

# UHCO Graduate Program Handbook

June, 2020

## Table of Contents

<b>Welcome .....</b>	<b>3</b>
<b>The College of Optometry Buildings.....</b>	<b>3</b>
<b>General Information about the Graduate Program .....</b>	<b>6</b>
<b>Content Area of Physiological Optics and Vision Science.....</b>	<b>7</b>
<b>Graduate Programs Offered.....</b>	<b>7</b>
<b>Assistantships, Scholarships &amp; Fellowships .....</b>	<b>8</b>
<b>Curriculum.....</b>	<b>10</b>
<i>Master of Science in Physiological Optics (PHOP) Course Requirements .....</i>	<i>10</i>
<i>Doctor of Philosophy in Physiological Optics Course Requirements.....</i>	<i>11</i>
<b>The PhD Qualifying Exam in Physiological Optics and Vision Science.....</b>	<b>11</b>
<i>The Written Qualifying Examination .....</i>	<i>12</i>
<i>The Oral Qualifying Examination.....</i>	<i>13</i>
<b><u>Evaluation of the oral qualifying exam.....</u></b>	<b>14</b>
<b>Technical Skill/Foreign Language Requirement.....</b>	<b>16</b>
<b>Other PhD Requirements.....</b>	<b>16</b>
<b>Thesis (MS) &amp; Dissertation (PhD).....</b>	<b>17</b>
<i>MS Thesis or PhD Dissertation Preparation – General Comments .....</i>	<i>17</i>
<i>Initial Steps in Completing a Master's Thesis .....</i>	<i>18</i>
<i>Initial Steps in Completing a Doctoral Dissertation.....</i>	<i>20</i>
<i>Final Steps for Completing a Thesis or Dissertation.....</i>	<i>21</i>
<i>Thesis/Dissertation Document Preparation, Submission and Binding Information .....</i>	<i>22</i>
<b>Graduation Information.....</b>	<b>26</b>
<b>OD/MS program .....</b>	<b>27</b>
<b>OD/PhD program.....</b>	<b>28</b>

**Grievance Procedures for Graduate Students ..... 29**

## **Welcome**

Welcome to the University of Houston (UH) College of Optometry's Graduate Program in Physiological Optics and Vision Science. We hope this handbook will help you to become acquainted with the Graduate Program and the College of Optometry.

Graduate students may also wish to consult the 2019-2020 Graduate Catalog for information about UH policies for graduate students at <http://publications.uh.edu/index.php?catoid=33>, and the section that describes the Graduate Program in Physiological Optics and Vision Science,

The College mailing address is:

College of Optometry, University of Houston, 4901 Calhoun Rd., JDA Rm 2195, Houston, TX 77204-2020

Questions and concerns about the Graduate Program may be referred to:

Renee Armacost, Graduate Program Manager, [rattelade@uh.edu](mailto:rattelade@uh.edu), 713-743-1885, (Room JDA 2115).

## **The College of Optometry Buildings**

The College is housed in two buildings that are connected on the 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> floors. The original building, J Davis Armistead (JDA), was designed specifically to serve as an optometric education and research center. JDA was completed in 1976, and it contains more than 133,000 square feet in three floors. A new six story building, 167,000 sq ft, facility, the Health Building 1 (Health1) opened for classes in 2013. Health 1 houses an ambulatory surgery center on the 1st floor along with an auditorium, it serves optometric educational and research missions on the 2<sup>nd</sup> floor, and a houses research in other disciplines on the 3<sup>rd</sup> and 4<sup>th</sup> floors. The University Animal Care Operations offices and vivarium are on the 5<sup>th</sup> floor and 6<sup>th</sup> floors. The 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> floors of Health 1 are continuous with Health 2 which opened in 2017. Health2 is the new home of the College of Pharmacy, and several UH Health programs and facilities. A new Health Sciences Library, which includes the Optometry Vision Science Library is located at the meeting point of the two Health buildings and JDA on the 2nd floor.

### **J Davis Armistead Building (JDA)**

#### **1<sup>st</sup> Floor**

The 1<sup>st</sup> floor of JDA includes a large reception area for the clinic, an optical dispensary (Essilor Optical Services), and several clinical services: Family Practice, Cornea and Contact Lens, Pediatric & Binocular Vision, Ocular Diagnostic & Medical Eye, Brain Injury & Vision Assessment & Rehabilitation, and the Center for Sight Enhancement (Low Vision). The teaching clinics occupy about 50,000 square feet and are equipped with the latest ophthalmic instruments and diagnostic systems, including, for example: visual field analyzers, spectral domain optical coherence

tomographers (OCTs), fundus cameras, corneal topographers, confocal microscope, wavefront analyzer, and a combined A scan/B scan ultrasound instrument.

### **2<sup>nd</sup> Floor**

The 2<sup>nd</sup> floor of JDA includes business offices, administration, faculty and staff offices and several faculty research labs for studies of human subjects. These labs include: The Visual Optics Institute (VOI) which houses a lathe for wavefront guided production of contact lenses, the Houston lab for a multicenter Bifocal Lenses in Nearsighted Kids (BLINK) study and other labs for ocular imaging, testing or recording of cortical visual evoked potentials (VEPs), electroretinograms (ERGs), refractive error, and accommodation. The photography and audio-visual service is also on the 2<sup>nd</sup> floor, and there are two conference rooms, a classroom and five teaching laboratories for the optometry students, all of which have projection facilities. JDA 2<sup>nd</sup> floor also houses the Graduate office for graduate student support (JDA 2115), the Office of Optometry Relations for Optometry admissions, support of professional students, and for administration of continuing education. In addition, there is a suite of graduate student offices, and two student lounges with microwave ovens in both, and large refrigerators in one.

### **3<sup>rd</sup> Floor**

The 3<sup>rd</sup> floor of JDA contains faculty research laboratories and some additional graduate student offices. Graduate students have access to network computers, with internet and email access to provide state of the art hardware and software tools for research. The 3<sup>rd</sup> floor also houses NEI Center Core Grant for Vision Research supported services, which are also listed under Technical Services. The NEI Biological Imaging Core on the third floor includes a histology lab, two electron microscopes for ultrastructural studies, one with 3-D reconstruction capabilities, a confocal microscope for immuno-histochemical studies, and a deconvolution microscope that allows live imaging. The Instrument Design services include machine and electronics shops.

## **Health Building 1 (Heath 1)**

### **1<sup>st</sup> and 2<sup>nd</sup> Floors**

The 1<sup>st</sup> and 2<sup>nd</sup> floors of Heath 1 house the UH College of Optometry Vision Institute. On the 1<sup>st</sup> floor there is an ambulatory surgical eye center and a versatile auditorium with projection capabilities. The 2<sup>nd</sup> floor has two classrooms for UHCO (The Brien Holden Vision Institute Classrooms) that provide amphitheater seating and excellent audio and projection services with a resident PC as well as accommodations for laptops. There are numerous small student study rooms, and the Smith Wensveen conference room. The Ocular Surface Institute (TOSI), with associated offices and labs, and the Dry Eye Center, are also on the 2<sup>nd</sup> floor of Health 1.

### **3<sup>rd</sup> and 4<sup>th</sup> Floors**

The 3<sup>rd</sup> and 4<sup>th</sup> floors of Health 1 provide facilities for members of other Colleges. Occupants include neuroscientists, computer scientists, psychologists, and the Texas Institute for Measurement, Evaluation, and Statistics (TIMES) that provides statistical support and data management services for many projects, including NEI core grant supported statistical services.

### **5<sup>th</sup> and 6<sup>th</sup> Floors**

The 5th and 6th floors are University of Houston AAALAC and OLAW approved rodent and nonhuman primate (NHP) vivariums respectively. NHPs research labs are also on the Health1 6<sup>th</sup> floor.

## **Research in the College of Optometry**

Faculty research interests (<https://www.opt.uh.edu/research-at-uhco/research-faculty/>) and an overview of research in the college (<https://www.opt.uh.edu/future-students-residents/programs/graduate-program/graduate-poster/>) can be found on the College of Optometry website.

Areas of ongoing research in the college include, but are not limited to: visual physiology and psychophysics, cellular and molecular biology of vision, visual optics (refractive error, ocular wavefront aberrations), mechanobiology of anterior segment structures, structural and functional alterations in retinal and optic nerve pathologies in animal models and human patients, ocular surface studies including morphology, cell biology, wound healing and immune response, and mechanisms of Meibomian gland disorder and dry eye disease.

## **Technical Services**

The Technical Services facilities of the College of Optometry provide technical support for the faculty, students, postdoctoral fellows, residents and staff of the College. The group offers the following support services: Photography and Audio Visual, IT, Biological Imaging (Histology and Microscopy), Instrument and Optical Design (Construction and Repair), and Electronics Design (Construction and Repair).

Graduate students are encouraged to consult with Technical Services personnel to determine the most efficient way to accomplish a particular technical job such as design and fabrication of research apparatus. Using the various tools and skills available in Technical Services will increase graduate students' awareness of the breadth and depth of instrument development available to them as investigators.

Within the AV service, on the second floor of JDA, there are qualified personnel available to support the College with AV production capabilities for research presentations and publications, such as: figures, technical illustrations and posters. Computer generated graphics, photographic services including video production and editing, may also be available. Another service of the AV Department (and IT team) is setting up and maintaining the classroom projection facilities, audio equipment, Skype and lecture capture.

Computer software and hardware support for offices, labs, classrooms and clinics is provided by the computer support, IT team (JDA 3357). Software development Python and MATLAB for graduate students are offered at the college or may be taken elsewhere in the University. In addition, the NEI Core Grant provides application development expertise to assist laboratories in developing customized software for their research needs.

The machine shop has two band saws, two drill presses, milling machine, lathe, shaper, disc/belt sander, a 3-D printer and a Maximat lathe/mill combination. Custom electronic equipment as well as replacement hardware may be obtained from the electronics shop. Access to some of the equipment in each of the areas is limited to the individual responsible for that area: for example, the lathe and the milling machine in the shop are operated only by the College's chief laboratory machinist. The personnel of Technical Services welcome the opportunity to train graduate students in the safe and efficient use of the other devices in the various working areas.

## **General Information about the Graduate Program**

This handbook is intended to serve as a guide for the graduate students in the College of Optometry Graduate Program in Physiological Optics and Vision Science. It provides a basic roadmap for progression toward a graduate degree and should be consulted frequently in planning a program of study. It is a supplement, not a substitute, for the *Graduate Catalog* (<http://publications.uh.edu/index.php?catoid=33>) of the University of Houston. In the *Graduate Catalog*, the Graduate School and the Graduate and Professional Studies Committee have provided University wide policies and regulations as well as descriptions of the programs offered at UH.

This handbook covers the basic steps toward completion of the graduate degrees offered in Physiological Optics and Vision Science at the UH: the Master of Science (MS), the Doctor of Philosophy (PhD) and the OD/MS degree. The OD/PhD is briefly described as well. The handbook attempts to answer frequently asked questions and provide necessary information for successful completion of the graduate degrees. For a grievance procedure explicitly, see the section on "Grievance Procedures for Graduate Students" at the end of this document.

In seeking information more generally on academic policies, consider doing the following:

- (1) Consult the University's *Graduate Catalog* on the University website to determine the University's policy.
- (2) Consult this handbook to determine specific applications of the UH Graduate policy for the Graduate Program in Physiological Optics and Vision Science.
- (3) Discuss any issues with your research mentor and/or the Director (Associate Dean) of Graduate Studies.
- (4) If a judgment on the problem which concerns you cannot be achieved otherwise, your mentor will refer the question to the Graduate Faculty. On such matters, please do not bypass your mentor, who should act as your agent, unless the problem involves the mentor. Official interpretations of University policy for graduate programs are made by the University (Faculty Senate) Graduate and Professional Committee. However, it is appropriate that matters requiring special rulings, or actions, for the Graduate Program in Physiological Optics and Vision Science be handled through the Thesis or Dissertation Committee Chair (your research mentor), the Director (Associate Dean) of the Graduate Program, and Dean of the College of Optometry.

The basic responsibility for planning and completing a program of graduate study rests with the student. The research mentor, generally selected in the 2<sup>nd</sup> year if not sooner, serves as the Chair of the student's research committee, and has the role of mentor (advisor) and counselor. It is also important that the Associate Dean (Director)

of Graduate Studies be consulted about each student's plans and progress during individual advisory meetings that are held each term, as well as when students are competing the program milestones (e.g. qualifying examinations, formation of committees, research proposals and defenses) that are described below. The advisory meetings help the student to plan coursework, timelines for completing research related milestones, and allow the student to assess their own progress in the program. The official administrative records for each student reside in the graduate office, managed by Renee Armacost.

## **Content Area of Physiological Optics and Vision Science**

The Graduate Program in Physiological Optics and Vision Science is under the administration of the College of Optometry and more directly, the Associate Dean for Graduate Studies, and the graduate faculty committees. It is oriented toward the study of basic and applied visual processes, including the physical, physiological, pathophysiological and psychological aspects of vision. It is designed to prepare graduates of an Optometric curriculum, or those with a Bachelor's degree in a science related to vision, or applicable to the study of vision, for a career in teaching and/or research in optometry and/or vision science. Principal career opportunities exist in educational institutions, research institutions, industry, military and government laboratories, and specialized optometric practice.

Faculty biographical sketches, and research interests that are posted on the College website (<https://www.opt.uh.edu/research/research-faculty/>) indicate the range of research interests and expertise within the College of Optometry. In addition, students interested in applying techniques and knowledge from other (mainly biomedical) disciplines, e.g. biology, biomedical or electrical engineering, computer science, pharmacology, psychology, and advanced statistics can enroll in selected courses in those areas. It is also possible to take courses at other institutions in the Texas Medical Center, e.g. biostatistics and data science in the University of Texas (UT) Health School of Public Health.

## **Graduate Programs Offered**

The College of Optometry offers graduate courses leading to the degrees of Master of Science (MS) and Doctor of Philosophy (PhD). In addition, a dual OD/MS program is offered that OD students enter in the Spring of their second year in the OD program. The OD/MS program, which includes elements of the MS program, is described separately after the full time MS and PhD programs are described. The OD/PhD program is briefly described as well. The Master of Science program curriculum and requirements are planned to serve the needs of students who expect to continue to the doctorate as well as those who may desire only a Master's degree. It is the intention that the Master's program should provide a fundamental background in the field of Physiological Optics and Vision Science. Students seeking a Master's degree may plan their programs to allow the degree of specialization in certain applied skills that they may desire, some training in teaching, the completion of a research project, and preparation of a formal Thesis.

The Doctor of Philosophy (doctoral) program is based on recognition that individuals must, in addition to mastering the content area, prepare themselves for successful careers as educators and researchers. Students need not complete the MS program prior to entering the PhD program. The programs distinguish, sometimes arbitrarily, the academic content of physiological optics as a discipline from the skills, techniques, and methodologies required for

work in specific career areas. It is the intention of the PhD program that its doctoral graduates, regardless of their area of specialization, should first be well-rounded and informed teachers and vision scientists. Special attention is given to a fundamental background in physiological optics and vision science. In their academic work, students must demonstrate reasonable mastery of physiological optics and vision science as a whole, and outstanding mastery of specialized, related, areas of research.

## **Assistantships, Scholarships, & Fellowships**

The general policy is to provide financial support or aid to all full-time students in the Graduate Program in Physiological Optics and Vision Science. Graduate students must enroll in at least 9 hours to be considered full-time.

Several forms of financial aid are available to full time students in the Graduate Program. Full time doctoral students in good standing will receive University Graduate Tuition Fellowships (GTF) for tuition and most fees to the extent that funds are available. Teaching and research fellowships provide stipends for students. A concise description of various graduate student support programs follows:

- (1) UH Graduate Teaching Fellowships: For graduate students who have student contact in an instructional setting and who have primary responsibility for teaching a course for credit or for licensed US ODs, as an attending clinician in the clinic. They must have completed a minimum of 18 semester hours of doctoral credit in their teaching field, be in good standing in the graduate program and make satisfactory progress toward the degree each term. They may be listed, in some cases, as the instructor of record .
- (2) Graduate Teaching or Instructional Assistantships: Graduate students who have student contact in an instructional setting as part of their assigned job duties, and who perform under a faculty member's direct supervision. They must be in good standing in the graduate program and must make satisfactory progress toward the degree each term.
- (3) Graduate Research Assistantships: Members of the faculty who hold research grants or contracts may employ one or more Graduate Research Assistants at the standard stipend levels agreed upon by the College, University, granting agency, and the principal investigator. Appointments to these positions are made by the principal investigator of a particular grant or contract research program, and administrated via the graduate program and the business office.
- (4) Graduate Program Assistantships: Graduate students who do not have student contact in an instructional setting but who assist with academic programs or projects under a faculty member's direct supervision.
- (5) Competitive NEI (or NIH or NSF) Fellowships, and Grants or funding from other sources: Pre- and post-doctoral fellowships in various forms are available. As announcements are received by the graduate office, they are distributed to the graduate students and faculty for information and subsequent application.



All of the options for financial assistance described above are available **only to full-time** students admitted to degree programs, and in good standing. Additional sources of financial assistance may become available to graduate students. Inquiry should be directed to the Associate Dean for Graduate Studies. Graduate students are encouraged to apply, under guidance from their mentors, for these fellowships when they are announced by the college or externally. Evidence of support from peer reviewed grants/awards can assist in further grant support for the student as well as the College and may provide additional funds for travel, supplies and small items of equipment.

**Graduate Student Travel:** The Graduate Program Office generally has funds to support graduate student travel to scientific meetings. The dollar amount of support is determined by the number of students requiring support and the amount of money budgeted each year. Those presenting a paper or poster as the first author generally receive greater funding than those who do not present. Students are also encouraged to apply for travel funds from the Graduate School (Cullen Travel Fellowship), or the organizations that are arranging the professional meetings, such as the Association for Research in Vision and Ophthalmology (ARVO) and the American Academy of Optometry (AAO) and its affiliated research foundation, the American Academy Optometric Foundation (AAOF).

## **Curriculum**

### **Master of Science in Physiological Optics (PHOP) Course Requirements**

Courses taken must total minimum of **30 semester credit hours**, including a written thesis. Master of Science Degree students are expected to complete an independent research project under the supervision of a faculty mentor and at least two additional research committee members and to write and defend a thesis for the degree.

#### **ALL of the following basic vision core courses in Physiological Optics) and Vision Science (PO/VS):**

**(The second digit in the course number is the number of credit hours)**

- PHOP 6241 - Basic PO/VS Part 1
- 6242 - Basic PO/VS Part 2
- 6243 - Basic PO/VS Part 3
- 6152 - Basic PO/VS Lab (This may be included in 6243)

#### **TWO of the following Advanced Module courses**

- PHOP 7241 - Pathophysiology of the Anterior and Posterior Segments
- 7242 - Visual Neuroscience
- 7243 - Optics and the eye

#### **ALL of the following Basic Research Skills:**

- PHOP 6275 – Professional Development in the Visual Sciences
  - 6371 - Experimental Design in Visual Sciences
  - 6372 - Experimental Quantification in Visual Sciences
- 18 hours total

#### **Each Semester:**

- PHOP 6160 - General Seminar in PO/VS

**Electives:** As needed to strengthen student's education in a particular area related to his/her research

**Research hours** (practicum), and **independent study** (tutorial) are offered on an "as needed" basis to meet the individual needs of students (X indicates credit hours ranging from 1 to 9):

- PHOP 6X57 - Research Practicum B
- PHOP 6X67 - Research Practicum A
- PHOP 6X98 - Spec Problems in Physiological Optics and Vision Science
- PHOP 7X57 - Advanced Research Practicum B
- PHOP 7X67 - Advanced Research Practicum A

**Master's Thesis hours:** 3 hours are required, and students may register for up to 6 hours

- PHOP 6399 - Master's Thesis
- PHOP 7399 - Master's Thesis

### **Doctor of Philosophy in Physiological Optics Course Requirements**

Courses (and research hours) taken must total a minimum of 60 semester hours, including the written dissertation. This track includes a technical skill or foreign language, written and oral qualifying examinations, original research, writing and defending a doctoral dissertation.

#### **ALL of the following basic vision core courses:**

- PHOP 6241 - Basic PO/VS Part 1
- 6242 - Basic PO/VS Part 2
- 6243 - Basic PO/VS Part 3
- 6152 - Basic PO/VS Lab (This may be included in 6243)

#### **TWO of the following Advanced Module courses**

- PHOP 7241 - Pathophysiology of the Anterior and Posterior Segments
- 7242 - Visual Neuroscience
- 7243 - Optics and the eye

#### **ALL of the following Basic Research Skills:**

- PHOP 6275 - Professional Development in the Visual Sciences
- 6372 - Experimental Quantification in Visual Sciences
- 6371 - Experimental Design in Visual Sciences

- IDNS 6391 - Ethics in Science

21 hours total

#### **Each Semester:**

- PHOP 6160 - General Seminar in PO/VS

**Electives (minimum 5 hours required):** As needed to strengthen student's education and/or skill in a particular research area, e.g. PHOP 7276 - MATLAB Programming for Vision Science

**Research hours (practicum) and independent study (tutorial)** are offered on an "as needed" basis to meet the individual needs of students. (X indicates credit hours ranging from 1 to 9):

- PHOP 6X57 - Research Practicum B
- PHOP 6X67 - Research Practicum A
- PHOP 6X98 - Spec Prob- Physiological Optics and Vision Science
- PHOP 7X57 - Advanced Research Practicum B
- PHOP 7X67 - Advanced Research Practicum A

**Doctoral research hours** (for students who have passed the PhD candidacy exam)

- PHOP 8X98 - Doctoral Research

**Doctoral Dissertation hours** (grades on a maximum of 9 hours can be included in the GPA)

- PHOP 8X99 - Doctoral Research

## **The PhD Qualifying Exam in Physiological Optics and Vision Science**

### **Purpose of the Exam**

The purpose of the qualifying examination (in two stages described below) is to evaluate whether a student in the PhD program is eligible to be advanced to candidacy and permitted to proceed with doctoral research toward a PhD. This decision should be made as early as possible in the graduate student's career. The examination evaluates the following, which are taken to be necessary prerequisites for the conduct of doctoral research:

- (1) Factual knowledge in the broad area of physiological optics, as well as in experimental design,
- (2) Depth and breadth of topical knowledge,
- (3) Integration of knowledge from diverse areas to solve problems,
- (4) Ability to write and defend a small research proposal in the format (shortened) of a NIH grant
- (5) The ability to think and respond effectively on one's feet.

To meet these requirements, the qualifying examination consists of separate written and oral portions. The written examination taken in August of the summer following the first year courses is intended primarily to evaluate basic understanding of experimental design and statistical analysis as covered in required courses, as well factual knowledge of material in the core curriculum. Because questions cover the whole of the core curriculum including the Advanced Modules and are generated by a cross section of the graduate faculty, an important part of the examination is to determine whether the student can discern which factual information is needed to answer a particular question. When constructed properly, the written qualifying examination can also examine how well the student can integrate material presented separately in different core courses and in different sections of the same course.

The subsequent oral examination should be taken in the **5<sup>th</sup> to 8<sup>th</sup>** semester (Spring of 2<sup>nd</sup> year through spring of 3<sup>rd</sup> year). The examination focuses on depth of understanding of the student's chosen area of research, the student's ability to generate a research proposal in that area, and the student's capacity to think analytically and to respond to questions on his/her feet. The focus of the oral examination should be to determine whether the student, if advanced to candidacy, is likely to generate and complete experiments that will lead to significant advancement of knowledge, and is likely to be able to function as an independent researcher in the future.

### **The Written Qualifying Examination**

The written part of the qualifying examination should be taken after completion of the first year in the graduate program, typically in August before the beginning of the next academic year. By this time the graduate student should have completed all of the didactic material in the core curriculum (i.e., the basic PO/VS courses). The courses covering this material are therefore offered to graduate students on a yearly basis.

Written examinations will be scheduled as needed. Ordinarily, students who enter in the Fall and will take the written examination in the following Summer. If a sufficient number of students indicate readiness or if an appropriate contingency arises, an additional written examination may be scheduled.

The Chair of the Written Qualifying Examination Committee will solicit from the graduate faculty a number of questions to examine basic factual knowledge in each of the several topical areas covered in the basic PO/VS core courses, basic research skills courses, and advanced modules given in the first year of graduate studies. Since part of the rationale for the written qualifying examination is to foster integration of material within and between areas of vision science, questions will be written collaboratively by the qualifying exam committee.

The written examination will be constructed by the examination committee according to the following guidelines:

- (1). 50% (3/6 answered) of the questions on each written exam should cover material from the Fall comprehensive courses (Basic POVS), Fall and Spring, in PO.
  
- (2) 17% of the questions (1/6), on material from Experimental Design, and Statistics.
  
- (3) 33% (2/6) of the questions on material from the Advanced Modules

It is expected that at least 2 half days of 3-4 hours each will be allocated for students to complete the written examination. After the examination, each question will be graded (pass, not pass). Each question will be graded by two faculty members with knowledge in the field(s) associated with the particular question. A failed question is one in which both graders give a non-passing grade. A contingently passing grade is assigned when basic knowledge is demonstrated in some but not all areas covered by the question, but the deficiencies are not so severe as to lead to a failure. Contingent passes may be corrected by meeting with the graders and correcting the answer appropriately as determined in the meeting. Students are required to pass all portions (questions undertaken on the first attempt) of the examination on either the first or second attempt. If a second attempt is necessary, it should generally be taken within the subsequent Fall term, and will include only the areas not passed on the first attempt, except, when the initial failure is of more than 50% of the questions. This will result in a full reexamination. Two failures of one or more questions is cause for dismissal from the PhD degree program.

Students are encouraged to seek the help of faculty members who teach and do research in areas covered by the exam. After the written examination has been graded, the Associate Dean for Graduate Studies, or Qualifying Committee chair will provide each student with a written assessment of his or her performance with regard to his/her areas of strength and weakness, and any parts of the examination that must be re-taken.

### **The Oral Qualifying Examination**

Students in the PhD program should plan to take the oral qualifying exam between the 5th and 8th semester in the graduate program. The chair of the oral qualifying committee is generally the mentor/advisor of the student. The student, the chair and the Associate Dean will confer to appoint the remainder of the committee, which will consist of at least 3 members (including the chair) who are experts in specific areas of physiological optics and vision science, or related fields, in which the student intends to obtain in-depth knowledge. Three areas of knowledge to be assessed in the exam, which are related to the committee's expertise, will be listed on the appointment form. The form may be obtained from the graduate office. One or more of the committee members may be appointed from outside the College, particularly if the student is seeking knowledge in a (minor) area for which expertise is not available within the College. However, at least the chair and one other member of the committee (excluding the Associate Dean, who may choose to be an ad

hoc member of any qualifying committee) must be a College of Optometry graduate faculty member. Commonly the student has taken special problems tutorials and/or a research practicum with committee members who are not the main mentor. When the committee is appointed, a timeline for completion of the exam should be determined.

Prior to the exam, the student will study to acquire the knowledge in the areas listed on the committee appointment form. The student also will prepare a short grant proposal, NIH style, on the topic of the student's ongoing research. The grant proposal will (at the minimum) follow the modified 7-page format, including 1 page of specific aims, for Student Vision Research Support Grant (sVRSG) available from the graduate office. If an mentor and student wish to use a longer format such as the RO1 format (12 page research plan + 1 page specific aims), they may do so, with the consent of the appointed oral qualifying committee. This decision will be recorded on the same form used to appoint the committee. The student will distribute this qualifying exam grant proposal to the faculty members **two weeks** prior to the set time of the examination.

**Evaluation of the oral qualifying exam focuses on 2 areas:**

1. Quality of the short grant proposal with respect to the research proposed and the presentation
2. Oral defense of the proposal – the student demonstrates understanding and ownership of the proposed research, and demonstrates knowledge in the three areas related to the committee's expertise, that were defined for the exam.

Every effort shall be made to hold the oral portion of the qualifying examination in the time frame agreed upon when the committee is appointed. Of course, the examination may be postponed as demanded by extenuating circumstances, but postponements are expected to be the exception rather than the rule. The rationale for setting a deadline at the outset of preparation and holding to it is to avoid extending the qualifying process over a protracted period of time.

The entire committee should be present at the oral examination, or a member may be present by Zoom/Skype if necessary. The format of the examination is left to each committee to decide, but generally, the student presents the proposal and his or her progress on research (a planned ~30+ minute presentation) and the committee members ask questions during and following the presentation. The exam may last two, or sometimes more, hours. The acquisition of in-depth knowledge and the integration of this knowledge with a focus on the student's research will be assessed during the oral qualifying examination. It should also be kept in mind that the purpose of the exam is to determine whether the student, if advanced to candidacy, is likely to generate and complete experiments that will lead to significant advancement of knowledge. Performance on the prior written examination may be taken into account.

Upon completion of the oral examination, the qualifying committee will decide and inform the student whether he/she has passed (or passed with distinction), not passed (requiring a single re-examination), or failed. Failure requires dismissal from the PhD program, as does a "not passed" outcome on the second attempt of the oral examination. An "in progress" decision is not permitted.

Because of the small size of the oral qualifying committee, the decision that it reaches must be unanimous. The Associate Dean of Graduate Studies, at his/her discretion, may or may not vote; it is expected that the Associate Dean will register a moderating vote if the examination committee is disposed to act with undue leniency or harshness.

Reasonable effort to reach a unanimous decision is expected but, if a unanimous decision cannot be reached, the student will be advised and each committee member and the Associate Dean will prepare a written statement within 3 days indicating his/her vote and explaining the reasons. In case of a split vote, a decision will be made by a standing adjudication committee of at least 8 faculty members (drawn from the Qualifying Committee and the Graduate Review Committee), from which any faculty who participated in the examination in question shall be disqualified. The adjudication committee will receive and consider the written reports of the members of the qualifying committee and the Associate Dean. The committee may solicit other evidence or testimony regarding the qualifying examination itself (but not other aspects of the student's graduate career) as it deems necessary. A graduate student representative will be present to observe, but will not vote (primarily to protect the representative from unavoidable criticism). The outcome of the adjudication process need not be restricted to pass, not pass, or fail; each case must be heard on its merits and the action recommended must be as fair as possible to all concerned. As a last resort, a new committee may be appointed (from which original committee members and the Associate Dean may be excluded) and the examination repeated. Because of possible student anxiety, it is imperative that the adjudication process be carried out as quickly as reasonable conduct permits and within a period not to exceed 14 days.

Successful completion of the oral examination completes the qualifying process and the student is then advanced to candidacy for the PhD. At that time it is appropriate to begin the process for the dissertation committee to be appointed and for the student to plan his/her dissertation research. Research experience, and work that will contribute to the dissertation that occurs prior to completion of the qualifying process is strongly encouraged; however, this research should be aimed at learning particular research techniques, identifying an area of special interest, or evaluating the feasibility of an area of research. Failure to undertake the two parts of the qualifying in accordance with the times described above will cause the Graduate Student Review Committee to meet to determine whether the student is making satisfactory progress in the graduate program. It is the responsibility of the Associate Dean to encourage students to meet program requirements on schedule, monitor adherence, and call meetings of the Graduate Student Review Committee when necessary.

A schedule for meetings with the dissertation committee is outlined in the section entitled, "Steps in completing a doctoral dissertation." In a sense, the last meeting, the dissertation defense is an extension and the culmination of the qualifying examination process. This view of the defense implies it is substantially more than a vehicle for the student to inform faculty and peers about the dissertation project. At the defense, the student should present his/her dissertation research and receive questions from the audience in a public setting. Then in a closed meeting, the candidate will be examined and challenged by the appointed research committee on in-depth understanding of the completed research and on how this work fits into the broad fabric of vision science.

## **Technical Skill/Foreign Language Requirement**

All PhD candidates must demonstrate competence in one of the following Technical Skill/Foreign Language areas, or a new area that is timely and approved by the Mentor and Associate Dean:

- (1) Computer programming
- (2) Electronics
- (3) Statistics
- (4) Biological Imaging
- (5) Foreign Language
- (6) Other (with the permission of the Mentor, the Associate Dean for Graduate Studies and appropriate persons with expertise to evaluate competency in the particular skill)

The specific requirements will be determined for a skill/language by the Associate Dean for Graduate Studies and faculty or staff member(s) with expertise in the area. The expert(s) will outline requirements and will stipulate if the student has fulfilled the requirements. For example for the computer programming skill, the instructors for programming courses, and the Core Grant Principal for the Research Computing Module will evaluate a MATLAB (or Python) program that the student has written for his or her research.

## **Other PhD Requirements**

**Teaching:** The activities of an individual with a PhD usually require the organization and presentation of research, teaching, and/or clinical materials before different groups. Therefore, candidates for the PhD are encouraged to experience laboratory and classroom teaching.

**Research:** Research constitutes an integral component of the graduate program. Graduate students are expected to be engaged in research under the supervision of the graduate faculty during all phases of the program. All PhD candidates must engage in independent research that is approved by the student's dissertation committee and write a dissertation for the award of the degree.



## **Thesis (MS) & Dissertation (PhD):**

With the conviction that research skills are vital to all fields of professional function in contemporary vision science, the Graduate Program in Physiological Optics and Vision Science requires the demonstration of such skills as an important aspect of each of its degree programs. The student must execute an independent research study under faculty supervision. The completed independent research studies fall into two categories: Master's Thesis and PhD Dissertation.

### **MS Thesis or PhD Dissertation Preparation – General Comments**

#### **Responsibilities for Thesis/Dissertation:**

**The Committee** gives guidance and constructive criticism on research procedures as well as in the preparation of the thesis/dissertation. The Committee is expected to:

- a. assist the student in formulating the research proposal
- b. approve the student's written proposal
- c. help the student overcome problems encountered in conducting the research
- d. provide guidance to the student in writing the dissertation
- e. conduct the student's defense of dissertation, and
- f. approve the dissertation.

**Committee members** should lead the student through the research process, by frequent interactions with all committee members and the student in such a way that the student is not given solutions but develops the tools needed to carry out the process. The student should not be alone during the process, but develop the skills *with* his or her committee to be prepared to do independent research in the future.

**The Chair** (mentor) should lead the student through the process of identifying a problem worthy of research - and developing logic on approaching that problem, and help the student to limit the scope of the project.

**The Student** is responsible for keeping all committee members informed of experiment results. This could be handled by individual meetings as well as by regular committee meetings.

## **Initial Steps in Completing a Master's Thesis**

**Step 1:** *The student selects a general research area of interest.* This usually takes place during the first two semesters of the first year. The student should decide in which areas he or she is interested; this is a good time for talking to other graduate students and faculty members.

**Step 2:** *The student discusses research interests with Associate Dean for Graduate Studies.* This should start about the time the student registers for the second semester. At this time the student is encouraged to register for at least one research practicum or special problems course with a faculty member in the area of the student's general interest, perhaps including a lab rotation in that faculty member's lab. This is a step toward identifying a potential research mentor(s).

**Step 3:** *The student meets with potential s to discuss research questions in the area of interest.* This should be during the third semester (summer) if not sooner.

**Step 4: A. Mentor:** *The student contacts the Associate Dean to report the choice of research mentorr, and the mentor confirms willingness to serve.* The mentor must be a member of the graduate faculty with special interests closely related to the proposed thesis topic. This should be the result of meetings by the student with the potential mentors.

**B. Committee:** The mentor and student should *propose additional committee members* (sometimes with one faculty member from a department outside the College of Optometry). The proposed committee is recorded on the proposal form (provided by the graduate office) and submitted to the Graduate Office. The Associate Dean officially appoints the Thesis Committee. The appointment form should be submitted by the fourth semester (spring of the 2<sup>nd</sup> year). Committee members are selected for their special expertise. If a change of committee members is necessary due to changes in the project, or other reasons, the process is simple, at least until the formal proposal is submitted. To modify committee membership before the formal proposal is signed, the chair must notify the Associate Dean, who will reformulate the committee.

**Step 5:** *A one page statement of research direction is submitted to the committee and the Associate Dean. At the time of committee appointment at the earliest, and before the end of the 4<sup>th</sup> semester at the latest, the student and the committee meet to identify:*

- a. The general problem
- b. The specific experimental question(s)
- c. The significance of answering the question
- d. The general methodology

These items form the statement of research direction. For some students the statement be based on data from their project; for others, if the statement is very early, there will be more concentration on literature review. The Committee closely monitors the student's progress on all preliminary research activities to assure that the project neither languishes nor progresses beyond the pilot (preliminary) stage before the formal research proposal is prepared. The

Committee monitors the student's progress and meets with the student on a regular basis. During these meetings, the student briefs the Committee on the progress of the research.

**Step 6:** *The formal research proposal (7 to 10 pages) is submitted to the Research Committee and when approved, to the Associate Dean.* The student consults with his/her Committee in preparing a formal proposal that includes information such as:

- a. an explicit statement of the general problem and the specific research question and specific aims
- b. the specific experimental question or questions (aims) to be addressed
- c. significance and innovation of the research
- d. brief review of relevant literature (and bibliography) to support the rationale for the research
- e. experimental approach including
  - i. specification of the experimental subjects
  - ii. specification of methods and procedures
  - iii. modes of analysis
- f. anticipated results
- g. possible interpretations
- h. time line for completion

The committee meets with the student to consider and approve the formal proposal. A copy signed by all Committee members of the approved proposal is submitted to the Associate Dean to be placed in the student's file. This proposal should be submitted to the Associate Dean by the end of the 5th semester.

Students will be required to have progress meetings with their respective thesis committee at least once every six months. The student is responsible for arranging the meetings and for delivering to the Graduate Program Office a completed sign-off sheet, on which the committee will indicate progress, before the end of each six-month period. Failure to provide the Associate Dean with the statement of research direction, thesis proposal, or the sign-off sheet according to the schedule specified above will cause the Graduate Student Review Committee to meet to determine whether the student is making satisfactory progress in the graduate program. It is the responsibility of the Associate Dean to encourage students to meet program requirements on schedule, monitor adherence, and call meetings of the Graduate Student Review Committee when necessary.

The **final** steps for the Master's Thesis can be found in a later sections along with steps for the Doctoral Dissertation, These appear after the initial steps for the Doctoral Dissertation.

## **Initial Steps in Completing a Doctoral Dissertation**

(Steps 1-5 below are specific to doctoral student)

**Step 1:** Student will complete the oral qualifying examination during 5<sup>th</sup> to 8<sup>th</sup> semester as described in the section above on qualifying examinations.

**Step 2:** The Dissertation committee must be appointed by the end of the semester following that in which the Oral Qualifying exam was successfully completed. The Dissertation committee should consist of 4-5 members, three of whom (the chair and two others, must be graduate faculty of the College of Optometry and were likely already members of the Oral Qualifying Committee), and one of whom must be from outside the College.

### **Step 3: Dissertation Committee Formation, Meetings and Documentation**

At the time of identifying prospective members of the dissertation committee, the student will provide the potential committee members with a 1-2 page document "Statement of Research Direction". This statement will include:

- a. The general problem/ area of the student's research
- b. The specific experimental question(s) identified at this stage
- c. The significance of answering the question(s)
- d. The general methodology
- e. The time line for proposed experiments for the following 6-12 months.

The student and mentor will fill out a Dissertation Committee Appointment form that can be requested via email from the graduate office. They will then return the form, electronically, to the graduate office for approval and distribution.

If the student has not met with a research (or qualifying) committee for a year, a meeting should be scheduled to discuss the project described in the Statement of Research Direction.

**Step 4:** Within one year (ideally sooner rather than later) of the first dissertation committee meeting the student must provide the committee with a formal Dissertation Research Proposal. This documents the major body of work the student intends to complete the Dissertation. The proposal should cover the following areas, and at the choice of the mentor and student, it can be in formal NIH R01 proposal format or in a less formal format that covers the necessary components:

- a. an explicit statement of the general problem
- b. the specific experimental question or questions (aims) to be addressed
- c. significance and innovation of the research
- d. brief review of relevant literature (and bibliography) to provide rationale for the research
- e. experimental approach including
  - i. specification of the experimental subjects
  - ii. specification of methods and procedures
  - iii. modes of analysis
- f. anticipated (and real) results (summary) and possible interpretations
- g. the timeline to completion.

This proposal will be discussed with the student at a required meeting proposal defense meeting of the dissertation committee. Revisions can be made to this document after the meeting. The student must secure approval (signature

or email) from each committee member and then the Proposal is submitted to the Grad program Office to be filed in the student's folder. Filing of the final version of the Proposal must occur within 2 weeks of the committee meeting. This document then serves as a formal record of what the expectations are for the dissertation research.

**Step 5:** Regular dissertation committee meetings must be held at least once a year so that the committee can monitor and have input in to the student's progress. Meetings can be at shorter intervals at the mentor's/student's discretion. After each meeting the mentor will complete a "Progress Form" and write a brief summary of the student's progress since the last meeting and the short term research goals (discussed at the meeting) for the next meeting. The student must secure approval of this "Progress Form" (signature or email) from each committee member and then the form is submitted with the Grad program Office. Submission of the final version of the form must occur within two weeks of the committee meeting. This document then serves as a formal record of what the expectations are until the next meeting.

**Step 6:** The five steps above are the general sequence of events but as always, exceptions can be made (with the permission of the Associate Dean for Graduate Studies) for extenuating circumstances (e.g. OD/PhD), and a special step formulated.

### **Final Steps for Completing a Thesis or Dissertation**

**Step 7:** *Execution and writing of the thesis/dissertation.* The actual execution of the research is carried out by the student independently, although presumably with frequent consultation with the mentor and the Thesis or Dissertation Committee. Procedural modifications within the general framework of the proposal may occur with Committee approval (meetings not required, but as needed), although the student is expected not to depart drastically from his or her proposal.

The format of the thesis or dissertation follows acceptable standards of scientific and scholarly writing in the discipline. As an added guide, reference may be made to Strunk and White, "The elements of Style 4<sup>th</sup> Edition" or Zinsser, "On writing Well" 30<sup>th</sup> Anniversary Edition. It is the primary responsibility of the candidate and, secondarily, the Thesis/Dissertation advisor and committee that the document has the correct format and is grammatically correct.

**Step 8:** *Thesis/Dissertation defense.* The final oral defense of the MS thesis or the PhD dissertation is normally scheduled by the student and the Chair of the Thesis or Dissertation Committee, in consultation with the graduate office, at a time agreeable with all members of the Committee. The candidate **MUST** distribute complete, properly formatted, and corrected per mentor's review, copies of the thesis or dissertation to all committee members **at least two weeks in advance of the date of the defense.** Students should provide an abstract for the thesis/dissertation defense announcement form to the graduate office, along with the time and place of the defense. The graduate office will distribute the announcement about the oral defense. The defense is open to the entire academic community and notification will also be made to the appropriate Colleges and Departments within the University.

## **Thesis/Dissertation Document Preparation and Submission Information**

The University requires that every student submit a final electronic thesis or dissertation in PDF format through the Vireo system (see details below). Before submitting the thesis/dissertation for binding and to Vireo, the student must include the following items in this order, as required by the University of Houston, and **verify with the Associate Dean for Graduate Studies** that the submission is acceptable PRIOR to uploading it to Vireo. These instructions are active as of Sept. 2019, and are largely taken verbatim from the instructions posted by the College of Natural Sciences and Mathematics:

### **"A. ORDER OF PAGES**

The manuscript must include the following required items in the order listed; no other order is acceptable. Only items in italics are optional.

Front matter: items 1 to 8; should be numbered with lower case roman numerals ("ii", "iii", "iv", etc...), except for title page and the optional copyright page. If you are not using one or more than one optional page, the number of the page immediately following the title page should be "ii".

**USE THE OFFICIAL TEMPLATE FOR THE FRONT MATTER PROVIDED BY THE GRADUATE SCHOOL**, provided by the graduate office.

Note that the manuscript no longer contains a signature page. The committee signatures will be collected when the committee members approve the final document. The signatures will be on a separate university approved form provided by the graduate office.

1. **Title Page** - No page number should be printed, but page "i" is assigned. below.
2. *Copyright Page – Optional. No page number should be printed, but page "ii" is assigned.*
3. *Dedication or Epigraph Page – Optional.*
4. *Acknowledgements –Optional. Double-spaced.*
5. **Abstract** – There should be only one abstract that summarizes the whole thesis/dissertation. The abstract must be double spaced and no longer than 350 words. There should not be additional abstracts at the beginning of individual chapters.
6. **Table of Contents** – May be single spaced. All entries should match exactly the corresponding headings and subheadings in the manuscript. The page number listed for each entry must be correct.
7. **List of Tables** – Table titles and page numbers must be included and correct. All tables must be incorporated in the text, and not put at the end of the manuscript.
8. **List of Figures** – Figure titles and page numbers must be included and correct. Do not include figure legends in the list of figures. All figures must be incorporated in the text, and not put at the end of the manuscript.
9. **Text of Manuscript** – Must be double spaced. The first page of the text should show the lower-case Arabic numeral 1. The manuscript's format must be consistent throughout the complete work.
10. *Appendices – Optional - Supplemental information (e.g., extensive data tables, detailed methods, ancillary proofs) may be placed either before or after the references.*

11. **Bibliography** – The title of this section can be “Bibliography”, or “References”. The bibliography may be single-spaced or double-spaced; if single-spaced, there must be an additional space between references. Be consistent in your bibliographic format. (Standard format of a journal – choose one, e.g. Invest Ophthal Vis Sci if reference superscripts are used). Only a single bibliography is allowed at the end of the thesis/dissertation. There should not be a list of references at the end of each section/chapter.

## **B. NUMBERING THE PAGES**

- Each page in the manuscript, beginning with the title page, is assigned a number;
- Do not write the word “page” in front of the number;
- Although assigned, the page number is NOT printed on the title page and the optional copyright page;
- All page numbers are centered at the bottom of the page, with the bottom (base) of the page number right at the one-inch margin;

## **C. FORMATTING**

### **Margins**

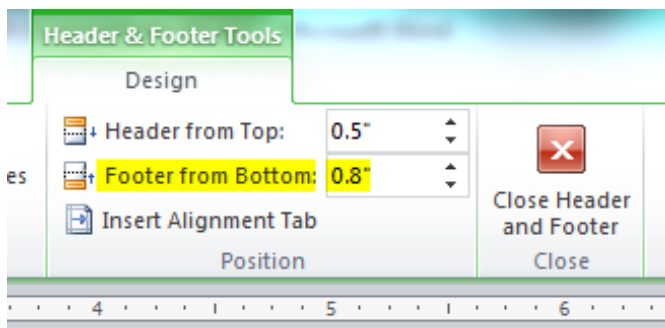
- The following margins are required:

**Left:** 1 inch

**Right:** 1 inch

**Top:** 1 inch

**Bottom:** 1 inch from the base of the page number. In WORD, set your margin at 1 inch, and your “Footer from Bottom” at 0.8 inch (see below). There might be slight variations on different printers. Print a page on your printer and double check that the bottom of the page number is at least 1 inch from the bottom edge of the sheet of paper.



- All text, captions, and figures (including charts, graphs, maps, tables, and photographs) must be inside these margins. There are no exceptions.

### **Spacing**

- The abstract, acknowledgments, and main body of the manuscript must be double-spaced.
- The captions must be single spaced.
- The table of contents, list of tables, and list of figures may be single-spaced or double-spaced.

- The text of the references may be single-spaced (with an additional space between references) or double-spaced.
- Be consistent in the spacing you choose between sections and sub-sections.

### Fonts

- Make sure that the font size is legible. We recommend that you use the following typefaces used by NIH for formatting grant proposals, which are
  - o Arial 11 points or larger;
  - o Times New Roman at a font size of 12 points or larger; or
- Do not change font between sections of the manuscript

### Headings

- You are free to choose how to format your headings and sub-headings, but remain consistent throughout the manuscript in terms of font type and size, capital letters versus lower case, underlined or not, etc.
- Make certain that your table of contents agrees with the manuscript regarding page numbers and exact titles of headings;
- Avoid sections that begin on the last line of a page or sections that end on the first line of a page.

## D. FIGURES AND TABLES

- All text, captions, and figures (including charts, graphs, maps, tables, and photographs) must be inside these margins. There are no exceptions.
- All figures and tables should be placed within the body of the manuscript and not at the end.
- Figures and tables in color must be submitted as such, and not printed in black and white.
- Graphs should have axes and axis labels, including units.
- **All lettering within the figure, graph or chart must be legible:** letters should be at least 1 mm tall in the printed form. Be aware that figures obtained from other sources or screen shots may have been reduced such that the lettering is no longer legible. In this case, the lettering should be eliminated or the figure relabeled.
- Scale bars should be provided, as appropriate.
- **Each figure and table must have a number and a title.**
  - o The style of numbering figures and tables should be consistent throughout the manuscript. For figures, the full ("Figure") or abbreviated ("Fig.") word may be used, but consistently. For tables, the full word "Table" should be used;
  - o The numbering of figures can be consecutive from beginning to end of the manuscript (Figure 1, Figure 2, etc.) or by chapter (for first chapter: Figure 1.1, Figure 1.2, etc.; for second chapter: Figure 2.1, Figure 2.2., etc.). A similar numbering format should be used for tables. Figures in appendices should also have captions and numbers (e.g., figure A.1, A.2, or A1.1, A2.1);
  - o The number and title of a figure must be positioned below the figure;
  - o The number and title of a table should be positioned a table above the table.
- **Each figure must have a caption (legend),** which is complete enough to be self-contained (i.e., the reader should not have to go into the main text to understand the figure).
  - o Captions should be single-spaced;



- Captions should be positioned below the figure, next to the figure number and title;
  - Captions should be on the same page as the figure, unless there is not enough room on the page for the whole caption to fit; in this case, the figure number, title, and caption should be positioned on the page before the figure.
  - If the figure or caption is in landscape mode (rather than portrait), the bottom should be on the right (outside) edge of the page; however the margins remain the same and the page number remains at the bottom, as with all other pages.
- Captions or comments for tables are optional; if a table has a caption, it may be positioned above the table (next to table number and title) or below the table.

**Reusing figures or any type of illustrations from the literature:**

- You may reuse a figure or illustration from your own published articles, as long as you have: 1) permission to do so from the publisher (this may be automatic: see Publisher Policies on Pre-Published Content) and 2) you cite the reference in the figure legend;
- You may **NOT** reuse a figure or illustration from someone else's article unless: 1) it has been **substantively** altered or adapted in some way or 2) you have received permission for its reuse. In either case, the citation must be made clear. You should treat these issues with as much care as you would when submitting an article for consideration with a journal, since you are directly liable for any infringement of copyright. It is recommended that you contact the [Copyright Team](#) in the Libraries for assistance if you have any questions regarding copyrighted material.
- Beware of the meaning of "open access": only articles that have Creative Commons licenses attached to them allow the reproduction of figures. You should always follow the allowances of the license attached to that article. Generally, you can reuse anything in an article with a Creative Commons license for educational/non-commercial purposes without permission, so long as you cite the original author(s). It can occasionally happen, however, that a specific figure or illustration contained within an open access article has a separate license attached to it that is more restrictive.
- Articles found free online but that do not have a Creative Commons license are under full copyright protection and may not be reused or reproduced in any form without written permission from the author(s).
- Bottom line: a free online article or an "open access" article may or may not allow reuse of its contents. Make sure to check the copyright license for the specific figure you want to reuse.

**Electronic Copy:** An electronic version (PDF) of the Thesis/Dissertation must be submitted to the University archive (Vireo) in order for the student to meet the University graduation deadline. **Prior to submission to Vireo**, the student must submit the final PDF copy to the Associate Dean for Graduate Studies who will check the Dissertation for proper formatting and content. The Associate Dean will inform the student when the Dissertation/Thesis can be submitted to Vireo. Students should then request instructions for submission of the PDF to Vireo from the graduate office. Approval of graduation, which means that the degree is official, will not occur until the PDF has been submitted to Vireo, and approved within by the advisor and the graduate office.

**The final date for submission of the final electronic copy to Vireo in a given term is the official last day that final course grades can be submitted in May, August, or December.**

**Hard Copy – sent out for binding (not required), but student may want to purchase copies.**

**Paper:** For a durable high quality copy, use at least 20-pound, 8.5 X 11 white bond with at least 25% rag content for the original and one copy. (the Graduate Office has paper available for purchase by students for this copy; Neena Bond 02717).

Satisfactory copies for committee members may be prepared on at least 13-pound paper. In general, xerox quality duplication is an acceptable means of duplication for the additional copies.

**Preparation for Binding:** Bind each copy separately using rubber bands, both horizontally and vertically, to secure pages. Stack the copies together and put an additional copy of the title page on top of the stack. On this page, circle in red ink the title of the thesis/dissertation, author's name, and date of graduation (This information is printed on the covers of the bound copies). On the lower right-hand corner of the page, print the number of copies in the stack.

**Fees:** Copyright fees and binding of copies for the student and/or committee must be paid for by the student. Fees are to be paid to the Graduate Program Office and are listed as follows:

Binding:	\$45.00 - \$55.00 per copy
Copyright:	\$65.00 (not usually done)

**Forms:** There are a number of forms to be completed prior to graduation. Students should work with the Graduate Program Office to ensure all of the necessary paperwork is completed in a timely fashion.

## **Graduation Information**

**Applications:** Applications for graduation should be filed during the semester in which the student intends to graduate. Student may apply for graduation through MyUH. Check with the Graduate Program Office for the current dates for submitting the application. A fee of \$25.00 will be billed to the student's university account. There is a deadline less than half way through each term for the application. Late applications will be billed \$50.00.

**Commencement:** Commencement usually takes place in mid-May for those who completed their requirements for graduation the previous August or December or that May. Robes, hoods, etc. may be rented or purchased from Bookstore. Student should notify the Graduate Program Office (as soon as possible if they will participate in the commencement exercises. The graduation rehearsal is usually the day before the actual commencement.

## **OD/MS program**

A dual OD/MS program is available for enrolled optometry students wishing to pursue and complete a Master's (MS) degree in Physiological Optics/Vision Science concurrently with the doctor of optometry (OD) degree.

### **Admission Requirements**

OD students may apply for the OD/MS program in the Fall of the 2nd academic year for admission in the Spring of their second year. The applicant must have a history of research with a faculty mentor. The prior research generally was done during the Summer between the first and second year of the OD program, in a federally- or college-funded summer research training program for OD students.

### **Degree Requirements**

The dual OD/MS program requires:

- The entire Optometry, OD program curriculum.
- The MS curriculum for OD/MS students, which includes a total of 30.0 Credit Hours of coursework and research hours.
  - 6 credit hours in basic research skills courses are required (PHOP 6371 and 6372).
  - 12 credit hours of OPTO 6000-level science courses may be shared for the MS portion of the dual degree.
- A written thesis based on original research (see sections describing the MS thesis above). The research generally is an extension of the research carried out in the summer research program. The student must write and defend a thesis proposal and the thesis.
- In the final term, the student must enroll once in PHOP 7399 - Thesis Writing Credit Hours: 3.0
- The student's thesis committee must consist of a minimum of 3 members, at least two of which are graduate faculty members. One may be external to the program, for example, from the clinical program or other departments, other universities or industry, subject to approval by the Associate Dean of the graduate program.
- The student will do research for about 1/3 of the summer between 2<sup>nd</sup> and 3<sup>rd</sup> year, and will complete a one page statement of research (see MS program) and appoint a research committee by the end of the summer. Optimally the student will complete a MS thesis proposal by the end of the Fall term of 3<sup>rd</sup> year.
- Graduate program coursework and research hours with the prefix PHOP will be supported by UHCO
- Research hours (practicum) and independent study (tutorial called "Special Problems") are offered on an as needed "as needed" basis to meet the individual needs of students.

### **Basic Research Skills Courses**

	Credit hours
PHOP 6371 - Experimental Design in Visual Sciences	<b>3.0</b>

PHOP 6372 - Experimental Quantification in Visual Sciences	<b>3.0</b>
PHOP 6275 - Professional Development for Vision Scientists	<b>2.0</b> optional
PHOP 6160 - General Seminar Visual Sciences	<b>1.0</b> <i>completed at least once</i>
PHOP 7399 - Thesis writing	<b>3.0</b>

**Elective Courses**

As needed to strengthen student's education and/or skill in a particular research area.

Example:

PHOP 7276 - MATLAB Programming for Vision Science Credit Hours: **2.0**

**OD/PhD program**

A dual OD/MS program is available for enrolled optometry students wishing to pursue a doctoral (PhD) degree in Physiological Optics and Vision Science. The program would begin concurrently with the doctor of optometry (OD) degree, and be completed after the OD is conferred. Students may enter the program as OD/MS students and then apply to transfer credits and the research project to the PhD program at some point. The decision to transfer would occur in consultation with the MS mentor and the Associate Dean for Graduate Studies. The PhD student would be required to take all required PHOP courses for the PHD, some after OD graduation due to the rigors of the OD program. An individual schedule is possible, and sample schedules are available in the graduate office.

## **Grievance Procedures for Graduate Students**

### **Step 1: Attempt at resolution of the grievance through informal efforts**

Every effort shall be made by the graduate student and the faculty member(s) involved to settle their differences amiably and informally to redress the grievance. If appropriate or necessary, the Associate Dean for Graduate Studies shall participate in this informal effort to resolve this grievance. If appropriate, the aid of a disinterested mediator should be sought to aid resolution. A grievance involving the associate dean will begin with a similar process mediated by the vision sciences department chair or his/her designee.

### **Step 2: Submission of formal “complaint” within 10 days**

In the event that an informal resolution is not possible, the graduate student may petition the associate dean by filing a document, the “Complaint”, within 10 days of the mutual decision that the grievance cannot be settled informally. The formal written “Complaint” must state (a) when he/she discovered the issue being grieved, (b) what issue is being grieved and the evidence to support the grievance, (c) the desired resolution, (d) the postal (not e-mail) address to which written communication may be sent. It is the responsibility of the grievant to notify the office handling the grievance of any change of address during the course of the grievance. After receipt of the “Complaint”, the associate dean must respond in writing to the grievant within 10 working days.

### **Step 3: Formal written “Petition”**

In the event that a resolution is not possible at the graduate program level (Steps 1 and 2 above), the grievant may petition the Dean of the College of Optometry, against which the grievance is held, or the dean’s designee. This is done by submitting a formal written “Petition,” appended to the written “Complaint”, and the associate dean’s written response, within 10 working days after the decision of the associate dean. The grievant may include in his/her notice of appeal copies of any documentation that he or she considers useful at this point, but shall retain possession of the originals. The Dean of the college must respond in writing within 20 days, and the response must include an explanation for his/her decision.

### **Step 4: Appeal seeking university level review by the Graduate and Professional Studies Grievance Committee (GPSGC), which is under the purview of the Dean of Graduate and Professional Studies**

Please read the Grievance Policy and Procedures for Graduate, Professional, and Post-baccalaureate Students that can be found in the graduate catalogue: [http://www.uh.edu/grad\\_catalog/](http://www.uh.edu/grad_catalog/) and specifically: <http://publications.uh.edu/content.php?catoid=33&navoid=11964> . Please note that the graduate program has a different process than the professional Optometry program.

