

# CLINICAL SCIENCE (CLS)

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## **CLS 560: Clinical Methods I. (4.50 credit hours)**

Three lecture hours and three laboratory hours per week. This course is the first in a series that presents the basic clinical tests and procedures comprising a comprehensive primary eye care examination. The content of this course includes the principles and clinical methods for entrance testing, retinoscopy, and clinical refraction. The laboratory provides demonstration and practice of these clinical methods.

## **CLS 561: Clinical Methods II. (4.50 credit hours)**

Three lecture hours and three laboratory hours per week. This course is a continuation of Clinical Methods I and emphasizes the principles and clinical methods for patient interviewing, history taking, entrance testing, assessment of basic binocular vision and accommodation, and an introduction to prescribing spectacle lenses. The laboratory provides demonstration and practice of these clinical methods and how test results are recorded.

## **CLS 660A: Ocular Health Procedures IA. (3.00 credit hours)**

One and one-half lecture hours and three laboratory hours per week. This course presents basic procedures and techniques in ocular health assessment for the primary care optometrist. The principles, performance and interpretation of various health assessment procedures utilized in clinical practice are discussed. A systematic, problem-oriented approach to the diagnostic evaluation of the eye and neuro-visual system is emphasized. Standards of care and medico-legal issues in ocular health assessment are presented along with insurance codes and reimbursement guidelines. The laboratory provides experience in the use of these procedures, as well as the clinical utilization of pharmaceutical agents commonly used in primary care optometric practice. The laboratory requires that students actively participate as doctors and patients while learning these procedures.

## **CLS 660B: Ocular Health Procedures IB. (3.00 credit hours)**

One and one-half lecture hours and three laboratory hours per week. This course presents basic procedures and techniques in ocular health assessment for the primary care optometrist. The principles, performance and interpretation of various health assessment procedures utilized in clinical practice are discussed. A systematic, problem-oriented approach to the diagnostic evaluation of the eye and neuro-visual system is emphasized. Standards of care and medico-legal issues in ocular health assessment are presented along with insurance codes and reimbursement guidelines. The laboratory provides experience in the use of these procedures, as well as the clinical utilization of pharmaceutical agents commonly used in primary care optometric practice. The laboratory requires that students actively participate as doctors and patients while learning these procedures.

## **CLS 661: Case Analysis and Prescribing I. (2.00 credit hours)**

Two lecture hours per week. This course is designed to support the student's clinical decision making from the classroom to the clinic. Integration and application of knowledge is stressed in the formulation of a clinical diagnosis and management. The use of scientific principles and epidemiology to review patient history, and the formulation and testing of hypotheses to arrive at a clinical diagnosis and management is stressed. Students are taught the art and science of prescribing lenses and prisms for ametropias, presbyopia and binocular anomalies. Emphasis is placed on consideration of occupational, avocational and safety factors in determining a treatment and management plan.

## **CLS 662: Case Analysis and Prescribing II. (2.00 credit hours)**

Two lecture hours per week. This course is designed to support the student's clinical decision making from the classroom to the clinic. Integration and application of knowledge is stressed in the formulation of a clinical diagnosis and management. The use of scientific principles and epidemiology to review patient history, and the formulation and testing of hypotheses to arrive at a clinical diagnosis and management is stressed. Students are taught the art and science of prescribing lenses and prisms for ametropias, presbyopia and binocular anomalies. Emphasis is placed on consideration of occupational, avocational and safety factors in determining a treatment and management plan.

## **CLS 663: Ocular Health Procedures II. (3.50 credit hours)**

Two lecture hours and three laboratory hours per week. Clinical procedures used in the assessment, diagnosis, treatment and management of ocular disease, such as anterior segment eye disorders, retinal disease, the glaucomas and the ocular manifestations of systemic disease, are presented in this course. Emphasis is placed on the appropriate integration of the procedures in the ocular health examination. The laboratory solidifies the competence of the techniques utilized in the effective treatment and management of ocular disease.

## **CLS 663C: Ocular Health Procedures IIC. (0.50 credit hours)**

Two laboratory hours per week for 5 weeks. Clinical procedures used in the assessment, diagnosis, treatment and management of ocular disease, such as retinal disease and the ocular manifestations of systemic disease, are presented in this course. Emphasis is placed on the appropriate integration of the procedures in the ocular health examination. The laboratory solidifies the competence of the techniques utilized in the effective treatment and management of ocular disease.

## **CLS 663Z: Ocular Health Procedures IIZ. (1.50 credit hours)**

Three laboratory hours per week. Clinical procedures used in the assessment, diagnosis, treatment and management of ocular disease, such as anterior segment eye disorders, retinal disease, the glaucoma and the ocular manifestations of systemic disease, are presented in this course. Emphasis is placed on the appropriate integration of the procedures in the ocular health examination. The laboratory solidifies the competence of the techniques utilized in the effective treatment and management of ocular disease.

## **CLS 664A: Ocular Disease Diagnosis & Mgmt IA. (2.00 credit hours)**

Two lecture hours per week. This course presents a comprehensive discussion of anterior segment diseases and disorders. Pathophysiology of ocular tissues is related to the disease processes to provide a strong understanding of the ocular disease presentation and patient symptoms. Clinical cases are presented to enhance student learning. Clinical and laboratory evaluation is discussed along with the diagnosis, treatment, and management of anterior segment diseases. Current management strategies will emphasize the utilization of appropriate therapeutic agents and modalities for proper follow-up care. Selected readings help to emphasize current thoughts on treatment and management.

## **CLS 664B: Ocular Disease Diagnosis & Mgmt IB. (2.00 credit hours)**

Two lecture hours per week. This course presents a comprehensive discussion of anterior segment diseases and disorders. Pathophysiology of ocular tissues is related to the disease processes to provide a strong understanding of the ocular disease presentation and patient symptoms. Clinical cases are presented to enhance student learning. Clinical and laboratory evaluation is discussed along with the diagnosis, treatment, and management of anterior segment diseases. Current management strategies will emphasize the utilization of appropriate therapeutic agents and modalities for proper follow-up care. Selected readings help to emphasize current thoughts on treatment and management.

**CLS 665: Case Analysis and Prescribing III. (2.00 credit hours)**

Two lecture hours per week. This course is designed to support the student's clinical decision making from the classroom to the clinic. Integration and application of knowledge is stressed in the formulation of a clinical diagnosis and management. The use of scientific principles and epidemiology to review patient history, and the formulation and testing of hypotheses to arrive at a clinical diagnosis and management is stressed. Students are taught the art and science of prescribing lenses and prisms for ametropias, presbyopia and binocular anomalies. Emphasis is placed on consideration of occupational, avocational and safety factors in determining a treatment and management plan.

**CLS 670: Cornea and Contact Lenses I. (4.00 credit hours)**

Three lecture hours and two laboratory hours per week. The basic characteristics and design features of gas permeable contact lenses are presented. Topics addressed in this course include lens fabrication, verification and analysis, contact lens optics and fluorescein pattern interpretation. Approaches to fitting gas permeable contact lenses considering the contributions of corneal topography, refraction, over-refraction and tear lens calculations are demonstrated. Care of gas permeable contact lens patients and the anatomical and physiological changes associated with adaptation and long-term wear are discussed.

**CLS 671: Cornea and Contact Lenses II. (3.50 credit hours)**

Two lecture hours and three laboratory hours per week. Continuing applications of gas permeable contact lens fitting and management are presented, gas permeable lens modification, and gas permeable toric lens indications, optics and analysis are covered in both lecture and laboratory. Soft contact lens materials including silicone-hydrogels, soft contact lens fit assessment and patient management are taught. Management options for presbyopia with single vision and multifocal contact lenses are presented. Contact lens wear complications and management options are discussed. Contact lens prescribing strategies and patient cases are presented. Refractive surgery patient selection, available surgical procedures and co-management are discussed.

**CLS 672: Mgmt Non-Strab Binocular Vision Cnd. (3.50 credit hours)**

Two lecture hours and three laboratory hours per week. This course will cover the diagnosis and management of non-strabismic binocular vision conditions including anomalies of the vergence, accommodation and ocular motor systems. Lecture topics include the clinical evaluation, case analysis, diagnosis and management of these systems. A range of treatment options will be discussed, including lenses, prisms and vision therapy. Office-based vision therapy utilizing a sequential approach will be emphasized.

**CLS 720: Clinical Medicine I. (4.00 credit hours)**

Three lecture hours and two laboratory hours per week. This course provides the fundamental principles of general pathology and when applicable ocular implications and manifestations are highlighted. Topics of discussion include Cell Injury, Death, and Adaptation, Acute and Chronic Inflammation, Tissue Repair: Cell Regeneration, Fibrosis, and Wound Healing, Hemodynamic Disorders, Thrombosis, and Shock, Disorders of the Immune System, Genetic & Pediatric Diseases, Environmental Diseases, Neoplasia, General Pathology of Infectious Disease, Diseases of the Blood Vessels & the Heart, Hematopoietic & Lymphoid System, Respiratory System, Kidney and Its Collecting System, GI Tract & the Liver/ Biliary Tract, Pancreas & Diseases of the Endocrine, Musculoskeletal System, Nervous System, Skin, and Psychiatry. The laboratory portion concentrates on clinical procedures, diagnostic evaluation and treatment and management, and enables application of those theories learned in lecture. The laboratory include: gross clinical observation with emphasis on head and neck, review of systems, medical case history taking, medication reconciliation, patient case presentation, headache history, systemic emergencies, and cardiovascular evaluation comprising of pulse, blood pressure, carotid bruits assessment, glucometry & HA1C Testing, epiluminescence microscopy, cranial nerve test & neurological screener, allergy testing, and lab testing.

**CLS 721: Clinical Medicine II. (4.00 credit hours)**

Three lecture hours and two laboratory hours per week. This course provides the fundamental principles of general pathology and when applicable ocular implications and manifestations are highlighted. Topics of discussion include Cell Injury, Death, and Adaptation, Acute and Chronic Inflammation, Tissue Repair: Cell Regeneration, Fibrosis, and Wound Healing, Hemodynamic Disorders, Thrombosis, and Shock, Disorders of the Immune System, Genetic & Pediatric Diseases, Environmental Diseases, Neoplasia, General Pathology of Infectious Disease, Diseases of the Blood Vessels & the Heart, Hematopoietic & Lymphoid System, Respiratory System, Kidney and Its Collecting System, GI Tract & the Liver/ Biliary Tract, Pancreas & Diseases of the Endocrine, Musculoskeletal System, Nervous System, Skin, and Psychiatry. The laboratory portion concentrates on clinical procedures, diagnostic evaluation and treatment and management, and enables application of those theories learned in lecture. The laboratory include: gross clinical observation with emphasis on head and neck, review of systems, medical case history taking, medication reconciliation, patient case presentation, headache history, systemic emergencies, and cardiovascular evaluation comprising of pulse, blood pressure, carotid bruits assessment, glucometry & HA1C Testing, epiluminescence microscopy, cranial nerve test & neurological screener, allergy testing, and lab testing.

**CLS 722: Ophtha Lasers, Injection & Med Dia. (2.50 credit hours)**

Two lecture hours and one laboratory hour per week. The purpose of this course is for the student to become knowledgeable in the protocol of advanced complex diagnostic and therapeutic clinical procedures involving ocular disease conditions. Special emphasis is placed on the indications and procedural application of anterior and posterior segment lasers, neuro-imaging, diagnostic and therapeutic injections, laboratory evaluation of patients and emergency care.

**CLS 723: Ophthalmic Surgery. (2.50 credit hours)**

One and one-half lecture hours per week and two laboratory hours per week. The purpose of this course is to present ophthalmic surgical procedures and advanced imaging techniques that are commonly encountered in practice. Special emphasis is placed on pre-operative patient selection, variations of surgical procedures and assessment of normal and complicated post-surgical outcomes. Ordering and interpretation of imaging techniques will also be presented.

**CLS 760: Pediatric Optometry. (2.00 credit hours)**

Two lecture hours per week. The diagnosis and management of common vision problems in young children requires an understanding of vision development, as well as the utilization of diagnostic procedures that are developmentally appropriate. This course provides diagnostic strategies for examining the infant, toddler and preschooler. Application of pediatric tests for special needs children is presented, as well as the implication of ocular health on normal visual development.

**CLS 762A: Ocular Disease Diag & Mgmt IIA. (3.00 credit hours)**

Three lecture hours per week. The evaluation, diagnosis, treatment and management of diseases of the optic nerve and the glaucomas are presented. Emphasis is placed on understanding the disease process and the clinical presentation and appropriate use of diagnostic modalities, including new technologies. Therapeutic strategies emphasize medical and surgical management, co-management and follow-up care. Medico-legal issues, patient education and standards of care are presented including record keeping, coding and reimbursement guidelines.

**CLS 762B: Ocular Disease Diag & Mgmt IIB. (2.00 credit hours)**

Two lecture hours per week. This course series will detail the basic anatomy and physiology of posterior segment structures (vitreous, retina choroid) and then familiarize students with the pathophysiology, presentation, diagnosis, and clinical management of ocular diseases that manifest there. Ancillary testing important to managing these conditions such as spectral domain optical coherence tomography (SD-OCT), fundus auto-fluorescence (FAF), and fluorescein angiography (FANG) will also be introduced and reviewed, with an emphasis being placed on the structural and functional relationships of these tests.

**CLS 763A: Ocular Disease Diag & Mgmt IIIA. (2.00 credit hours)**

Two lecture hours per week. The course covers ocular complications associated with systemic disease. The lectures emphasize the diagnosis, treatment and management of the ocular sequela of systemic diseases as well as ocular signs that may preempt the onset of the systemic disease. Areas of emphasis include neurology, orbitopathy, endocrinology and connective tissue disorders.

**CLS 763B: Ocular Disease Dia & Mgmt IIIB. (2.00 credit hours)**

Two lecture hours per week. The course covers ocular complications associated with systemic disease. The lectures emphasize the diagnosis, treatment and management of the ocular sequela of systemic diseases as well as ocular signs that may preempt the onset of the systemic disease. Areas of emphasis include uveitic syndromes, adult and pediatric orbital disorders, adult thyroid eye disease, rheumatology, AIDS and ocular emergencies. Optometric co-management with internal medicine and medical subspecialties is emphasized.

**CLS 765: Ocular Disease Case Management. (1.00 credit hours)**

Two discussion hours per week. The purpose of this course is to effectively integrate the information presented in the prior ocular disease courses. Utilizing an interactive, small group case discussion format, students will be able to enhance their abilities in proper differential diagnosis, testing protocol, treatment and management and patient education of conditions related to ocular disease.

**CLS 770: Cornea and Contact Lenses III. (3.25 credit hours)**

Three lecture hours per week and six laboratory hours per quarter. Advanced and more complex contact lens designs and fitting options are reviewed. Topics include management of astigmatism with gas permeable toric lenses and contact lens management of special corneal topographies such as those found with post-surgical corneas, post-traumatic corneas, keratoconus and orthokeratology patients. Large diameter and scleral contact lens indications and prescribing are covered. Contact lens care of pediatric patients is discussed. Myopia control including orthokeratology is presented. A description of corneal dystrophies and degenerations including contact lens options and treatment plans is included. Discussion of the physiologic impact of contact lenses on the cornea is presented in increased depth. Diagnosis, treatment and management of contact lens related complications in various lens wear modalities are described. Patient cases are presented to assist the student in applying their classroom knowledge to patient care. This course also includes the advanced topic of ocular prosthetics. The care, fitting and management of ocular prosthetic devices are presented and discussed. There is a hands-on laboratory covering the procedures and techniques used in fitting, creation and fabrication of various ocular prosthetic devices.

**CLS 771: Vision, Perception and Learning. (4.00 credit hours)**

Three lecture hours and two laboratory hours per week. The course will give the student a systematic approach for the diagnosis and management of Developmental Visual Information Processing disorders. The role of the optometrist as part of a multidisciplinary team in evaluating children with learning disabilities will be emphasized. The course will provide a review of child development, principles of standardized testing, learning disabilities and Attention Deficit Hyperactivity Disorder. The purpose of the tests used in the DVIP profile will be discussed along with relating specific disorders to symptoms that are found in the case history. Finally, a sequential management plan for treating patients with DVIP dysfunction will be presented.

**CLS 772: Strabismus & Amblyopia Diag. (4.50 credit hours)**

Three lecture hours and three laboratory hours per week. The evaluation of patients presenting with strabismus and/or amblyopia is discussed. A sequential examination strategy is presented with emphasis on the administration and interpretation of diagnostic testing procedures to arrive at an accurate diagnostic summary. Etiology, prevalence and characteristics of the more common types of strabismus and amblyopia are highlighted. Communication of prognostic and diagnostic outcomes with parents, patients and other health care professionals is discussed.

**CLS 773: Strabismus & Amblyopia Mgmt. (3.00 credit hours)**

Three lecture hours per week. Clinical management of patients with strabismus and/or amblyopia is discussed. Sequential treatment programs, including the use of lenses, prisms, occlusion, active vision therapy and appropriate surgical referrals for prevalent types of strabismus and amblyopia are presented. Emphasis is placed on early treatment, prevention and elimination of anomalous sensorimotor fusion, as well as the reestablishment of efficient binocular vision.

**CLS 774: Low Vision Rehabilitation. (4.00 credit hours)**

Three lecture hours and two laboratory hours per week. The topics presented include the performance characteristics of optical and non-optical treatment options for the visually impaired; assessment, treatment and management of geriatric and visually impaired patients; development of a vision rehabilitation plan; the multidisciplinary team approach to rehabilitation; patient communication and education; management of special populations; and practice management considerations. The laboratory presents the performance characteristics and clinical application of optical and non-optical treatment options for visual impairment.

**CLS 775: Cornea and Contact Lenses IV. (1.50 credit hours)**

Two laboratory hours and two clinic hours per week. This course consists of contact lens seminars and grand rounds. The major topic areas for student discussions and grand rounds patient presentations include management of regular and irregular astigmatism, presbyopia, irregular corneas such as keratoconus and pellucid marginal degeneration, management of orthokeratology and post-surgical corneas as well as prosthetics and dry eye. This course is designed for students to present patient cases and to submit a written case report.

**CLS 782: Health Promotion. (1.00 credit hours)**

One lecture hour per week. The course provides students with an understanding of the optometrist's role in health promotion. Program planning, implementation and evaluation of health promotion activities are discussed. Students are given the opportunity to participate in the creation of a community-based project of their choosing to gain firsthand experience in public health optometry.

**CLS 783: Business & Career Management I. (2.00 credit hours)**

Two lecture hours per week. This course provides learning experiences for students in financial planning and professional goals setting. Emphasis is placed on enhancing a student's interpersonal skills and professionalism as part of patient care, modern business principles, and clinico-legal aspects of record keeping, patient confidentiality, documentation, coding and billing, record release, and Americans with Disabilities Act issues are also covered. The desired outcome of the course is that the student will be able to select and excel in the best practice situation that meets his or her personal goals upon graduation.

**CLS 784: Business & Career Management II. (1.50 credit hours)**

Two lecture hours per week. This course provides learning experiences for students in financial planning and professional goals setting. Emphasis is placed on enhancing a student's interpersonal skills and professionalism as part of patient care, modern business principles, and clinico-legal aspects of record keeping, patient confidentiality, documentation, coding and billing, record release, and Americans with Disabilities Act issues are also covered. The desired outcome of the course is that the student will be able to select and excel in the best practice situation that meets his or her personal goals upon graduation.

**CLS 801: Adv Diag & Management of Dry Eye. (2.00 credit hours)**

This course will provide an overview of recent knowledge relative to clinical dry eye. An emphasis will be placed on advanced understanding, including test efficacy, assignment of sub-types and current management approaches. Therapeutic management will include mechanical and pharmaceutical strategies to control inflammation and stimulate tear flow. This course emphasizes the student's learning to provide them the information and practical skills to allow them to develop a dry eye center of excellence in a primary care setting.

**CLS 802: I and A of Imaging Technology. (2.00 credit hours)**

The purpose of this course is for students to enhance their interpretation and application of advanced imaging technology for ocular disease patients in a clinical setting. Material will be presented in learning modules based on different imaging technology: optical coherence tomography, B-scan and fluorescein angiography. Strong emphasis will be placed on optical coherence tomography. Clinically relevant diagnoses and disease management in clinical care will also be discussed to prepare students for 4th year rotations and patient care post-graduation.

**CLS 803: Geriatric Optometry. (2.00 credit hours)**

This course will provide an introduction into caring for the geriatric patient in the optometric setting. Primary eye care involves caring for the patient from birth to death. With projections of the aging population exponentially increasing in the coming years, it becomes increasingly important for optometrists to be able to care for geriatric patients accordingly. Older adults are more likely to experience chronic eye disease, live with multiple co-morbidities including depression, and experience a decrease in valued activities. In addition, optometrists need to be prepared to co-manage and educate the older adult population on common ocular diseases affecting the population in order to serve as part of their comprehensive healthcare team.

**CLS 804: Applied Ocular Genetics. (1.50 credit hours)**

This course will cover the history and present integration of genetics and genomics into eye care, including current challenges and gaps in our understanding of the genetic basis of ocular conditions. We will cover the benefits and limitations of current genetic test panels for ocular conditions. We will address the current clinical guidelines for genetic testing and the incorporation of genetic testing into clinical practice. Additionally, we will cover the current state of ocular gene therapy and related research. We will define precision medicine and consider the anticipated changes in medical and optometric practice. We will cover additional considerations such as data privacy and ethics of genetic testing.

**CLS 805: Effect Learning Strategies Optom. (1.00 credit hours)**

In this course, students will be introduced to common myths about learning and scientifically proven methods of learning. This course provides opportunities for practical application of course material to current optometry courses, including didactic, laboratory, and clinical.

**CLS 885A: Business & Career Management IIIA. (0.50 credit hours)**

The purpose of this course is to provide educational information and learning activities that facilitate the learning of knowledge and skills necessary for entering a desired mode of optometric practice. The students will be aware of the numerous options available to them and be able to choose that content most beneficial to their personal situations. The desired outcome is that the student will be prepared to enter her/his desired best practice situation upon graduation.

**CLS 885B: Business & Career Management IIIB. (0.50 credit hours)**

The purpose of this course is to provide educational information and learning activities that facilitate the learning of knowledge and skills necessary for entering a desired mode of optometric practice. The students will be aware of the numerous options available to them and be able to choose that content most beneficial to their personal situations. The desired outcome is that the student will be prepared to enter her/his desired best practice situation upon graduation.

**CLS 885C: Business & Career Management IIIC. (0.50 credit hours)**

The purpose of this course is to provide educational information and learning activities that facilitate the learning of knowledge and skills necessary for entering a desired mode of optometric practice. The students will be aware of the numerous options available to them and be able to choose that content most beneficial to their personal situations. The desired outcome is that the student will be prepared to enter her/his desired best practice situation upon graduation.

**CLS 885D: Business & Career Management IIID. (0.50 credit hours)**

The purpose of this course is to provide educational information and learning activities that facilitate the learning of knowledge and skills necessary for entering a desired mode of optometric practice. The students will be aware of the numerous options available to them and be able to choose that content most beneficial to their personal situations. The desired outcome is that the student will be prepared to enter her/his desired best practice situation upon graduation.