, Sparrow JM. Oxford Medical Publications. 37. The Eye. Basic Sciences in Practice. Forrester JV, Dick AD, McMenemy PG, Lee WR. W B Saunders. 38. A Stereoscopic Atlas of Macular Diseases: Diagnosis and Treatment. Gass JDM. 39. Neuroophthalmology. Glaser JS. Lippincott Williams & Wilkins. . 40. Clinical Ophthalmic Pathology. Harry J, Misson G. Butterworth/Heinemann. 41. Inherited Retinal Diseases. A Diagnostic Guide. Jimenez Sierra JM, Ogden TE, Van Boemel GB. Mosby. 42. Clinical Ophthalmology. Kanski JJ. Butterworth/Heinemann. 43. ABC of Resuscitation. Colquhoun, M. C., Evans, T. R., Handley, A. J. BMJ Publishing Group. 44. Walsh and Hoyt's Clinical Neuroophthalmology (5 volumes). Miller NR, Newman NJ, Williams and Wilkins. 45. The human eye. Oyster CW Sinauer Associates. Sunderland. Massachusetts 46. Paediatric Ophthalmology. Taylor D. Blackwell Science. 47. Decision Making in Ophthalmology. Van Heuven WAJ, Zwann J. Mosby. 48. Parsons' Diseases of the eye. Sihota and Tandon. 49. Wills Eye Manual 50. International Council of Ophthalmology Residency Curriculum available at <http://www.icoph.org/>

Journals 03-05 international Journals and 02 national (all indexed) journals

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 /				
6	CMEs				
7	Thesis / Research work				
8	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