Course Catalog

2019-2020

STATE UNIVERSITY OF NEW YORK
COLLEGE OF OPTOMETRY

The SUNY College of Optometry's Course Catalog is a supplement to the Student Handbook that is designed to provide descriptions and details related to the College's curriculum. The SUNY College of Optometry reserves the right to change the programs, requirements and or policies in this catalog as necessary. For a complete listing of the College's policies please see the Student Handbook.

This catalog was last updated on August 27, 2019

STATE UNIVERSITY OF NEW YORK
COLLEGE OF OPTOMETRY

College Catalog
2019-2020

SUNY College of Optometry
Academic Calendar
May 2019-May 2020

Holidays, Breaks & Program Start Dates

	First Year	Second Year	Third Year	Grad. Program
Orientation	Aug. 14-16, 2019	Aug. 15-16, 2019	May 16 & 17, 2019	
2019 FALL SEMESTER:				
Summer session:		June 4 – Aug. 2, 2019	May 28 – Aug. 3, 2019	May 28 – Aug. 2, 2019
Fall Semester begins:	August 19, 2019	August 19, 2019	August 19, 2019	August 19, 2019
Midterm week:	Oct. 10 – Oct. 16	Oct. 10 – Oct. 16	Oct. 10 – Oct. 15	Oct. 10 – Oct. 16
Last day of Fall Sem.:	December 9, 2019	December 9, 2019	December 12, 2019	December 9, 2019
Final Exams:	Dec. 10 – 19	Dec. 10 – 19	Dec. 13 – 19	Dec. 10 – 19
2020 SPRING SEMESTER:				
Spring Semester begins:	January 6, 2020	January 6, 2020	January 6, 2020	January 6, 2020
Midterm week:	Feb. 27 – Mar. 6	Feb. 27 – Mar. 6	TBA	Feb. 27 – Mar. 6
Last day of Spring Sem.:	May 4, 2020	May 4, 2020	May 11, 2020	May 4, 2020
Final Exams:	May 6 – May 15	May 6 – May 13	May 12 – May 13	May 6 – May 15

Fourth Year Clinic Rotations	
Summer rotation	May 28, 2019 – August 22, 2019
Fall rotation	August 26, 2019 – November 14, 2019
Winter rotation	November 18, 2019 – February 20, 2020
Spring rotation	February 24, 2020 – May 14, 2020 (Capstone: May 19, 2020)

Fall Semester		
June 14, 2019	Friday	2018-2019 Resident's Program Farewell Ceremony
June 19-23, 2019	Wed. – Sun.	AOA meeting. Classes and clinics in session.
July 1, 2019	Monday	2019-2020 Residency Program begins.
July 4, 2019	Thursday	INDEPENDENCE DAY (Building closed).
August 27, 2019	Tuesday	Faculty Meeting
September 2, 2019	Monday	LABOR DAY (Building Closed).
September 6, 2019	Friday	Externship Expo – Class of 2021
September 24, 2019	Tuesday	UEC Meeting
Sept. 30 & Oct. 1, 2019	Mon. & Tues.	No classes scheduled. (3rd and 4th year clinics are scheduled).
October 4-6, 2019	Fri. – Sun.	Envision
October 9, 2019	Wednesday	No classes scheduled. (3rd and 4th year clinics are scheduled).
October 10-15, 2019	Thurs. – Tues.	3rd Year Midterm Week – no classes or clinics scheduled. 3rd yr. classes resume 10/16.
October 10-16, 2019	Thurs. – Wed.	Midterm Week – 1st, 2ndyrs. & Grad. Prog. - no classes.
October 14, 2019	Monday	COLUMBUS DAY (Building Closed).
October 23-28, 2019	Wed. – Mon.	AAO Meeting. Classes and clinics are in session.
November 11, 2019	Monday	VETERAN'S DAY - (Building is opened, classes and clinics are scheduled).
November 27, 2019	Wednesday	No classes scheduled. No 3rd & 4th yr. UEC clinics scheduled.

November 28, 2019	Thursday	THANKSGIVING HOLIDAY (Building Closed).
November 29, 2019	Friday	No classes or clinics scheduled. Library access TBA.
December 3 or 5, 2019	Tues. or Thurs.	NBEO Part II Exam – Class of 2020 (Students choose one day to take the exam). Preceding day of your exam is a study day.
December 10 - 19, 2019	Tues. – Thurs.	Final Exams Week: no classes/clinics scheduled for each respective exam date. 1st, 2ndyrs. & Grad. Prog: Dec. 10 - 19 3rd year final exams: Dec. 13 - 19
December 19, 2019	Thursday	Faculty Meeting/Staff Recognition Ceremony/Holiday Party (Clinics Closed)
Dec. 24 – Dec. 31, 2019	Tues. – Tues.	Modified UEC schedule, please see Clinic Chiefs.
December 25, 2019	Wednesday	CHRISTMAS HOLIDAY (Building Closed).

Spring Semester		
January 1, 2020	Wednesday	NEW YEAR'S DAY (Building Closed).
January 2, 2020	Thursday	4th year rotations resume.
January 20, 2020	Monday	MARTIN LUTHER KING, JR. HOLIDAY (Building Closed).
January 28, 2020	Tuesday	UEC Meeting
February 17, 2020	Monday	PRESIDENT'S DAY (Building Closed).
Feb. 27 – Mar. 6, 2020	Thurs. - Fri.	Midterm Week: 1st, 2nd yrs. & Grad. Prog. - no classes or clinics scheduled. 3rd yrs - TBA.
March 8 & 9, 2020	Sun. & Mon.	Faculty Retreat/Faculty Meeting
March 9 - 13, 2020	Mon. – Fri.	SPRING RECESS (1st , 2nd , & 3rd years and graduate program)
March 12 & 13, 2020	Thurs. & Fri.	Residency Major Presentation (No am/pm clinics, evening clinics are in session).
March 17 & 18, 2020	Tues. - Fri.	NBEO Part I – Class of 2021 (No classes or clinics for 3rd yr. students; Monday, March 16 is a study day)
March 19, 2020	Thursday	3rd year classes/clinic schedules resume.
April 21-25, 2020	Tues. – Sat.	COVD Meeting. Classes and clinics in session.
April 10, 2020	Friday	No classes scheduled. (3rd and 4th year clinics are scheduled).
May 3 - 7, 2020	Sun. – Thurs.	ARVO Meeting. Classes and clinics in session.
May 5, 2020	Tuesday	Faculty Meeting
May 6 – 15, 2020	Wed. – Fri.	Final Exams Week – no classes or clinics scheduled for each respective exam date. May 6 – 15: 1st & Grad. Prog; May 6 – 13: 2nd yrs; May 12 & 13: 3rd yrs.
May 13 -15, 2020	Wed. – Fri.	**Class of 2021** – **MANDATORY:** UEC Compliance Training & Advanced Procedures Workshop.
May 14 & 15, 2020	Thurs. & Fri.	**Class of 2022** - Clinical Orientation. White Coat Ceremony will be held on 5/14.
May 19, 2020	Tuesday	Class of 2020 Capstone Program.
May 20, 2020 (Morning)	Wednesday	UEC Meeting
May 21, 2020	Thursday	Commencement-CLASS OF 2020!!!!!!
May 25, 2020	Monday	MEMORIAL DAY (Building Closed)
May 26, 2020	Tuesday	4th year summer rotation begins (class of 2021) & Grad. Program. New 3rd year summer schedule begins (class of 2022)
June 19, 2020	Friday	2019-2020 Resident's Program Farewell Ceremony

It is the policy of SUNY College of Optometry that faculty, staff or students may be excused from classes and UEC clinics for the observance of religious holidays if advance notice is given. Excused absence from clinic for religious observances requires advance notice to the appropriate UEC Service Chief at the beginning of the term for coverage and rescheduling. For academic courses, faculty must notify their Department Chair and students must notify the course Instructor of Record at the beginning of the term or as soon as the syllabus is available. Students are responsible for any missed materials, requirements, labs or clinics and must ensure that any missed examinations or assessments are made up. Faculty must take vacation leave for missed days.

Severe Weather Emergencies

When severe weather occurs, the President may decide to cancel classes, labs and/or clinic assignments. To close the college, a directive or declaration from the Governor's office is required.

Closure and cancellation notices will be made through the following outlets:

- College website- http://www/sunyopt.edu
- SUNY Optometry Emergency Mass Notification System and Office365 Email Alerts
- Recorded message on the College's main telepphone number (212-938-4000)

Tuition and Fees

OD Program Tuition and Fees

Annual Tuition (in-state)	$29,820.00
Annual Tuition (out-of-state, Canadian and foreign)	$51,150.00
College fee	$50.00
Student activity fee	$210.00
Technology fee	$325.00
Foreign Student Health Insurance	$1,577.28
Orientation Fee (First Years Only)	$85.00
Clinical Liability	$50.00

OD Program tuition and fees are subject to change

Additional Costs and Information

Instruments: First-year professional program approximately $1,800 (due in July.)

Books: First year approximately $1,100 (usually after classes start).

Room: For the 2019-2020 academic year, a student is allowed a maximum Financial Aid allotment of $15,600 for rent. The average rent for a student living in walking distance to the college is $1,300 per month. The average rent for a student commuting by subway is $800 per month.

Board: For the 2019-2020 academic year, a student is allowed a maximum Financial Aid allotment of $6,890 for food and household supplies (including utilities and phone).

Other Living Expenses: For the 2019-2020 academic year, the student is allowed a maximum Financial Aid allotment of $6,050 for all other expenses. Actual amounts spent will vary depending on a student's personal preferences. It is recommended that a student make arrangements to have two months living expenses available for start-up costs.

Graduate Program Tuition and Fees

Full-Time	
Annual Tuition per semester (in-state)	$5,545.00
Tuition per semester (out-of-state, Canadian and foreign)	$11,325.00
Part-Time	
Tuition per credit (in-state)	$462.00
Tuition per credit (out-of-state, Canadian and foreign)	$944.00
Fees:	
College fee	$50.00

College Fee (Part-Time) Per Credit	$1.70
Technology fee	$325.00
Student Activity fee	$81.00
Foreign Student Health Insurance	$1,577.28
Medical Evacuation/Repatriation	$80.52

***OD/MS:** Students who are accepted into the OD/MS program do not pay any additional tuition for the MS degree portion during the four years they are enrolled in the OD program.

***OD/PhD**: Students who are accepted into the OD/PhD program do not pay any additional tuition for the PhD program during the first two years they are enrolled full time in the OD progam.

Graduate tuition and fees are subject to change.

Out-of-state U.S. citizens may be eligible for in-state resident tuition after their first year.

Tuition Waivers and Graduate Assistantships

All eligible full-time Ph.D. students receive tuition waivers. Teaching and research assistantships are awarded to eligible full-time Ph.D. students. As of September 2014, the current graduate assistantship stipend level is $35,670 per year. Graduate students with an OD degree and a NYS optometric license may also apply for part-time clinical apppointments.

For up-to-date information, please visit our website: www.sunyopt.edu/education/admissions/tuition-fees

The Doctor of Optometry (OD) Degree Program

HEGIS Code 1209

The professional program leading to the Doctor of Optometry (OD) at The SUNY College of Optometry is four years in duration. The curriculum integrates the basic biological and vision sciences that form the foundation of clinical practice, teaches the fundamentals of optometry and develops critical thinking for patient care and clinical decision making. Patient care begins early and continues throughout all four years of the program with increasing responsibilities under the supervision of our clinical faculty at the University Eye Center (UEC) as well as through a minimum of two quarters during the fourth year at externship sites nationally and internationally.

The first two years of the program concentrate on integrating basic biological and visual sciences with clinical practice, while developing and understanding the theory and fundamentals of ocular examination, treatment and therapy. Students begin working in the UEC clinics in the first year and continue with greater responsibilities in subsequent years. Direct patient care begins in the spring of the second year. The third year integrates didactic and clinical teaching further and students care for patients in primary care and in various specialty services.

Clinical education in the fourth year is delivered in four, 12 week quarters. In the fourth year, students work as interns with patient care responsibilities and are assigned to multiple rotations through various clinics in the UEC and at least two external sites at various hospitals, other health care facilities and private practices as part of our externship program. Opportunities for rotations through one of the College's international clinical affiliates also exist. After the successful completion of the fourth year, the Doctor of Optometry (OD) degree is awarded. Once state licensing exams are passed, the graduate is qualified to begin practicing.

Curriculum Features: Tracks and Integration

The curriculum during the first, second and third years is delivered in two, 16-week semesters each year. A 10-week summer session takes place in the third year.

The curriculum features seven learning tracks:

Department of Biological and Vision Sciences

- Systemic and Ocular Health
- Refractive Conditions
- Visual Perception and Sensorimotor Control

Department of Clinical Education

- Clinical Examination – Optometric Theory and Clinical Optometry
- Public Health and Community Optometry
- Optometric Clinic
- Integrative

The Integrative track is designed to help students integrate clinical knowledge and skills with the basic sciences that form the foundation of the profession. In the third year, the integrative seminar is directly tied to the student's patient care assignments and takes place in the clinic in units called "pods," which are comprised of small groups of students and two clinical faculty supervisors.

Curriculum

First Year

The scientific foundation for optometric practice is established in the first year. During this year, students are introduced to the profession of optometry, optometric theory and the elements of clinical practice. The program builds from the knowledge base acquired prior to professional school through prerequisites and sets the foundation for advanced didactic and clinical activities during the rest of the curriculum and into optometric practice. Students provide elements of patient care in the UEC. Integrative Seminar helps students tie the basic and clinic sciences together.

Total lecture, lab, and clinic hours in a semester are listed below.

Fall Semester

Course Title	Dept*	Course#	Lec	Lab	Clinic	Credit Hours
Human Bioscience I	BVS	BVS-121FA	64	0	0.0	4.0
Gross Human Anatomy	BVS	BVS-106FA	32	16	0.0	2.5
Neuroanatomy	BVS	BVS-105FA	40	16	0.0	3.0
Ocular Anatomy, Biochemistry & Physiology I	BVS	BVS-181FA	32	0	0.0	2.0
Integrated Optics I	BVS	BVS-131FA	48	10	0.0	3.5
Optometric Theory I	CE	CEX-141FB	32	0	0.0	2.0
Clinical Optometry I	CE	CEX-151FA	16	48	0.0	2.5
Integrative Seminar I	CE	CEI-1FA	16	32	0.0	2.0
[1]Optometric Practice in a Changing Health Care Environment	CE	CEP-321SA	3	0	0.0	-

Spring Semester

Course Title	Dept*	Course#	Lec	Lab	Clinic	Credit Hours
Human Bioscience II	BVS	BVS-122SA	48	10	0.0	3.0
Ocular Anatomy, Biochemistry & Physiology II	BVS	BVS-182SA	48	4	0.0	3.0
Integrated Optics II	BVS	BVS-132SA	48	8	0.0	3.5
Visual Function: Sensory	BVS	BVS-170SA	60	6	0.0	4.5
Optometric Theory II	CE	CEX-142SB	32	0	0.0	2.0
Clinical Optometry II	CE	CEX-152SA	16	48	0.0	2.5
Integrative Seminar II	CE	CEI-1SA	16	32	0.0	2.0
Optometric Practice (continued..)	CE	CEP-321SA	3	0	0.0	-

*BVS= Dept. of Biological and Vision Sciences
CE= Dept. of Clinical Education

1= **This course continues throughout the curriculum. A final grade will appear Spring of third year.**

Second Year

The knowledge acquired in the first year sets the foundation for the second year. Basic knowledge acquired during the second year is intended to enhance the clinical skills of students. The Integrative Seminar in second year continues to integrate basic and clinical sciences and includes more direct clinical exposure. Students take on greater patient care responsibilities throughout the year, culminating with their taking on full responsibilities for their first patients by the end of the second year.

Fall Semester

Course Title	Dept*	Course#	Lec	Lab	Clinic	Credit Hours
Human Bioscience III	BVS	BVS-223FA	48	4	0.0	3.0
Microbiology	BVS	BVS-204FA	32	5	0.0	2.5
Pharmacology I	BVS	BVS-205FB	48	0	0.0	3.0
Integrated Optics III	BVS	BVS-233FA	48	16	0.0	3.0
Visual Function: Sensorimotor I	BVS	BVS-271FA	26	6	0.0	2.0
Visual Function: Sensorimotor II	BVS	BVS-272SA	32	9		2.5
Clinical Optometry III	CE	CEX-243FA	24	48	0.0	3.0
Integrative Seminar III	CE	CEI-2FA	16	32	0.0	2.0

Spring Semester

Course Title	Dept*	Course#	Lec	Lab	Clinic	Credit Hours
Ocular Disease I	BVS	BVS-251SA	64	16	0.0	4.5
Clinical Medicine **(A)	BVS	BVS-225SA	16	0	0.0	1.0
Anomalies of Visual Sensorimotor Functions I	BVS	BVS-371FA	30	20		2.5
Pharmacology II	BVS	BVS-206SA	40	0	0.0	2.5
Contact Lenses I	BVS	BVS-261SA	40	24	0.0	3.0
Clinincal Optometry IV	CE	CEX-244SA	24	48	0.0	3.0
Integrative Seminar IV	CE	CEI-2SA	16	32	0.0	2.0
Optometric Practice	CE	CEP-321A	1.5			

*BVS= Dept. of Biological and Vision Sciences
CE= Dept. of Clinical Education
**(A) module A runs the first 8 weeks of the semester. (B) module B runs the second 8 weeks of the semester

Third Year

In the third year students continue to take didactic courses in areas of ocular disease, contact lenses, binocular vision, public health and optometric practice. In addition, students are required to take two elective courses in the third year. Electives on special and advanced topics are offered during the summer and spring of the third year. While course work continues, students are also providing patient care in the primary care service in the UEC. Students are assigned to small clinical teaching units – called pods – comprised of students and two doctors. Each pod meets weekly for a full day clinical session and includes an integrative seminar where patient care is discussed. Students are assigned to a single pod for 16 weeks, spending 8 weeks with each of the two faculty members during the semester.

Summer

Course Title	Dept*	Course#	Lec	Lab	Clinic	Credit Hours
Pediatric Optometry & Visual Development	BVS	BVS-319FA	32	20	0.0	3.0
Optometric Clinic I	CE	CEC-341RA	0	0	75	2.5
Epidemiology	CE	CEP-304RA	16	0	0.0	1.0
Integrative Seminar V	CE	CEI-3RA	0	10	0.0	0.0
Electives	ALL	ELC–500	16	0	0.0	1.0

Fall Semester

Course Title	Dept*	Course#	Lec	Lab	Clinic	Credit Hours
Ocular Disease II	BVS	BVS-352FA	64	0	0.0	4.0
Anomalies of Visual Sensorimotor Functions II	BVS	BVS-372FA	32	9	0.0	3.5
Contact Lenses II	BVS	BVS-362RA	32	24	0.0	3.0
Optometric Clinic II	CE	CEC-342FA	0	0	144	3.0
Optometric Practice in a Changing Healthcare Environment[1]	CE	CEP-320SA	0	0	0.0	0.0
Integrative Seminar VI	CE	CEI-3FA	0	16	0.0	0.0

Spring Semester

Course Title	Dept*	Course#	Lec	Lab	Clinic	Credit Hours
Ocular Disease III	BVS	BVS-353SA	64	16	0.0	4.0
Low Vision **(A)	CE	CEX-249SA	12	5	0.0	1.0
Optometric Clinic III	CE	CEC-343SA	0	0	144	3.0
Public Health	CE	CEP-310SA	40	0	0.0	2.5
Optometric Practice in a Changing Health Care Environment[1]	CE	CEP-321A	24	0	0.0	2.5
Integrative Seminar VII	CE	CEI-3SA	0	16	0.0	0.0
Electives	ALL	ELC–500	16	0	0.0	1.0

* BVS – Biological &Vision Sciences
CE - Clinical Education

**(A) module A runs the first 8 weeks of the semester. (B) module B runs the second 8 weeks of the semester

[1] Optometric Practice in a Changing Helthcare Environment will run for all three years with a total credits hours of 24 hours over three years.

Fourth Year

Students request and are assigned to four clinical rotations during the fourth year. Rotations take place in a number of carefully selected internal and external sites in order to allow students to experience a greater variety of clinical environments. These environments expose fourth year students to a diversity of ocular and general conditions among patients of all ages and socioeconomic backgrounds. Students must receive exposure in the core areas of refractive care, binocular vision, ocular disease/trauma and interprofessional practice. At least two rotations must be at external clinical affiliates.

Course Title	Course #	Term	Hours	Credit Hours
Clinical Internship I	CEC-4401A	Summer	40	13.0
Clinical Internship II	CEC-4402A	Fall	40	13.0
Clinical Internship III	CEC-4403A	Winter	40	13.0
Clinical Internship IV	CEC-4404A	Spring	40	13.0
Clinical Seminar	CEI-4500A	1 quarter	2	2.0

Course Descriptions for the OD Program

First Year – Fall Semester

Human Bioscience I BVS-121FA
Instructor of Record: Jerry Rapp 4.0 Credits
Human Bioscience I is the first of a three course sequence. This course provides instructions in principles of basic biochemistry, cellular physiology, histology, molecular biology and human nutrition with appropriate clinical correlations throughout the course. The framework of this course provides a foundation for the successive courses in the human bioscience sequence.

Gross Human Anatomy BVS-106FA
Instructor of Record: David Krumholz 2.5 Credits
This course is included in the curriculum because it is necessary that the optometrist understand the fundamental anatomy of the entire body in order to deal successfully with a specialized part of it. Gross Human Anatomy provides not only a basic foundation in human anatomy, which will be of use in later courses, but also an appreciation that the eye is not an isolated entity. The immediate objective of this course is to introduce the student to the structural organization of the human body at the macroscopic level. The course is designed to provide the student with an understanding of the spatial and functional relationships of body systems, and to anatomical terminology. This will give the student an understanding of three-dimensional anatomical relationships, and enable the student to communicate effectively with other health care professionals. This course begins with the basics of gross human anatomy. A survey of the body's major systems serves as a basis for which to understand regional anatomy and how disease might be caused. The head is covered in greater detail, concentrating on the anatomical systems that surround or support the eye and orbit.

Neuroanatomy BVS-105FA
Instructor of Record: Patricia Modica 3.0 Credits
The purpose of this course is to educate students about the basic structure and function of the human central nervous system. This encompasses human neuroanatomy as well as some associated elements of neurophysiology and neurology. Beginning at the cellular level and spanning the nervous system from the periphery through spinal cord, brainstem and cerebrum, the course will cover all the major functional systems, their pathways and the consequence of pathology. The long-term objective is to provide students with the capability to recognize neurological issues in patients based on an understanding of the relationship of the visual system to the rest of the nervous system in health and disease. In addition to illustrated lectures, there will be laboratory studies of the human brain and small group conferences in which the clinical significance of neurological systems will be emphasized.

Ocular Anatomy, Biochemistry & Physiology I BVS-181FA
Instructor of Record: Richard Madonna 2.0 Credits
The OABP sequence is given as 2 courses in the Fall and Spring semesters of the first year. Modules are delivered that cover the anatomy, physiology and biochemistry of the eye, related visual structures and the visual pathway. The course is designed to emphasize the anatomy and underlying physiology of the eye and visual system particularly in relationship to a variety of important clinical conditions. Course material taught in histology, gross anatomy, neuroanatomy, and sensory visual function is heavily integrated into OABP and is emphasized throughout the course.

In OABP I we cover the anatomy and histological structure of the outer and middle coats of the eye, the

physiology of corneal transparency and the fundamentals of the eye's regulation of fluid formation and flow. The course also includes segments on structure and function of the ocular appendages and the physiology and biochemistry of the tear film. The anatomy, development, molecular composition and metabolism of the lens are discussed in the context of changes in the lens that occur during aging, including the biochemistry of cataract formation. The neuroanatomical basis for pupillary and accommodative responses and their clinical context is also covered.

Integrated Optics I BVS-131FA
Instructor of Record: Steven Schwartz 3.5 Credits
This is the first in a three-course sequence on clinical optics. Students learn the fundamentals of geometrical and visual optics as they apply to clinical practice. Topics include refraction at spherical and plane surfaces; image formation; thin and thick lenses; spherical ametropia; accommodation; astigmatism and cylindrical lenses; prisms; depth of field; magnification; retinal image size; reflection; and aberrations. Problem-solving skills are emphasized with the goal of developing an intuitive sense of optics that supports successful clinical interventions. Laboratories provide students the opportunity to visualize material covered in lectures.

Optometric Theory I CEX-141FB
Instructor of Record: Mark Rosenfield 2.0 Credits
This course will introduce the student to the theoretical basis for the clinical optometric examination, covering the analysis of clinical findings and appropriate testing procedures. The theoretical concepts underlying the clinical measurements of visual resolution, as well as the etiology and correction of refractive error will be examined. An evaluation of both objective and subjective techniques for quantifying refractive error will be included. Further, the etiology, measurement and clinical management of abnormal accommodative disorders will be introduced.

Clinical Optometry I CEX-151FA
Instructor of Records: Sarah Zuckerman & Catherine Pace 2.5 Credits
The Clinical Optometry course is given as two courses in the Fall and the Spring of first year. The course will contain lecture, laboratory and clinical portions during both semesters. The lecture will focus on patient communication and case analysis. The patient communication portion will discuss how to approach a patient, perform a case history and proper medical documentation. Other topic discussions will include professionalism and ethics, cultural competence and interprofessional collaborative patient care. The case analysis portion will focus on performing patient-centric and problem-driven clinical examinations, clinical reasoning and interpretation of result. Other topic discussions will include examination and prescribing techniques for different refractive cases and development of differential diagnosis and illness scripts. The laboratory component will teach clinical techniques, proper interpretation of results and expand upon performing patient-centric and problem-driven clinical examinations. The laboratory will incorporate new technology into the traditional eye exam. During the clinical component of the course, students will act as an optometric assistant in the Primary Care clinic of the University Eye Center. Clinical Optometry I will focus on the assessment of visual acuity and determination of refractive error.

Integrative Seminar I CEI-1FA
Instructor of Record: Susan Schuettenberg 2.0 Credits
This course teaches students how the material in the first year curriculum relates to their role as health care providers through a synthesis of lecture, clinical observation, case-based learning and small group discussion. Once a week, the entire class will attend a one-hour lecture with topics reflective of the ongoing course material being presented in other courses. For two additional hours per week, small seminar group observation and discussion will take place. The seminar meetings will reinforce the lecture concepts through clinical observation and case discussions relating to those observations. Lecture and small group discussions will include the participation of both basic and clinical science faculty in order to promote integration of the curricular material, and to show how the care provided is related to what is currently being learned. This will enable future clinicians to make informed clinical decisions, encourage critical thinking and promote lifelong independent learning.

Optometric Practive in a Changing Health Care Enviroment CEP-321A
Instructor of Record: Richard Soden
Rapid changes in health care and in optometric practice make it essential that graduating optometry students be well-versed in optometry's role in the public health system. The increased scope of optometric practice has made the Doctor of Optometry a significant part of the overall health care team. As a result, students will need to understand their own interests, goals and values so they may end up in a career path that is attractive to them. This course will provide each student with the knowledge, skills and background required for the development of a career plan. The student will become familiar with the various modes of practice available to a recent graduate. Key elements of health care reform, the role of optometry in the public health system and as a member of an interdisciplinary team, will be highlighted along with discussions of essential non-clinical factors (e.g. Medicare, Coding and Billing, etc.) that each graduate will be required to know regardless of their chosen career path. A key goal of the course is to encourage students to explore the various opportunities available to them within the Profession of Optometry and to prepare them for that path.

First Year – Spring Semester

Human Bioscience II BVS-122SA
Instructor of Record: Tracy Nguyen 3.0 Credits
This course is a continuation of Human Bioscience I that begins with instructions in the lympatic system, basic immunology and commone principles of pathological mechanisms followed by a system based approach to the discussion of the functional anatomy, physiology and pathology of organ systems. The organ systems covered in this course of the human bioscience sequence includes the cardiovascular system. Clinical correlations to the visual system is provided throughtout the course as appropriate.

Ocular Anatomy, Biochemistry & Physiology II BVS-182SA
Instructor of Record: Richard Madonna 3.0 Credits
The OABP sequence is given as 2 courses in the Fall and Spring semesters of the first year. Modules are delivered that cover the anatomy, physiology and biochemistry of the eye, related visual structures and the visual pathway. The course is designed to emphasize the anatomy and underlying physiology of the eye and visual system particularly in relationship to a variety of important clinical conditions. Course material taught in histology, gross anatomy, neuroanatomy, and sensory visual function is heavily integrated into OABP and is emphasized throughout the course.

OABP II begins with the study of the formation and flow of aqueous and its relationship to intraocular pressure. It continues with the study of the anatomy of the vitreous, retina, optic nerve and visual pathway with emphasis on the anatomical basis of diseases of the posterior segment and neuro-ophthalmic system. The biochemistry of the visual process including the biochemistry and molecular biology of rhodopsin and cone pigments and the events that occur during the visual cascade will be studied including a discussion of color blindness, congenital night blindness and hereditary retinal degeneration. Nutritional and biochemical implications in age-related ocular disease are also explored. The course ends with the study of the development of the eye and visual system and related developmental anomalies.

Integrated Optics II BVS-132SA
Instructor of Record: TBA 3.5 Credits
Students learn the fundamentals of particle-wave optics and physiological optics as they apply to image formation and clinical practice. The course integrates optical, biological, perceptual and clinical aspects. Topics include quantum and wave optics, interference, diffraction, scatter, polarization and lasers, model eyes, Purkinje images, blur of the retinal image, aberrations of the eye, optical transfer function, contrast sensitivity, photometry, fiber-optic nature of cones, entoptic images and cues for ocular accommodation. The goal is an

intuitive understanding of the optical aspects of vision as related to clinical care. This course is the second in a three-course sequence on clinical optics.

Visual Function: Sensory BVS-170SA
Instructor of Records: 4.5 Credits
Module A: Steven H Schwartz
Module B: Harold Sedgwick
This course covers monocular sensory processes and visual perception. Topics include spatial and temporal visual processes; visual adaptation; color vision; psychophysical methodology; information processing; gross electrical potentials; basic visual development and senescence; form, space, and motion perception; visually-guided action; and basic visual-cognitive processes. Topics are discussed in terms of their normal function and clinically relevant deviations from normal. The anatomical and neurophysiological bases for visual performance are examined and related to clinical testing. Laboratories emphasize the measurement of these functions in assessing the visual capacities of individual patients and the demonstration of relevant visual phenomena.

Optometric Theory II CEX-142S
Instructor of Record: Mark Rosenfield 2.0 Credits
This course is a continuation of Optometric Theory I. The clinical assessment of abnormal oculomotor function at both distance and near, and the etiologies underlying these conditions will be introduced. Treatment of abnormal accommodation, vergence and their synkinetic interactions will be discussed.

Clinical Optometry II CEX-152SA
Instructor of Records: Sarah Zuckerman/Cathy Pace 2.5 Credits
This is the second course in the Clinical Optometry sequence. The course will contain lecture, laboratory and clinical portions during both semesters. The lecture will focus on patient communication and case analysis. The patient communication portion will discuss how to approach a patient, perform a case history and proper medical documentation. Other topic discussions will include professionalism and ethics, cultural competence and interprofessional collaborative patient care. The case analysis portion will focus on performing patientcentric and problem-driven clinical examinations, clinical reasoning and interpretation of result. Other topic discussions will include examination and prescribing techniques for different refractive cases and development of differential diagnosis and illness scripts. The laboratory component will teach clinical techniques, proper interpretation of results and expand upon performing patient-centric and problem-driven clinical examinations. The laboratory will incorporate new technology into the traditional eye exam. During the clinical component of the course, students will act as an optometric assistant in the Primary Care clinic of the University Eye Center. Clinical Optometry II will focus on the assessment of binocular vision and accommodation, anterior segment evaluation and provide an introduction to posterior segment evaluation.

Integrative Seminar II CEI-1SA
Instructor of Record: Susan Schuettenberg 2.0 Credits
Integrative Seminar II is a continuation of Integrative Seminar I, with a slightly different emphasis. As students gain a greater knowledge base and become more familiar with the practice of optometry, the seminar will show how the delivery of care is based on the student's foundation of knowledge. Clinical observations will continue and be augmented by the provision of direct patient care during clinical screenings. Multiple lecturers will continue to address the group as a whole, which serves to place an emphasis on how the basic science courses form the foundation for the practice of optometry. By observing and discussing patient care strategies, utilizing critical thinking skills and introducing the concept of evidence-based medicine and other resources, students will acquire the skills necessary for lifelong independent clinical learning and decision making.

Second Year – Fall Semester

Human Bioscience III BVS-223FA
Instructor of Record: Suresh Viswanathan 3.0 Credits
This is the third and final course in the human bioscience sequence that adopts a system based approach to the functional anatomy, physiology and pathology of the renal endocrine, respiratory, gastrointestinal and reproductive systems. Additionally, the pathophysiology of the skin, bone, and hematopoietic system will also be covered. As with the previous course in this sequence, clinical correlations to the visual system is provided throughtout the course as appropriate.

Microbiology BVS-204FA
Instructor of Record: Ann Beaton 2.5 Credits
This course imparts knowledge about organisms that are responsible for causing human disease, in particular ocular disease. The course begins with basic immunology encompassing the specifics of innate and adaptive immunity, inflammation, humoral and cell mediated immunity, hypersensitivity, complement pathways and ocular immune privilege. The course includes information about bacteria, fungi, parasites and viruses and encompasses information about their structure, growth, genetics, classification and pathogenesis always keeping in mind ocular implications. There is an emphasis on understanding how organisms acquire antibiotic resistance and the public health implications for appropriate prescription and utilization of antibiotics. Organisms that play a role in ocular disease will be highlighted along with their clinical presentations. In addition, other important public health information in terms of immunizations and which disinfection techniques are most efficacious is imparted to students that may impact not only their clinical practice but their personal health and well-being.

Pharmacology I BVS-205FB
Instructor of Record: Miduturu Srinivas 3.0 Credits
This course is designed to acquaint students with general principles of drug action on organ systems, including the eye. The methods of administration, pharmacological actions, clinical applications and adverse effects of drugs in current clinical use will be considered in detail.

Integrated Optics III BVS-233FA
Instructor of Record: Mark Rosenfield 3.0 Credits
In this course, students will obtain the knowledge and skills necessary to evaluate modern ophthalmic lenses, and to understand their use in today's world. The optical and physical properties of ophthalmic prisms and lenses are covered in depth, including lens materials, design, standards, aberrations, safety, absorption, magnification and verification. The section on environmental optometry will cover the use of protective eyewear, as well as evaluating contemporary visual demands. Frame specification, design, selection and adjustment will also be discussed. Laboratories are geared to developing skills in frame selection, verification and dispensing.

Visual Function: Sensorimotor I BVS-271FA
Instructor of Record: Jordan Pola 2.0 Credits
This course is concerned with oculomotor behavior and physiology. It provides the student with a broad appreciation of the characteristics of eye movements and the functional properties of the mechanisms (e.g., neurophysiological networks, extraocular muscles) responsible for generating these movements. A central feature of the course is the utilization of control systems theory as a means to integrate and simplify some the complexities of the oculomotor behavioral and physiological data. As well as lectures, the course includes laboratory studies of basic quantitative aspects of fast and slow eye movements, and also the manner in which simple functional models of the oculomotor system can account for both normal and abnormal eye movements.

Visual Function: Sensorimotor II BVS-272SA
Instructor of Record: Kevin Willeford 2.5 Credits

This course is an analysis of the geometrical, psychophysical and physiological sensory and motor aspects of binocular vision, including their clinical implications. Topics include visual direction and correspondence, binocular summation/averaging, rivalry, fusion, the horopter, stereopsis, optically-based perceptual distortions/ adaptation and aniseikonia, fixation disparity and vergence/accommodation motor/perceptual interactions. Laboratory sessions cover many of these topics.

Clinical Optometry III CEX-253FA
Instructor of Record: Joan K. Portello/ Amy Steinway 3.0 Credits
The Clinical Optometry III course considers disorders of the anterior and posterior segments of the eye together with the tools used to analyze, diagnose and manage these conditions. This course adds to the skills learnt in the Optometric Theory I and II and Clinical Optometry I and II courses with advanced proficiency in the slit lamp examination, including contact and non-contact funduscopy, gonioscopy, and applanation tonometry. Students will develop binocular indirect ophthalmoscopy skills using both simulators and live subjects. The use of diagnostic pharmaceutical agents will be covered, as well as advanced diagnostic procedures such as anterior segment optical coherence tomography and ultrasonography of the anterior and posterior segment. Students will be encouraged to focus on the interpretation of results, critical reasoning, and developing appropriate management plans. To gain additional clinical exposure, students will continue to perform pre-testing procedures in the primary care clinic throughout the semester.

Integrative Seminar III CEI–2FA
Instructor of Record: Teresa Lowe 2.0 Credits
This course is designed to facilitate the student's transition into clinical practice by using an integrative approach. The course serves as an educational vehicle for the student to develop clinical thinking in becoming a Doctor of Optometry. In the Integrative Track, the student uses case studies for developing intellectual skills founded on informed clinical decision making, critical thinking, independent and collaborative learning. Students develop a foundation for optometric practice by employing scientific knowledge, informational resources and clinic participation. Through a synthesis of classroom teaching, case-based learning, group activities and clinic participation, the student will form an individualized patient evaluation, assessment and plan. The highest standards of professional conduct and responsibility will be emphasized throughout the course.

Second Year – Spring Semester

Ocular Disease I BVS-251SA
Instructor of Record: Mitchell Dul 4.5 Credits
The course is the first in a series of three courses detailing the pathogenesis, physiologic response, clinical manifestations, treatment and rehabilitation of conditions of the body and eye in response to local and systemic pathologic processes (e.g., infection, trauma, neoplasm) and disorders (e.g., congenital) with emphasis on the conditions of the anterior segment of the eye, related systemic conditions and the glaucomas. Epidemiological data is included to allow students to differentiate between high probability and/ or high risk conditions and low probability and/or low risk conditions. Previous course work in anatomy, physiology, pathology, epidemiology, monocular sensory processing, pharmacology and systemic medicine will provide the student with the foundation for understanding the principles and practices covered in this course.

Clinical Medicine (A) BVS-225SA
Instructor of Record: Xiaoying Zhu 1.0 Credit
This course will consist of group discussions that are case-based and reinforce the material presented within the clinical medicine and ocular disease courses. Team-based learning will be emphasized. Homework assignments will include cases that each team will complete before the group discussion. Answers to the homework assignments will be discussed during the group discussion. Discussion groups may include instruction of certain physical exam techniques, such as cranial nerve testing, lymph node assessment and others.

Anomalies of Visual Sensorimotor Function I BVS-371FA
Instructor of Record: Myoung Hee (Ester) Han 2.5 Credits
This course will concentrate on the diagnosis and treatment of non-strabismic binocular, accommodative, and oculomotor conditions. The course will explain the prevalence of functional sensorimotor vision disorders and discuss current research. Students will be able to choose and understand the appropriate clinical tests, to discuss clinical findings with patients, and to share relevant information with other professionals. The lab will familiarize students with hands-on testing and will provide the basic foundation to design and implement an optometric vision therapy program.

Pharmacology II BVS-206SA
Instructor of Record: Diane T. Adamczyk 2.5 Credits
This course is specific to ocular pharmacology, building on and integrating the material taught in Pharmacology I as it applies to ocular related conditions. It covers the fundamentals of ocular pharmacology, ocular drugs, systemic drugs and how they are used to treat various ocular conditions, and their ocular effects. The student will learn the basic concepts of the drug, mechanism of action, drug-drug interactions, contraindications and its effects on the body, organs and various systems. The pharmacology as it relates to the drug's clinical utilization will be discussed.

Contact Lens I BVS-261SA
Instructor of Record: David Libassi 3.0 Credits
This is the first half of an extensive course spanning two semesters on the art and science of prescribing contact lenses. This course will develop the principles of contact lens physiology and optics, and integrate them with your understanding of the cornea, tear film, and eyelid anatomy. Ocular measurements necessary for contact lens design will be correlated with on-eye evaluation of soft and rigid contact lenses. Oxygen requirements for safe lens wear will be contrasted for daily wear soft and rigid lenses, extended wear hydrogel lenses, and silicone-hydrogel lenses worn for continuous wear. This course emphasizes standard soft and rigid contact lens design, fitting and prescribing, as well as problem-solving in order to prepare you for fitting basic types of contact lenses as you start patient care. The laboratory sessions will support the lectures, providing the student with skills needed for lens handling, verification, pre-exam testing, lens selection, on-eye evaluation, patient education, patient education, patient instruction and problem solving.

Clinical Optometry IV CEX-254SA
Instructor of Records: Joan K. Portello/Amy Steinway 3.0 Credits
Clinical Optometry IV continues the Optometric Theory and Clinical Optometry course sequence held through the first and second year. The major emphasis of this course is the capability to examine patients in the University Eye Center. In particular, the ability to integrate previously learned skills in history taking, refractive and binocular testing and ocular health assessment in conjunction with optimal patient communication and interpersonal skills so that the student can efficiently develop a viable assessment and treatment plan. The course will also follow an interdisciplinary approach to facilitate optimal patient care outcomes.

Integrative Seminar IV CEI-2SA
Instructor of Record: Teresa Lowe 2.0 Credits
This course is an extension of Integrative Seminar III. The format consists of small group, lecture and clinic. Having acquired an increased knowledge and skills base, more complex critical thinking and clinical decision making skills will be stressed. There will be more emphasis placed on self-evaluation and self-learning as a means of professional development. Participation in the patient examination will be increased. Each student will present a formal slide show citing current literature.

Third Year – Fall Semester (Summer Session)

Pediatric Optometry and Vision Development BVS-319RA
Instructor of Record: Matthew Vaughn 3.0 Credits
Pediatric Optometry and Vision Development covers the facts and testing of the developing human and his/her vision during the infant, toddler, and childhood years. The course is intended to give the third year student an understanding of the developmental processes involved in the comprehension of both the normal and abnormal development of visual spatial concepts. The first half of the course starts with a survey of general physical and psychological development, followed by basic science of visual development. The course applies this knowledge to the pediatric optometric exam and prescribing for infants and children. Clinical application of research in perceptual and cognitive development and new techniques used in evaluation with discussion of the practical aspects involved in examining and treating children from birth to five years of age, as well as those with learning related vision problems are presented. Review of relevant research of the efficacy of perceptual training and communication skills in vision therapy will also be covered.

Optometric Clinic I CEC-341RA
Instructor of Record: Julia Appel 2.5 Credits
The third year clinical program provides the intern with a broad exposure to all facets of primary care optometry. Rotations are in the areas of primary care and in various specialty clinics. During these rotations, interns have patient-care responsibilities under the supervision of clinical faculty. The rotations are designed to allow the intern increasing levels of clinical responsibility and patient care opportunities.

Epidemiology CEP-304RA
Instructor of Record: Mark Sherstinsky 1.0 Credit
Epidemiology is the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems. As such, epidemiology is the basic science of public health and underpins the practice of health care at multiple levels (global, national, community and clinical). This course is designed to introduce optometry students to epidemiologic principles and research methods, with emphases on evidence-based clinical practice and public health in eye care. The overall course mission is to teach the student clinician to describe and understand the clinical presentation of disease and health-related events in a measured and evidence-based way. Course goals include an introduction to the following: a more critical and measured reading of ophthalmic and medical literature; the application of current and best research evidence to clinical care; study design and its translation into clinical care; and a community perspective to individual patient care.

Integrative Seminar V CEI-3RA
Instructor of Record: Julia Appel 0.0 Credit
The emphasis of Integrated Seminar is on developing the ability to think critically and obtaining the skills necessary for independent, life-long learning. Daily chart review and end of day case discussion foster clinical reasoning ability. Over the year, interns will submit clinical case analyses and professional writing samples to the IOR to assess written communication ability and competence of clinical thinking. There will be informal class discussions tackling the use of clinical reasoning in topics of patient care.

Third Year – Fall Semester

Ocular Disease II BVS-352FA
Instructor of Record: Kimberley Poirier-Schmidt 4.0 Credits
Ocular Disease II is the second in a series of three. Ocular disease courses detail the pathogenesis, physiologic response, clinical manifestations, treatment, and rehabilitation of conditions of the body and eye in response to

local and systemic pathologic processes and disorders. This course will concentrate on conditions of the posterior segment of the eye and related systemic conditions. This course will discuss selecting and utilizing appropriate methods of evaluation to differentially diagnose diseases of the posterior segment and to initiate or direct the patient toward appropriate treatment.

Anomalies of Visual Sensorimotor Function II BVS-372FA
Instructor of Records: Audra Steiner 3.5 Credits
This course will concentrate on the diagnosis and treatment of non-pathological binocular, accommodative and oculomotor conditions including strabismus and amblyopia. The course will explain the historic and current role of vision therapy within optometry, epidemiology of functional vision disorders and discuss current research. Students will become familiar and comfortable with appropriate testing, discussing findings with patients and sharing information with other professionals. The course describes neurologic adaptations to strabismus and amblyopia and remediation of these special conditions. An associated lab will familiarize students with testing and allow them to understand how to design and implement a vision therapy program.

Contact Lenses II BVS-362FA
Instructor of Record: Eva Duchnowski 3.0 Credits
This course will introduce the principles of advanced contact lens fitting. The application of a variety of gas permeable, soft and hybrid lens designs will be discussed. The course will teach students fitting techniques for corneal dystrophies/degenerations, presbyopia, aphakia, the post-surgical or traumatic eye, prosthetics, torics and orthokeratology.

Optometric Clinic II CEC-342FA
Instructor of Record: Julia Appel 3.0 Credits
This course is a continuation of Optometric Clinic I. The third year clinical program provides the intern with a broad exposure to all facets of primary care optometry. Rotations are in the areas of primary care and in various specialty clinics. During these rotations, interns have patient-care responsibilities under the supervision of clinical faculty. The rotations are designed to allow the intern increasing levels of clinical responsibility and patient care opportunities.

Integrative Seminar VI CEI-3FB
Instructor of Record: Julia Appel 0.0 Credit
The emphasis of Integrated Seminar is on developing the ability to think critically and obtaining the skills necessary for independent, life-long learning. Daily chart review and end of day case discussion foster clinical reasoning ability. Over the year, interns will submit clinical case analyses and professional writing samples to the IOR to assess written communication ability and competence of clinical thinking. There will be informal class discussions tackling the use of clinical reasoning in topics of patient care.

Third Year – Spring Semester

Ocular Disease III BVS-353SA
Instructor of Record: Patricia Modica 4.5 Credits
This course is the third in a series of three courses detailing the pathogenesis, physiologic response, clinical manifestations, treatment and rehabilitation of conditions of the body and eye in response to local and systemic pathologic and developmental processes and disorders. Emphasis is on the conditions of the neuro-ophthalmic and neurologic systems, including psychiatric conditions and acquired brain injury. It also integrates additional medical topics that include cardiac disease, endocrinology. Material is presented in a fashion that includes integration of ocular and systemic medical concepts as well as medical, surgical and rehabilitative management concepts. Epidemiological data is included to allow students to differentiate between high-probability and/or high-risk conditions and low probability and/or low risk conditions. Previous course work in neuro-anatomy,

physiology, pathology, epidemiology, pharmacology and systemic medicine will provide the student with the foundation for understanding the principles and practices covered in this course.

****Low Vision** CEX-349SA
Instructor of Record: Rebecca Marinoff/Richard Soden 1.0 Credits
As the population continues to age, optometrists will be confronted with a greater need to manage their visually impaired patients with low vision rehabilitation. This course will overview the evaluation, management and treatment options for individuals who are visually impaired and legally blind. After obtaining an appropriate case history, students will learn how to perform a series of functional tests to evaluate the visual capabilities of the patient. Ultimately the student will be able to prescribe the appropriate optical and non-optical devices for their patients, as well as appropriately refer for additional services. In addition, students will learn what low vision rehabilitation encompasses. This course will also cover the psycho-social aspects that patients with low vision may experience as well as the community resources available to visually impaired individuals. It is expected that after completing this course, students will be able to apply the knowledge they receive by performing low vision examinations in clinical settings.

Optometric Clinic III CEC-353SA
Instructor of Record: Julia Appel 3.0 Credits
This course is a continuation of Optometric Clinic I and II. The third year clinical program provides the intern with a broad exposure to all facets of primary care optometry. Rotations are in the areas of primary care and in various specialty clinics. During these rotations, interns have patient-care responsibilities under the supervision of clinical faculty. The rotations are designed to allow the intern increasing levels of clinical responsibility and patient care opportunities.

Public Health CEP-310SA
Instructor of Record: Mort Soroka 2.5 Credits
This course introduces the student to major health policy issues and examines the role of government in the health care system. Much of government policy relates to the payment systems of Medicare and Medicaid and regulation. Health care reform legislation impacts on all financing programs; private and governmental. New organizational structures such as Accountable Care Organizations (ACO's) and health care exchanges, will impact on the delivery and quality of care. The course introduces basic principles (such as supply and demand and quality assurance) in health care economics. The economics of health care markets and provider payment systems, especially managed care and third party programs and vision plans are covered. Of special emphasis is the role of optometry in the Medicare and Medicaid program and managed care and coding in third party programs. This course prepares optometry students to analyze and debate health care policy issues. Sessions are designed to help students understand how politics, economics, professional, social and ethical values contribute to health policy development and implementation. Specific policy issues reviewed include interprofessional relations, licensure, board certification, professional standards, cost containment, equity and access to care, quality improvement electronic medical records, complementary and alternative medicine, managed care systems, health care law, workforce and health care ethics. The course also addresses health law, health care reform, quality assurance, professional standards, clinical practice guidelines and regulation, disease management strategies, health disparities and health literacy and emerging legislative efforts and initiatives within health care. The history of research ethics, medical research oversight, institutional review boards, privacy and HIPAA are also discussed.

*****Optometric Practice in a Changing Health Care Environment (B) (Conclusion)** CEP-321SA
Instructor of Record: Richard Soden 2.5 Credits
This is the second and concluding, part of Optometric Practice in a Changing Health Care Environment. Rapid changes in health care and in optometric practice make it essential that graduating students be well- versed in optometry's role in the public health system. The increased scope of optometric practice has made the Doctor of Optometry a significant part of the overall health care team. As a result, students will need

to understand their own interests, goals and values so they will end up in a career path that is attractive to them. This course will be taught in two parts and will provide each student with the knowledge, skills and background required for the development of a career plan. Students will become familiar with the various modes of practice available to optometrists. Key elements of health care reform, the role of optometry in the public health system and as a member of an interprofessional team, will be highlighted along with discussions of essential non-clinical factors (e.g. Medicare, coding and billing, etc.) that each graduate will be required to know regardless of their chosen career path. A key goal of this course is to encourage students to explore the various opportunities available to them within the profession of optometry and to prepare them for that path.

Integrative Seminar VII CEI-3SA
Instructor of Record: Julia Appel 0.0 Credit

The emphasis of Integrated Seminar is on developing the ability to think critically and obtaining the skills necessary for independent, life-long learning. Daily chart review and end of day case discussion foster clinical reasoning ability. Over the year, interns will submit clinical case analyses and professional writing samples to the IOR to assess written communication ability and competence of clinical thinking. There will be informal class discussions tackling the use of clinical reasoning in topics of patient care.

**** This course runs for 8 weeks**
***** This course continues throughtout the curriculum. A final grade will appear Spring of third year.**

Fourth Year

Clinical Seminar CEI-4500A
Instructor of Record: Harriette Canellos 2.0 Credits

Fourth year interns are required to complete one quarter of clinical seminar. This seminar meets over two hours each week to provide a small group-learning environment focused on clinical case presentations derived from the students' clinical experience. The grand rounds format will provide a basis for integration and critical analysis of current clinical research with the goal of increasing the students' understanding, use and communication of evidence-based clinical information and collaborative practice.

External Rotations Program

The fourth year of the professional program at the SUNY College of Optometry is devoted entirely to the Clinical Education Track and consists of a four-quarter clinical rotation system that requires students to participate in external clinical site training as well as clinical rotations within the University Eye Center.

External clinical affiliations include various hospitals, other health care facilities and private practices and provide experiences in primary, secondary and tertiary care settings. These experiences provide participants with a wide range of patient care opportunities.

Each student is required to complete a minimum of two external rotations. Each rotation lasts for one quarter of the academic year (approximately 12 weeks.) In addition to externship sites, each student will be assigned at least one internship within the UEC that will provide a broad clinical experience. Students are guided to choose their rotations in a way that promotes balanced exposure to key areas of clinical care. These core experiences will include experiences in a multidisciplinary setting.

The external clinical education program is managed by the director of externships in addition to the external site supervisors at each location. Internal education is managed by the fourth year instructor of record. Both components are part of the Department of Clinical Education.

For a complete list of current externship rotation sites visit: www.sunyopt.edu/externships

Additional Programs

Combined OD/MBA Program

Qualified students working toward their OD degree may apply for the Advanced Graduate Certificate in Optometry Business Management. The certificate is offered jointly by the College and SUNY Empire State College. Upon completion it is applicable to the MBA in Healthcare Leadership also offered by Empire State. Students may enter the program in the summer between their first and second year of the OD Program.

The certificate is a six-course, 18-credit program. Two courses are part of the optometry curriculum, and four are offered online by Empire State College.

Advanced Graduate Certificate in Optometry Business Management
Recommended Sequence: (All courses are 3 credits)
Second Year, Summer – with SUNY Empire State College

High Performance Management
This course focuses on the managerial leadership roles and competencies needed to translate strategic visions into tactical and operational plans, as well as on tools and methodologies to improve organizational productivity through integration, communication, and the management of knowledge-based organizations. Students identify, develop, and apply competencies associated with the dynamics of change and flexibility and balance them with the competencies required to lead with stability and control.

Second Year, Summer – with SUNY Empire State College
Healthcare Financial Management
This course will teach students to make sound decisions that promote the financial well-being of a health care organization. The course starts by introducing the basic assumptions and concepts underlying the preparation and measurement of financial data, measurement of business operations, business valuation, financial reporting, budgeting, cost allocation, service and product costing and special reports for managerial purposes. It then progresses to analyze the principles governing the health care industry, rules and regulations in collecting, preparing and presenting financial data for health care providers. As the students comprehend the accounting and financial reporting aspects of healthcare organization, they will move on
to cover the financial decisions relevant to operating budget, capital budget and the right mix of cash flows and outflows to create values for the organization. Various learning activities may include readings, research, presentations, case studies, discussion, and financial market analysis.

Third Year, Summer – with SUNY Empire State College
Heath Care Operations Management
This course will help students to become familiar with the concepts, tools, and techniques for improving operational processes, such as lean processes, six sigma, flowcharting and statistical tools. It also provides students with the necessary knowledge and skills to run efficient and effective health care systems.

Third Year, Spring
Practice Development and Health Care Administration
See page 19 for the description of this course

Third Year, Spring
Public health Management
See page 19 for the description of this course

Fourth Year – with SUNY Empire State College
Strategies for Inter-professional Collaboration
This is the capstone for the program.

MBA in Healthcare Leadership

Required Courses

- Mastering Leadership in Healthcare Organizations
- Analysis of Healthcare Markets and Health Policy
- Quantitative Methods and Healthcare Operations Management
- Healthcare Financial Management *
- Healthcare Economics *
- Health Information Management and Informatics *

*Assessment Exams Available

Sample Electives

- Case Studies in Bioethics
- Healthcare Marketing Services
- Governance and Trusteeship
- Health Legal and Regulatory Affairs
- Healthcare Accounting
- Healthcare Quality, Compliance and Risk Management
- Strategic Communication and Inter-professional Collaboration
- HR Competencies for Healthcare
- High Performance Leadership

Special Affiliation Agreements with Undergraduate Institutions Joint Degree Program

The SUNY College of Optometry and 25 colleges and universities in New York State, New Jersey and Pennsylvania have established innovative affiliation agreements whereby students may complete a joint BS or BA degree and an OD degree in seven years.

Under this cooperative venture, selected academically talented high school seniors and college freshmen will be admitted to an approved joint-degree track at the undergraduate college and simultaneously to candidacy for admission to the professional program at SUNY Optometry. After three years of undergraduate work at any of the 25 affiliated schools, upon maintaining the required academic standing and meeting personal interview standards, the qualified student will be admitted to the SUNY College of Optometry. The student will receive his/her BS or BA degree from the undergraduate institution upon completion of the first year at SUNY Optometry. An OD degree will be awarded after the last year of professional study.

Students interested in this unique program are encouraged to contact the Office of Student Affairs and International Programs or visit http://www.sunyopt.edu/joint_degree for additional information.

Graduate Center for Vision Research (GCVR)

Vision science is a highly multidisciplinary field that encompasses basic, translational and clinical research in areas of biology, chemistry, physics, applied mathematics, engineering as well as molecular, cellular, cognitive and behavioral neuroscience. The Graduate Center for Vision Research embraces this inherent diversity as the foundation for a robust program offering training that intersects these varied disciplines. Students in the graduate program may work toward either an MS or PhD degree in Vision Science.

Programs

Combined OD/MS in Vision Science for Optometry Students
Master of Science students receive a broad education in a variety of areas of vision science as well as training in the concepts and methods used in both basic and clinical research. A total of 40 semester credit hours in courses or research is required. In addition, students must complete a thesis and oral defense. The combined OD/MS degree program is designed for students interested in conducting independent, original research as an adjunct to their optometric education, including those aspiring to a career in academia.

Qualified first year OD students at the SUNY College of Optometry may apply for admission into the Graduate Program in Vision Science leading to the joint OD/MS degree. OD students apply to the OD/MS program during the Fall semester of their first year in the OD Program. Accepted students enter the MS degree program in the Spring Semester of their first year. Elective time during the regular academic year and summers is devoted to graduate courses and research. This enables students to fulfill both OD and MS degree requirements within four years.

PhD in Vision Science Program
The doctoral program provides intensive training for students interested in a research career in academia or industry. PhD students participate in a series of courses, seminars, tutorials and journal clubs and receive intensive training in selected areas of vision research. Students must complete an original doctoral dissertation project in basic, translational or clinical vision research.

The PhD in Vision Science requires the completion of 80 semester hours of course credit. The core curriculum requirements include a year-long proseminar, which provides a comprehensive introduction to vision science, a minimum of five seminars/tutorials, an introduction to statistical methods, and a course in ethics in research. In addition, students must complete a minimum
of two laboratory rotations during the first year. During the laboratory rotations, students develop technical laboratory skills needed for research and gain experience interacting with a variety of researchers in different laboratory settings. By the end of their third year in the program, students complete a qualifying exam which consists of the submission of a written dissertation proposal followed by the oral defense of the proposal. Successful completion of the dissertation defense is the final requirement of the doctoral degree. PhD students are eligible for financial support through graduate student stipends, tuition waivers, grants and fellowships.

Combined OD/PhD in Vision Science
The OD/PhD is a comprehensive program that trains students in translational or patient-based research and is designed to prepare students for faculty positions in academic optometry. Qualified first year OD students at the SUNY College of Optometry may apply for admission into the Graduate Program in Vision Science leading to the joint OD/PhD degree. OD students apply to the OD/PhD program during the Fall semester of their first year in the OD program. If accepted, they enter dual degree program in the Spring Semester of their first year.

Students follow the optometry curriculum while devoting summers and academic year elective time to graduate seminars and research. The core curriculum requirements provide a comprehensive introduction to vision science, a minimum of five seminars/tutorials in different designated option list areas, an introduction to statistical methods and a course in ethics in research. At the end of the second year of the OD program, students work full time towards completing the remainder of the 80 semester credit PhD degree. PhD students must complete an original doctoral dissertation project in basic, translational or clinical vision research. During the laboratory rotations, students develop technical laboratory skills needed for research and gain experience interacting with a variety of researchers in different laboratory settings. PhD students complete a qualifying exam which consists of the submission of a written dissertation proposal followed by the oral defense of the proposal. Successful completion of the dissertation defense is the final requirement of the doctoral degree. Upon completion of all PhD requirements, students return to the OD program as third year optometry students to complete clinical requirements.

Combined Residency/Graduate Program
The combined Residency/Graduate program at SUNY Optometry offers a unique opportunity for new ODs seeking a graduate degree in vision science research in an area with clinical application while developing and maintaining advanced clinical competencies. The residency program will be completed over a two year period (equivalent to a 12 month program), while concurrent graduate work occurs. The master's degree can be anticipated to be completed within 2-3 years, and the first 1-2 years of the PhD can be completed during residency training. Clinical areas of interest will be coupled with graduate work/research in areas such as: Primary Care, Pediatrics, Cornea and Contact Lens, Vision Rehabilitation, Traumatic Brain Injury, or Ocular Disease.

Curriculum

The core curriculum for PhD students consists of the following courses, Introduction to Vision Science: Proseminar Part I, Introduction to Vision Science: Proseminar Part II, Introduction to Statistics, Scientific Integrity and Ethics in Research and five elective graduate seminars or tutorials. In addition, all full-time students are required to attend research colloquia, journal club, to pass a qualifying exam, as well as submit a dissertation proposal and complete and defend a PhD dissertation.

Students in the OD/MS Program take four regularly scheduled optometry program courses (Integrated Optics I; Visual Function: Sensory; Ocular Anatomy, Biochemistry and Physiology I and II) in place of Introduction to Vision Science: Proseminar Part I and Part II. In addition, students take Introduction to Statistics, Research Survival Skills, Vision Science Journal Club and Scientific Integrity and Ethics in Research. OD/MS students are also required to take four GM200 level seminars. At least three of these seminars must be Advanced Topic seminars which are offered in these four topic areas: Oculomotor Systems; Sensory Physiology and Perception; Optics, Refractive Error, and Maturation of the Optical System; and Ocular Bioscience.

Core Curriculum

G100 Level Courses	**Course#**	**Lec**	**Lab**	**Credit Hours**
Ocular Anatomy, Biochemistry and Physiology I	GVS-181FA	2.0	0.5	2.0
Ocular Anatomy, Biochemistry and Physiology II	GVS-182SA	3.0	0.5	3.0
Integrated Optics	GVS-131FA	3.0	1.0	3.5
Visual Function: Sensory	GVS-170SA	4.0	1.5	4.5

G200 Level Courses	Course#	Lec	Lab	Credit Hours
Introduction to Statistics and Statistical Computing	GM201	2.0	0.0	2.0
Optics of the Eye	GM202	3.0	0.0	2.0
Color Perception	GM204B	2.0	0.0	2.0
LGN and Cortex: Early Visual Processing of the Brain	GM207B	2.0	0.0	2.0
Ocular Motility: Oculomotor Systems	GM208B	2.0	0.0	2.0
Ocular Motility: Visuo-motor selection and decision processes	GM208C	2.0	0.0	2.0
Visual Perception: Current Research on Clinical Conditions Affecting Space Perception	GM210D	2.0	0.0	2.0
Visual Perception: 3D Shape Perception	GM210E	2.0	0.0	0.0
Visual Perception: Visual Attention, Psychophysics, Physiology and Modling	GM210G	2.0	0.0	2.0
Pre-dissertation Research	GM215	2.0	0.0	2.0
Scientific Integrity and Ethics in Research	GM219	1.0	0.0	1.0
Computational Modeling in Early Visual Processing	GM2211B	2.0	0.0	0.0
Retinal Mechanism and Behavior: Retinal Circuitry	GM222B	2.0	0.0	2.0
Proseminar: Introduction to Vision Science: Part I	GM230	6.0	0.0	6.0
Proseminar: Introduction to Vision Science: Part II	GM231	6.0	0.0	6.0
Research Survival Skills	GM240	2.0	0.0	2.0
Vision Science Journal Club for M.S. Students	GM241	2.0	0.0	2.0
Vision Science Journal Club for PhD Students	GM245	2.0	0.0	2.0
Advanced Topics in Oculomotor Systems	GM251	2.0	0.0	2.0
Advanced Topics in Sensory Physiology & Perception	GM252	2.0	0.0	2.0
Advanced Topics in Optics, Refractive Error, and Maturation of the Optic System	GM253	2.0	0.0	2.0
Advanced Topics in Ocular Science	GM254	2.0	0.0	2.0

G300 Level Courses	Course#	Credit Hours
Independent Study	GE307	variable

G400 Level Courses	Course#	Credit Hours
Dissertation Research	GD401	variable

Course Descriptions

G100 Level Courses

Ocular Anatomy, Biochemistry & Physiology I
GVS-181FA

2.25 Credits

This course covers the anatomy, physiology and biochemistry of the globe, related visual structures, and the visual pathway. Part I begins with an anatomical overview of the eye and related structures providing the student with an introduction to the basic structural features of the eye. This is followed by the anatomy of the fibrous tunic and the physiological basis for corneal transparency and how the cornea regulates its hydration and metabolism. Uveal anatomy and the physiology of the ocular fluids follow. The production of aqueous humor and its outflow through conventional and uveoscleral pathways leads to a discussion of intraocular pressure and its regulation. The neuroanatomical basis for papillary and accommodative responses and their clinical context follows. Finally, the anatomy, development, molecular composition and metabolism of the lens lead to a discussion of changes in the lens that occur during aging, including the biochemistry of cataract formation.

Ocular Anatomy, Biochemistry & Physiology II
GVS-182SA

3.25 Credits

This course is a continuation of OABP I. It begins with the study of the anatomy of the vitreous, retina, optic nerve and visual pathway. The biochemistry of the visual process including the biochemistry and molecular biology of rhodopsin and cone pigments, and the events that occur during the visual cascade will be studied including a discussion of color blindness, congenital night blindness and hereditary retinal degeneration. Nutritional and biochemical implications in age- related ocular disease will then be explored. Processing of visual information by the retina, lateral geniculate nucleus and function of the ocular appendages and the physiology and biochemistry of the tear film. The course ends with the study of the development of the eye and visual system. Integration with material taught in Gross Human Anatomy and Neuroanatomy is integral to the understanding of the structure and function of the eye and is emphasized in the course.

Integrated Optics GVS-131FA

4.5 Credits

This introductory course, which integrates elements of geometrical, physical and visual optics will prepare the student for the challenges for clinical practice, as well as the requirements of the National Boards. The lectures, in conjunction with the laboratories, will help the student develop and appreciation of the eye as an optical instrument, a practical understanding of the broad-based clinical applications of lenses, prisms and mirrors, and the basic consideration of lens design principles as applied to the eye and ophthalmic instruments. It will serve as a foundational information base and provide background knowledge for the higher level clinical and optometric courses and literature review. The 32 instructional sequence is: Introduction to light, optics of thin spherical and astigmatic lenses, optics of spherical refracting interfaces, optics of mirrors, optics of thick and thin prisms, fiber optics, Gaussian systems, Newtonian optics, system stops and field of view, introduction to Visual Optics and model eyes, axes and angles of the eye and Purkinje-Sanson images.

Visual Function: Sensory GVS-170SA

4.5 Credits

This course covers monocular sensory processes and visual perception. Topics include spatial and temporal visual processes; visual adaptation, color vision; psychophysical methodology; information processing; gross electrical potentials; basic visual action; and basic visual-cognitive processes. Topics are discussed in terms of their normal function and clinically relevant deviations from normal. The anatomical and neurophysiological bases for visual performance are examined and related to clinical testing. Laboratories emphasize the measurement of these functions in assessing the visual capacities of individual patients and the demonstration of relevant visual phenomena.

G200 Level Courses

Introduction to Statistics GM201

2.0 Credits

This seminar provides students with an overview of some basic concepts and methods in statistical analysis. Students will gain an understanding of experimental research design as well as a thorough knowledge of hypothesis testing and sampling error. They will also gain the ability to perform and analyze the results of a simple t-test between or within groups, the ability to perform and analyze the results using post-hoc tests of one-way and multi-way mixed ANOVAs. Also, students will learn how to perform and analyze the results of Pearson's r as well as ordinal and nominal correlation techniques as well as gain an understanding of when and how to use non-parametric statistics.
Prerequisites: Undergraduate statistics or permission of instructor.

Optics of the Eye GM202

2.0 Credits

This seminar examines the role of natural "aberrations" from the environment (optical vergence) and from refraction and chromatic dispersion across the extended pupil of the chambered vertebrate eye, especially the role of defocus and chromatic aberration. We consider the hypothesis that defocus and chromatic aberration specify optical vergence, distance and relative depth, monocularly and binocularly, as polychromatic blur across the retina in conjunction with polychromatic apodization across the exit pupil of the eye, and that modulation/phase across both retina and pupil are potential signals for accommodation, emmetropization and visual perception. Readings explore the nature of the retinal image, blur from diffraction, defocus and aberrations, the Stiles-Crawford effect, sensitivity of the visual system to wavefront spherical curvature (optical vergence) and chromostereopsis.
Prerequisites: Integrated Optics I or Proseminar: Introduction to Vision Science or the equivalent. Courses may be taken concurrently or permission of instructor.

Color Perception GM204B

2.0 Credits

This tutorial builds from the fundamentals of aperture color matching to the most recent work on color appearance in material perception. It requires reading classic and recent papers on relevant topics. The goal of the course is to make students think deeply about research questions in all aspects of color perception. There will be an emphasis on the way ideas have developed about these topics, to give a context to present foci of interest. Each tutorial will focus on a specific topic and will be shaped by the background and interests of the students. Since the area covered is large and growing, students can take the tutorial more than once

for credit. Topics include color matching and the dimensionality problem, color adaptation to simple and complex fields, color induction from Mach bands to 3-D figural effects, perception of illuminants and filters, color as a cue for object identification and color and perception of material qualities.
Prerequisites: PhD Students or permission of instructor.

LGN and Cortex: Early Visual Processing of the Brain GM207B
2.0 Credits

This tutorial will provide basic information on the role of thalamus and striate cortex visual processing. It requires ready classic and recent papers on topics related to thalamocortical processing. It covers anatomy, physiology and computational models of sensory processing in the early visual pathway. The objectives of the course are to provide a basic understanding of the anatomy and physiology of the early visual pathway and address recent discoveries in this field as well as develop critical thinking skills when reading the relevant scientific literature.
Prerequisites: There is no specific prerequisite other than a genuine interest in the topics to be discussed and a willingness to read a large number of papers and write reports on the reading material. Open to PhD students or permission of instructor.

Ocular Motility : Oculomotor Systems GM208B
2.0 Credits

This course provides students with an overall appreciation of the behavioral, functional and physiological characteristics of the oculomotor system. This involves a review of the various oculomotor subsystems (saccadic, smooth pursuit, fixation, vestibuloocular and optokinetic) and especially what sort of stimuli and central functional mechanisms are responsible for eye movements. In addition, the course will consider a variety of current issues about the perception of visual space at the time of saccadic and smooth pursuit movement.
Prerequisite: Permission of instructor. Not open to first year optometry students.

Ocular Motility: Visuo-motor selection and decision processes GM208C
2.0 Credits

Visually-guided behavior requires selection of an object (or objects) as the goal for action. This tutorial investigates the neural processes underlying the visual selection of objects for action. Special emphasis is placed on saccadic eye movements, although smooth pursuit eye movements and visually-guided reaching movements are also considered.
Prerequisites: Permission of instructor. Students should have basic familiarity with the structure and function of the oculomotor system from the PhD Proseminar course (or equivalent).

Visual Perception: Current Research on Clinical Conditions Affecting Visual Space Perception GM210B
2.0 Credits

This tutorial covers cues to depth and spatial layout and how they are combined by the visual system. Special emphasis is placed on binocular disparity as a cue for stereoscopic depth perception. Topics covered include: pictorial depth cues; utility of binocular vision; binocular vision: version and vergence; panum's fusional area; geometric horopter (Vieth-Mueller circle); empirical horopter; horizontal disparity: head-centric (vergence), absolute retinal, relative; geometric and Induced effects; relative depth disparity; binocular correspondence and correlation; coordinate systems: Helmholz, Fick, Hess, Harms, polar, direction circles; development of stereoscopic vision in infancy; neural basis of disparity detection in V1 and MT cells; optimal (Bayesian) cue combination; robust weighting of redundant cues.
Prerequisites: PhD students or permission of instructor.

Pre-dissertation Research GM215

1 credit per 2 hours of research per week

For MS students and PhD students before passing their Specialty Area exam.
Hours: Variable
Prerequisite: Must have consent of instructor.

Scientific Integrity and Ethics in Research GM219

1.0 Credit

The purpose of this course is to familiarize graduate students and postdoctoral fellows with basic ethical issues confronting scientists in biomedical science research. The course addresses ethical considerations in the use of human and animal research subjects, scientific integrity in data management, analysis, authorship, and publication. Additional topics include peer review, scientific fraud, conflict of interest, mentoring, intellectual property, collaborations, and the role of scientists in society. The course is designed to meet or exceed all NIH requirements for instruction in the responsible conduct of research; NOT-OD-10-019 on November 24, 2009 and updated on April, 19, 2011.

Retinal Mechanism and Behavior: Retinal Ciruitry

GM222

2.0 Credits

The course will cover aspects of retinal circuitry involved in the encoding and propagation of the visual image. Original papers ranging from classic work to more contemporary reports focusing on retinal morphology, physiology and neuropharmacology will be discussed.
Prerequisites: The material will be at an advanced level that will build upon the basic lectures in Proseminar I, which is a necessary prerequisite. The course material will be at a level directed at doctoral students, but will be open to OD/MS students as well who have taken Visual Function (Module A).

Proseminar: Introduction to Vision Science: Part I GM230

6.0 Credits

This course the first part of a year-long course designed to give a basic introduction to the eye. The emphasis will be to provide a background to the physiology, biophysics and neurobiology of the eye. Lecturers will impart basis information and ideas and also stress current foci of research interest. There will also be an emphasis on introducing research methods and their pitfalls. At the end of the course the student will have acquired background knowledge of the eye's vegetative anatomy, membrane biophysics and synaptic transmission. An understanding of the concepts of physiological optics, structure and function of the front of the lens and cornea and knowledge of retinal anatomy and how it manifests in the primate retina as well as the basics of color vision. Students will also learn the methodology of vision research, both from a biochemical/pharmacological and systems/neurobiological perspective. Finally, students will also gain a basic understanding of the main forms of retinal disease.
Prerequisite: PhD students only. Permission of instructor.

Proseminar: Introduction to Vision Science: Part II
GM231

6.0 Credits

This seminar gives a basic introduction to post-retinal visual processes and perception. The emphasis is on providing a background to the functional neurobiology of the cortex. This seminar is aimed at students in

the PhD program. Lecturers will impart basic information and ideas and also stress current foci of research interest. There will also be an emphasis on introducing research methods and their pitfalls. These topics will then be further pursued in the tutorial program.
Prerequisite: PhD students only. Permission of instructor.

Research Survival Skills GM240A
1.0 credit

This course will provide basic knowledge and skills for students conducting Masters-level research in optometry and vision science. It will set expectations for progress through the OD-MS program and offer guidance on how to successfully design, conduct and disseminate research in basic, translational or clinical areas, Learning objectives include :Types of research in optometry and vision science; how to develop a research question and design an appropriate study; how to apply for authorization to conduct research; how to write an abstract and submit to a scientific meeting; how to present scientific information (papers, talks) and how to submit a manuscript for publication.
Prerequisite: Open to all OD/MS students.

Vision Science Journal Club for OD/MS Students GM241A
1.0 credit

Journal Club for OD/MS students covers the skills needed to read and discuss research papers in a comprehensive manner in order to understand their scientific and clinical value. Basic paper structure, writing styles and key words will be covered . The course format combines a face to face lecture component, along with an on-line discussion component. All students will also have to present a paper.
Prerequisite : Open to all OD/MS Students.

Vision Science Journal Club for Doctoral Students GM245A
1.0 credit

Journal Club for Doctoral students is a mixed format venue for presenting and discussing current research in vision science. The course is run primarily by graduate students. Students in the PhD program are expected to attend every week until their final semester in the program.
Prerequisite: Open to all Doctoral Students.

Advanced Topics in Oculomotor Systems GM251
2.0 credits

This Advanced Topics course will cover selected topics in accommodation, eye movements, and pupil responses. Neural and physical systems that control accommodation, near response, ACA and CAC ratios, physical properties of the lens, consequences for image formation, presbyopia, development of the lens and it s control systems, and pathology. Eye movement topics include the neural and physical properties of the saccadic, vergence, and steady fixation control systems and their pathologies. Pupil topics include basic neural control of pupil size in response to light and other factors, melanopsin ganglion cells. The course will be taught in mixed format including both lecture and seminar format (student presentation of papers). All students are expected to read all assigned papers carefully before class and participation in class discussion is a component of evaluation, as well as critical reviews, papers, and/or exams.
Prerequisite: Permission of Instructor.

Advanced Topics in Sensory Physiology and Perception GM252

2.0 credits

This Advanced Topics course will cover selected topics in neurophysiology of the visual system and visual perception. Selected topics may include the transduction of light ; signaling in the retina, LGN, and visual cortex; visual adaptations; detection and processing of luminance contrast, color, motion, and binocular disparity; object and scene percept ion; perceptual learning and vision therapy; and pathologies such as amblyopia and strabismus.

Prerequisite: Permission of Instructor.

Advanced Topics in Optics, Refractive Error and Maturation of the Optical System GM253

2.0 credits

The course covers selected topics in geometric and physiological optics, emphasizing theory and research applications in which measuring the optical characteristics of the eye is essential. Special topics include higher-order wavefront aberrations, optical limitations of neural processing, optical methods of imaging the retina, control of eye growth and development of refractive state, accommodation and presbyopia . The course will be taught in mixed format including both lecture and seminar format (student presentation of papers). All students are expected to read all assigned papers carefully before class and participation in class discussion is a component of evaluation, as well as critical reviews, papers, and/or exams.

Prerequisite : Permission of Instructor.

Advanced Topics in Ocular Bioscience GM254

2.0 credits

This Advanced Topics course will cover selected topics in the cellular and molecular systems that support the living eye, and related pathologies. Topics may include cellular and molecular mechanisms for homeostasis and protein expression, immune response, pathologies caused by diabetes, glaucoma, etc., and methods of measurement including imaging at various spatial scales. The course will be taught in mixed format including both lecture and seminar format (student presentation of papers). All students are expected to read all assigned papers carefully before class and participation in class discussion is a component of evaluation, as well as critical reviews, papers, and/or exams.

Prerequisite: Permission of Instructor.

G300 Level Courses

Independent Study GE307

1 credit per 2 hours of independent study per week.

Hours: Variable

Prerequisites: Must have consent of instructor

G400 Level Courses

Dissertation Research GD401

1 credit per 2 hours of research per week

For PhD students working on their doctoral dissertation.

Hours: Variable

Prerequisites: Must have consent of instructor