



New England College of Optometry

Master of Science in Vision Science

Program Policy Handbook

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Master of Science in Vision Science Program Policy Handbook

Introduction

This handbook describes the policies and procedures of the Master of Science degree programs at New England College of Optometry. It is to be used as a guide for applicants, students, and graduate faculty advisors.

Program Goals and Philosophy

The Master of Science in Vision Science is a research-based degree program available to select students at New England College of Optometry. The establishment of an educational research program resulting in the award of a Master of Science in Vision Science is consistent with the College's mission.

The Master of Science in Vision Science at New England College of Optometry is designed to develop analytical thinking and problem solving skills through the planning and execution of publication-quality laboratory research projects. Research will be in an area of vision science that is determined by the ongoing research programs of the graduate faculty at the College.

The College supports active research programs in the vision, biomedical, and clinical sciences. Areas of investigation currently include biochemistry, cell biology, and other biological sciences, visual neuroscience, development of the eye and visual system, visual optics, visual psychophysics of normal and abnormal vision, high resolution retinal imaging, oculomotor control, clinical optometry, and mechanisms of ocular diseases and disorders.

A graduate research program benefits students, the College, and the profession. Optometry students who obtain an additional research-based degree will possess skills that enable them to contribute new information to the profession, improve their ability to assess the scientific basis of developments in optometry and vision science, and be more competitive for residencies and academic or industry positions. The College will, in turn, benefit by fulfilling aspects of its mission and vision statements, and by maintaining and enhancing the College's reputation both nationally and internationally as a leader in optometric education and research.

Definitions

Throughout this document the following definitions are used:

- “Advisor” refers to a member of the graduate faculty who is the principal advisor to an M.S. student and is responsible for seeing the student through completion of the degree.
- “College” refers to New England College of Optometry
- “Dean” refers to the Vice President/Dean of Academic Affairs.
- “Director” refers to the Director of Graduate Studies.
- “Graduate Faculty” refers to those faculty certified by the Graduate Studies Committee and Dean to supervise graduate student research.
- “GSC” refers to the Graduate Studies Committee, which is comprised of members elected by the Graduate Faculty.
- “M.S. Program” refers to the Master of Science in Vision Science.
- “O.D./M.S. program” refers to the four-year dual degree program.
- “O.D. program” refers to the four-year professional O.D. degree program.
- “Stand-alone M.S. program” refers to the two-year Master of Science program.

Program Overview

The M.S. program at New England College of Optometry emphasizes hypothesis driven research and the development of analytical and problem solving skills in experimental optometry and vision science. Two programs are offered. The dual O.D./M.S. degree is available to qualified students currently enrolled in the O.D. program. The M.S. is also offered as a stand-alone graduate degree with tuition. Both graduate programs require the completion of graduate level courses, development and execution of an original research project, and completion of a thesis with a thesis examination. The dual O.D./M.S. degree can be earned within the time frame of the four-year O.D. degree program and the stand-alone M.S. degree can usually be completed in two years. Any change in the cost of the program to students, including any student fees, will only be made before enrollment and will not be applied to students already enrolled in the program.

Students in the M.S. program receive a broad background in vision science and strong training in research. Degree requirements include 12.75 credits of core optometry course work, 11 credits of graduate courses, and 12.5 credits toward the development and execution of a Master’s Thesis, and a thesis examination. For O.D./M.S. students, modifications to the course sequence in the O.D. program, including optional exemptions from Clinical Reasoning and elective courses, are made to accommodate graduate course requirements and laboratory research time so that students may typically complete the dual O.D./M.S. program in four years.

Opportunities for financial aid through work-study and research stipends may be available.

Administrative Structure and Governance

All aspects of the Master of Science in Vision Science Program operations are the responsibility of the Director of Graduate Studies (Director). The Director of Graduate Studies reports to the Vice President/Dean of Academic Affairs (Dean).

The Graduate Studies Committee

Faculty governance of the M.S. program is conducted through the Graduate Studies Committee (GSC). This GSC assists the Director with admissions decisions, student-advisor pairings, curriculum evaluation, monitoring student progress, approval of Thesis Committees, selection and regular review of graduate faculty, and all other details of program policy as described below.

Committee Membership

The GSC consists of a minimum of four graduate faculty members elected by the graduate faculty and one non-voting graduate student representative. Graduate faculty members serve three year terms. The graduate student representative is elected from the M.S. student body and serves a one year term for no more than two years. The Director is a voting member of the GSC, serves as the GSC chair, and reports the actions and decisions of the GSC to the Dean on a regular basis.

Committee Functions

The GSC is involved in the following aspects of the M.S. Program operations:

Admissions

- The GSC develops, with the assistance of the Office of Admissions, the application procedures and admissions policies to the M.S. Program.
- The GSC reviews applications to the M.S. Program and selects, interviews, and accepts or rejects applicants.

Student Progress

- The GSC defines and oversees the requirements for the M.S. Program.
- The GSC approves student-advisor pairings.
- The GSC monitors student progress in the M.S. Program and certifies the fulfillment of all degree requirements.
- The GSC considers and conducts appropriate actions regarding students who are not meeting degree requirements or expectations.
- The GSC reviews and approves membership of Thesis Committees.

Program Review

- The GSC advises the Director and the Dean on issues concerning the M.S. Program as needed.

- The GSC periodically reviews the M.S. Program and recommends changes in curriculum, procedures, and policy when necessary and appropriate.
- The GSC reviews and approves courses for graduate level credit and their inclusion in the M.S. Program.

Graduate Faculty

- The Dean appoints Graduate Faculty upon recommendation by the GSC.
- The GSC develops the selection criteria for graduate faculty.
- The GSC periodically reviews the graduate faculty and makes recommendations to the Dean concerning changes as necessary.
- The GSC is represented in searches for new faculty who are expected to have a position on the graduate faculty.

Admissions

New England College of Optometry M.S. program seeks to admit students possessing the qualities and motivation necessary for success in research. Admission is based on an assessment of both academic and non-academic qualifications. Candidates are evaluated on academic performance as well as recommendations, essays, and admissions interviews if granted.

Students admitted into the O.D./M.S. program are chosen from those accepted into the regular four-year Doctor of Optometry program. Students may apply for admission into the O.D./M.S. program during the first year in the O.D. program. Candidates for admission are identified at the beginning of the spring semester of the first year and final acceptance depends on student performance in laboratory during that semester and the following summer. Matriculation into the O.D./M.S. program is finalized in the beginning of the fall semester of the second academic year.

A stand-alone M.S. degree program is also available. Applications for the stand-alone M.S. program are accepted through April 1 for admission at the beginning of the following fall semester.

Admission Requirements

For admission into the O.D./M.S. dual degree program, the following are required, together with O.D. application requirements:

- BA or BS degree
- College transcripts indicating a minimum 3.0 GPA on pre-requisites for the O.D. program
- Optometric Admissions Test (OAT) or Graduate Record Exam (GRE general) scores
- Completion of the Laboratory Research Survey course in the fall term of the first O.D. program academic year.

- An additional admissions essay detailing interests in the M.S. program and expectations
- A minimum of one reference, in addition to those sent for the OD program, attesting to the applicant’s analytical or research skills and potential for success in a research program

For admission into the stand-alone M.S. degree program:

- BA or BS degree
- College degree transcripts indicating a minimum 3.0 GPA on pre-requisites for the O.D. program
- Any professional degree transcripts
- GRE (general) scores
- An admissions essay detailing interests in the M.S. program
- Three references attesting to the applicant’s analytical or research skills and potential for success in a research program

Pre-requisite College Courses

	Semester(s)	Quarters
Biology (with lab)	2	3
Chemistry (with lab)	2	3
Physics (with lab)	2	3
Organic Chemistry (with lab)	1	2
Biochemistry	1	2
Microbiology	1	2
Calculus	1	2
Statistics	1	2
Psychology	1	2
English	2	3

An applicant accepted for admission must complete all prerequisite academic requirements prior to the year of entry. The College reserves the right to withdraw any acceptance if an incoming student has not satisfactorily completed the prerequisite courses.

Application Process

Applicants may request information and an application package by contacting the Admissions Office directly (1-800-824-5526, admissions@neco.edu) or through the College website www.neco.edu/admissions. Applications should be submitted along with the appropriate application fee as early as possible prior to the anticipated start date.

Once a complete application has been reviewed the applicant will either be interviewed or advised of a decision not to admit. No application will be considered complete, and no admissions decision will be made without an interview (personal or telephone). Upon acceptance, a nonrefundable deposit will be required to secure a seat in the entering class. Only one deposit is required for dual O.D./M.S. degree students.

O.D./M.S. Program

Students already enrolled in the O.D. program will be able to apply for the O.D./M.S. program during the fall semester of the 1st year. All applicants must complete the Laboratory Research Survey course in the fall of the first academic year. By the beginning of the spring semester, suitable candidates are identified and paired with graduate faculty advisors. Final acceptance and matriculation into the O.D./M.S. program is made at the end of the summer before the second academic year following final assessment by the assigned graduate faculty advisor.

Regular Admittance –

First year O.D. students may apply to the O.D./M.S. program during the fall semester. Applications from these students must be received by December 15. Notification of the status of these applicants will be made at the beginning of the spring semester.

Summer Admittance –

In unique situations, and if space permits, O.D. students may apply to the O.D./M.S. program during the summer before the beginning of the second O.D. year. Such students will need the sponsorship of a member of the graduate faculty and will have demonstrated a productive summer of research in their sponsor's laboratory. Applications must be submitted directly to the Director not later than August 1 before the start of the second O.D. year.

Stand-Alone M.S. Program

Applications to the stand-alone M.S. program should be made as early as possible and must be made no later than April 1 for enrollment in the following fall semester (beginning in late August). Members of the Graduate Faculty will conduct interviews and laboratory visits will be arranged if possible. Acceptance into the stand-alone program will normally be accompanied by identification of the student's laboratory advisor.

Re-Applicants

The College retains all application files for one year. Should an unsuccessful candidate wish to re-apply, a re-application form may be submitted with the application fee. (No fee is necessary for matriculated OD students.) The re-applicant must submit a new application form and include official transcripts for college courses taken since the last application. All transcripts and recommendations submitted during the prior year can be used for re-application. Re-applicants to the O.D./M.S. program will only be considered if they have completed the Laboratory Research Survey course and have the sponsorship of a member of the Graduate Faculty.

Admission of Students with Advanced Standing

Following submission of a completed admissions application, and upon request by the applicant, the GSC will review applications from prospective students with advanced standing and make all decisions concerning transfer of credit. The GSC may certify transfer of credits from another program if they are deemed to be equivalent and satisfactory.

Exemption from a course may be granted only with the approval of the instructor for that course. If the instructor finds that the student has sufficient educational background and successfully passes a test administered by the instructor, the student may be exempted from the course. If an exemption is granted, the course instructor must notify the GSC, Registrar, and student in writing by the end of the third week after the course begins. The student is required to attend classes until receiving written notification of exemption.

Mechanism for Advisor-Student Pairing

Every graduate student must have a graduate faculty advisor. The advisor will help the student develop an original and independent research project that will form the student's thesis. It is also the responsibility of the advisor to assist the student in the completion of all program requirements by their due dates.

Applicants for the dual O.D./M.S. program or stand-alone M.S. program will submit a list of requested graduate faculty advisors as part of their application. Applicants are strongly encouraged to visit laboratories as early as possible, and talk with prospective advisors about their research and the nature of the projects the students could be involved in. The GSC will review requests and, following the recommendations of the prospective advisors, will make all pairings. Student requests will be given priority but the recommendations and availability of the prospective advisors will determine pairings. In cases where any of a student's requested advisors are unavailable, the GSC will work with the student to find a suitable alternative.

Students entering the regular O.D./M.S. program will be placed with advisors assigned during the beginning of the second semester of the first year. Students entering the stand-alone M.S. program will be paired early in the first semester or in the summer before the first year of the program. These pairings are considered tentative. A formal application to the GSC explaining a proposed change of advisor may be considered, but any change depends on the feasibility of completing a project as determined by the GSC and the approval of the new advisor.

Degree Requirements

The M.S. in Vision Science at New England College of Optometry emphasizes the development and execution of an original vision research project. A Master's thesis describing this project is required for completion of the program and will be reviewed by a Thesis Committee. In addition, a Thesis Committee will examine the content and background of the student's thesis project during a thesis examination. In both the stand-alone M.S. and the dual O.D./M.S. degree programs, the M.S. program will consist of 36.25 credit hours of study, comprised of 12.75 credits of core courses, 11 credits of graduate level courses and 12.5 credits of research development and thesis work. A minimum GPA of 3.00 and the successful completion of all thesis requirements are required for completion of the M.S. program. Students in the dual O.D./M.S. degree program will also be expected to maintain a minimum of a 2.75 GPA in the O.D. program.

M.S. Program Curriculum

<u>Courses</u>	<u>O.D./M.S.</u>	<u>M.S.</u>	<u>Credits</u>	<u>Grading</u>
Dual Degree Core Courses				
*Cell Biology, Histology and Ocular Anatomy (1 semester) (BSD90300)	Fall Yr1	Fall Yr1 or 2	3.75	graded
*Optics I (1 semester) (VS91001)	Fall Yr1	Fall Yr1 or 2	4.00	graded
*Visual Sensation & Perception (1 semester) (VS91222)	Fall Yr1	Spring Yr1	3.75	graded
^Laboratory Research Survey (1 semester) (GRS97001)	Fall Yr1	Fall Yr1	1.25	P/F
M.S. Degree Courses				
Biostatistics and Experimental Design I (1 semester) (GRS97003)	Fall Yr2	Fall Yr1	2.25	graded
Biostatistics and Experimental Design II (1 semester) (GRS97004)	Fall Yr3	Fall Yr2	0.75	graded
** Research Colloquia (4 semesters) (GRS97010-13)	Yrs2-3	Yrs1-2	2.00	P/F
# Graduate Research Seminar I (1 semester) (GRS97020)	Fall Yr2 or 3	Fall Yr1 or 2	1.50	graded
# Graduate Research Seminar II (1 semester) (GRS97021)	Spr Yr2 or 3	Spr Yr1 or 2	1.50	graded
# Graduate Research Seminar III (1 semester) (GRS97022)	Spr Yr2 or 3	Spr Yr1 or 2	1.50	graded
# Graduate Research Seminar IV (1 semester) (GRS97023)	Fall Yr2 or 3	Fall Yr1 or 2	1.50	graded
Independent Study (GRS97080)	as needed		(1.50)	P/F
M.S. Research Credits				
‡Thesis Proposal Development (1 semester) (GRS97030)	Fall Yr2	Fall Yr1	1.00	P/F
Thesis Proposal (1 semester) (GRS97031)	Spring Yr2	Spring Yr1	1.50	P/F
Laboratory Research (4 semesters) (GRS97040-43/50-51)	Yrs1-3	Yrs1-2	8.00	P/F
Thesis Preparation (2 semesters) (GRS97050-51/55)	Yr4	Yr2	<u>2.00</u>	P/F

Total = 36.25

Curriculum Notes:

*These courses, or their equivalents, provide much of the necessary background in the three major topic areas (biological science, optics, and visual psychophysics) in which M.S. students may conduct their research projects. The courses are also required for the O.D. program so students in the O.D./M.S. degree program will receive dual credit. Students in the stand-alone M.S. degree may be eligible to transfer credits for these courses if they can show equivalency in past degree programs. They may also petition for course exemptions if they can show proof of mastery of the subject. Procedures for obtaining course exemptions and credit transfers are detailed in the relevant sections of the Student Handbook and M.S. Program Policy Handbook.

^Laboratory Research Survey provides an overview of the basic areas of research conducted at the college and potentially available to students in the M.S. Program. In separate lectures graduate faculty will discuss the details of their research including the major hypotheses and findings, and representative research designs and procedures. O.D. students may take the course for additional credits. A short paper is required for credit.

**Research Colloquia are held throughout the academic year. The series features invited lectures on a wide variety of topics by an international group of researchers. Whenever possible, graduate student participation will include reading and discussion of topical papers in advance of the lecture and meeting with the speaker as coordinated with the Graduate Research Seminars. Additional lectures will be held each year on Research Ethics, Institutional Animal Care and Use Committee (IACUC) and Institutional Review Board (IRB) functions and procedures.

#A sequence of four Graduate Research Seminars are presented over a two-year period. All M.S. students are required to take all four seminars (see seminar descriptions below). For some individuals the GSC may allow the replacement of one seminar with an Independent Study to be administered by the advisor. Such a change must be proposed to the GSC by the advisor explaining the reasons for the request and a detailed description of the material and the way it will be covered in the course.

‡Thesis Proposal Development is an independent tutorial conducted by the student's advisor and involves a comprehensive literature survey of the chosen research area. Through regular meetings the student and advisor discuss this literature in detail and the student writes a paper, reviewed by the advisor, summarizing the literature. This paper should help in the development of the thesis proposal and thesis.

Graduate Research Seminars

These seminars present graduate level material in each of the 3 major core content areas (biological science, optics, and visual psychophysics) in which M.S. students may conduct their research projects. In addition, there is a seminar on selected topics, usually on the development of refractive state and myopia reflecting a large proportion of the research currently being conducted at the College. Students will be graded on participation in the seminars and the quality of required presentations and/or papers. The general seminar topics are as follows:

I. Biomedical Research in Vision

This seminar examines selected areas of recent biological research in vision. Current advances in methodology, specifics of research design, and impact of

research findings will be emphasized. Selected topics are based on participating faculty expertise and include ocular immunology, diabetic retinopathy, nutrition and the eye, ocular circadian rhythms, anterior segment physiology, regulation of IOP and glaucoma.

II. Optics in Vision

This seminar discusses current research in visual optics with concentrations on theory and method of non-invasive techniques for measuring the optical characteristics of the eye and the functional characteristics of the eye's optics. Topics include optical aberrations of the eye and their role in vision, optical characteristics of blur, optical limitations on neural processing, and optical imaging methods.

III. Special Topics – Eye Growth, Emmetropization, and the Development of Myopia

This seminar surveys and critiques the recent experimental and epidemiological research on the control of eye growth and the development of refractive state. Topics include the visual regulation of eye growth, emmetropization and refractive error development, animal models of myopia, the biochemistry and biomechanics of eye growth, and the genetics of eye growth and refractive error development. Occasionally other special topics in Vision Science may be selected.

IV. Visual Neurophysiology and Development of Vision

This seminar covers a wide range of material examining recent work on the neurophysiology of the visual system in health and disease. Emphasis is placed on the development of visual system functions. Topics include binocular vision, strabismus and amblyopia, control of eye movements and accommodation, color vision and color vision defects, retinal processing and spatial vision.

Thesis Research Project

The M.S. program at New England College of Optometry emphasizes the development of the technical, analytical, and problem solving skills necessary for successful research in vision science. Accordingly, actual hypothesis driven experimental research in the laboratory or clinic is the centerpiece of the program. This research is oriented toward the development, execution, and completion of a Master's Thesis. The following are the essential components for completion of the thesis research project.

Thesis Proposal

In May of the second year (O.D./M.S. program), or January of the first year for the stand-alone M.S. program, each student must submit to the GSC, with the signed approval of the advisor, a thesis proposal defining the thesis project, the methods and design of the experiments needed for completion, the progress to date, and plans for completion. The GSC reviews the proposals. There are three possible

outcomes – approve, approve pending revisions, or reject. Rejection results in dismissal from the program.

The thesis proposal is described in more detail in the section “Elements of the Thesis Proposal”. Examples of successful proposals on a variety of thesis topics are also available to M.S. students on the College intranet and from the Program administrative assistant.

Thesis Committee

A Thesis Committee will be formed to oversee the completion of the thesis. The Thesis Committee will be proposed, in writing, as part of the thesis proposal to be completed in the second year of the O.D./M.S. program (first year for the stand alone program).

The Thesis Committee is composed of three thesis examiners and is to include at least one member external to the College. The thesis examiners must be recognized by the GSC as knowledgeable in the area of vision research selected by the student.

At the discretion of the advisor, any member of the Thesis Committee may play an active role in the development of the thesis project, read and comment on early drafts of the thesis, or may take part only in the review of the thesis and thesis examination.

Thesis

All M.S. degree candidates are required to submit a written research thesis in partial fulfillment of the requirements for award of the degree. The thesis must include a cover and title page, abstract, table of contents, introduction of the thesis topic with a comprehensive review of the literature, appropriately organized methods, results, and discussion sections for the experiments performed, and a final conclusions section summarizing the outcome of the project.

The thesis may be in the form of an expanded paper (or papers) that can be submitted for publication in a peer-reviewed journal. Papers published by the student prior to completion of the thesis may be reformatted and used in the thesis. Thesis examples on a variety of vision science topics are available to M.S. students in the library and from the M.S. program administrative assistant. For additional information on content see Elements of Final M.S. Thesis and Information for Thesis Examiners below.

The thesis advisor determines when the thesis is complete and ready for review by the Thesis Committee. It should be sent electronically (in editable format such as Word) to the Thesis Committee and the Director of Graduate Studies at least 30 days before the Thesis Examination is scheduled to take place. The thesis advisor must also notify the Director of Graduate Studies of the date and time of the Thesis Examination, not less than 30 days in advance, so that accommodations for the defense can be made.

It is the responsibility of the student, with approval by the advisor, to send the **final** version of the thesis to the Thesis Committee and Director of Graduate Studies. The final version of the thesis may include revisions requested by the thesis committee at the defense, or edits needed to comply with the formatting requirements of the Library (see “Elements of Final M.S. Thesis” below). The final thesis should be in electronic form, in Word and PDF format.

For the M.S. student to be recognized at commencement, the Thesis Examination must be completed no later than April 15, and the **final** version of the thesis must be submitted by May 1 during the spring semester of the fourth year for the O.D./M.S. program, or the second year in the stand-alone M.S. program.

In the spring semester of the last program year, students are enrolled in Thesis Preparation II. This is the last "course" required before the thesis examination. Accordingly, a student will not receive a “Pass” until formally submitting a completed final thesis by the May 1 deadline. If this deadline is not met, the student will receive a grade of Incomplete (INC) for Thesis Preparation II that will stand until the thesis is completed.

The completion of the thesis defense and submission of the final thesis after the spring semester of the final program year is allowable. If the thesis examination will not be completed in time for commencement, the GSC must be notified in writing no later than April 15 of that spring semester so that accommodations and planning can be made. The student has a grace period through the summer and following Fall Semester for completion, i.e., until 12/31 of that calendar year, to defend the thesis at an examination and file the final version of the thesis.

If the thesis is not submitted and defended at a Thesis Examination within the grace period described above, the student will pay a maintenance fee of one credit per semester to remain in the program or will receive an administrative withdrawal. Appeals for extensions of the grace period must be explained to the GSC in writing before the end of the grace period. The GSC will allow a student to remain in the M.S. program for a period of 1.5 years after the grace period ends (thus for a period of two years following the original expected graduation date). If the student has not submitted a thesis for examination and a final thesis ready for binding within this 1.5 year extension period, the student will receive an administrative withdrawal from the M.S. program.

Thesis Examination Procedures

Completion of the program may only occur following a successful thesis examination and defense. The thesis examination is conducted by the Thesis Committee together with the student’s advisor. The advisor will chair the examination procedures. The examination is scheduled by the student and advisor, and the Director of Graduate Studies is notified in writing of the date and time of the examination at least 30 days in advance. At least two of the three members of the Thesis Committee and the advisor must be present for the examination to take place; the external member of the Thesis Committee may attend the examination via

telephone or internet conference call if attendance is not possible. The M.S. program administrative assistant can help with scheduling a time and room, and setting up any AV or telephone/video conferencing needed.

The examination will consist of a short presentation by the student to the Thesis Committee summarizing the main points of the project. The public may be present for this part of the examination, but will not be present for the examination. In closed session the examination involves the Thesis Committee asking the student questions on areas relating to the thesis and thesis topic. The task of the Thesis Committee is to determine the completeness of the thesis project and examine the student's command of the subject matter relevant to the thesis topic.

The possible outcomes of the Thesis Examination are: accept, accept with minor revisions to be checked by the advisor, revise with re-examination, or reject. Acceptance, and acceptance with minor revisions, indicate a successful thesis examination and will be indicated by the signature of all three members of the Thesis Committee and the advisor. A decision to revise and re-exam will require a repeat of the Thesis Examination. A decision to reject results in dismissal from the program. See Information for Thesis Examiners below for additional information.

Once final edits of the thesis are completed and the formatting requirements are met, the thesis will be bound and 2 copies will be catalogued and stored in the College's Library. One copy will be preserved in Special Collections and the second will be available for circulation. Binding services will be provided through the library. Additional bound copies must be requested by the student or advisor.

Registration and Maintenance of Matriculation

Transcripts

Students matriculated in the M.S. program will have a separate graduate transcript. Upon successful completion of the program the transcript will note the degree awarded and date received as well as the short title of the Thesis.

Evaluation of Student Performance

The graduate faculty advisor and GSC monitor student progress throughout the program. Student GPA is recorded and compiled by the Registrar and provided to the Director on a regular basis. Progress on the thesis project and other program requirements is monitored by regular progress reports from the advisor.

Probation and Dismissal

Procedures for placing M.S. students on probation and dismissing them for failure to achieve and maintain minimal program requirements or professional conduct follow the procedures outlined in New England College of Optometry Student Handbook, section on Academic Policies and Procedures.

To remain in the M.S. program, the student must minimally maintain a 3.00 GPA for the graduate program curriculum. To remain in the dual O.D./M.S. degree program the students will also be expected to maintain a minimum of a 2.75 GPA in the O.D. program. Students dropping below these GPA requirements will be placed on academic probation and the student and advisor will be notified. If a student remains on academic probation for two consecutive terms (not including an intervening summer session) he or she may be dismissed from the M.S. program.

It is the responsibility of the student and advisor to perform all program requirements by their due dates. If the missed due date is not acknowledged within 14 days of the due date the student may be dismissed from the program. The student may appeal and negotiate with the Director for an appropriate new due date with approval by the GSC. If a new deadline is set and the student misses that as well, he or she may be dismissed from the program.

Students who fail to complete a thesis and submit it for examination during the Spring semester of the final program year (second year in the stand-alone M.S. program, or the spring semester of the fourth year in the dual O.D./M.S. degree program), have, with permission of the Director and approval by the GSC, until the end of the following fall semester for completion (see “Thesis Research Project” section above). If the final thesis is not completed by that time the student must reschedule a plan for completion with the Director for review by the GSC and will pay a maintenance fee or will be withdrawn from the program.

Dismissal Appeals Procedure

Appeals of GSC dismissal decisions are made in writing to the Dean who will review the case and consult with the Director before making a final decision.

Withdrawal

Students may withdraw from the program at any time by submitting a written withdrawal notice directly to their advisor, any member of the GSC, the Director, or the Dean. The Director will notify the registrar in writing and provide the student’s withdrawal letter.

Financial Aid, Awards, and Assistantships

Students in the M.S. program are eligible for a variety of competitive and non-competitive sources of financial aid.

Support and Stipends

Students who are U.S. citizens, or hold permanent resident visas, may be eligible for Federal Work Study (FWS) funds and research stipends administered through the College. For non-U.S. nationals, funds equivalent to FWS funds are available. Actual amounts available from FWS and non-FWS funds depend on student eligibility as determined through the Office of Financial Aid. All stipends, and any requirements for obtaining the stipend, are unrelated to the specific degree requirements.

Student support may also be obtained directly from advisors who have independent project funding for student assistantships.

Loans

Student loans are available for qualified students. Information about federal student assistance for U.S. students, and non-federal aid for international students, is available in the Financial Aid Handbook on the College's website: www.neco.edu.

Project Funds

The Graduate Studies Committee does not review applications for project funds, and the student's thesis proposal is not an application for funding. Funds for conducting student research projects may be obtained from the College's research budget or through the extramural funding of the advisor if available. To obtain intramural research funds from the College, the student's advisor must apply directly to the Research Committee as described in New England College of Optometry Faculty Handbook.

The Research Committee reviews all applications for intramural projects requesting funding. The faculty advisor must apply to the Research Committee directly by presenting a complete description of the project, the rationale, and the budget specifics. IRB or IACUC approval of the project is also necessary before any funds can be dispersed. Students are not eligible to apply directly to the Research Committee (nor to the IRB or IACUC).

Funds for Travel to Scientific Meetings

The Graduate Studies Committee has established M.S. Student Travel Grants to encourage professional development through attendance at scientific meetings where students can present their original material. It is anticipated that each student attends at least one major research conference before graduating. Students may attend additional meetings if they are primary authors and are presenting their work. Students are expected to present their results at research meetings such as the

annual meeting of the Association for Research in Vision and Ophthalmology (ARVO), the American Academy of Optometry (AAO), the Vision Sciences Society (VSS), the Optical Society of America (OSA), the Fall Vision Meeting (OSA) or the International Congress on Eye Research (ICER).

All M.S. students are eligible for Travel Grants. Priority will be given to authors on presentations. All Student Travel Grants are competitive and are based on availability, student authorship, and whether they have received travel grants in the past.

Application Procedure:

M.S. students presenting at AAO or ARVO must first apply for an AAO travel grant (<http://www.aao.org/students/stf>) by the appropriate deadline. Students attending ARVO must also apply for one of the ARVO travel grants.

To attend other meetings, nominations for a Student Travel Grant must be made by the student's faculty advisor. The nomination should be made as soon as the faculty member or student is advised that their abstract has been accepted for presentation.

Students receiving a Travel Grant from NECO will be reimbursed up to the amount of the award following the meeting, upon completion of an expense form. All receipts for qualifying expenses must be attached to ensure reimbursement up to the full amount of the grant. Qualifying expenses include round-trip economy airfare, ground transportation to/from airports, hotel room up to six nights, and personal meals (up to seven days – may include travel days). If the meeting is local and the student will be driving, mileage to/from Convention Center and hotel parking are qualified expenses. Travel Grants do not reimburse for rental cars.

Outcomes Assessment

The Director, with the assistance of the Offices of Academic Affairs, Admissions, and Registrar, tracks the number of applications to the O.D./M.S. and M.S. programs, the demographics of the applicants, enrollment, and student performance. Upon completion of the M.S. program, with the assistance of the Office of Alumni Affairs, graduates will be periodically contacted and polled to determine their current location, position, whether they are working in vision research, what impact the M.S. degree has had on their current position, and collect any comments they have about the M.S. program retrospectively. These data are used for program development and recruitment strategies, and the assessment of program impact following graduation.

Graduate Faculty

The Dean, upon recommendation by the GSC, appoints the graduate faculty. All members of the graduate faculty shall be members of the faculty of New England College of Optometry.

Graduate faculty are selected by the GSC from those faculty possessing the appropriate background, skills, and resources, to mentor M.S. students and conduct hypothesis driven experimental research programs that will adequately support student participation. Graduate faculty may also participate in teaching graduate level courses and seminars.

Responsibilities of the Graduate Faculty Advisor

It is the responsibility of the advisor to assist the student in the completion of all program requirements by their due dates, and to oversee the design and execution of the student's research project. The advisor will assist the student in the completion of the thesis, including a thorough review of the literature relevant to the project, the formation of a Thesis Committee to be approved by the GSC, and oversight of the final thesis examination. The advisor will also assist the Director and the GSC in their review of the student's progress while in the program.

Selection and Review Criteria

The GSC reviews all College faculty wishing to join the graduate faculty and makes their recommendation to the Dean. The GSC also evaluates existing graduate faculty on a regular basis. To apply for admission to the Graduate Faculty, the applicant should submit to the GSC a current CV and a cover letter that outlines their research training and experience and their resources for training graduate students. A letter of recommendation from a former advisor or a current colleague is also desirable. The chief selection criterion for appointment to the graduate faculty is whether the faculty member possesses the experience and research program required to support students pursuing the M.S. in Vision Science. Other selection criteria include the following:

- must be a member of the Faculty of New England College of Optometry.
- formal advanced degree training in research, usually to the Ph.D. level.
- must conduct an active and independent research program.
- must maintain a record of peer-reviewed publications.
- must have space and resources adequate for student needs.
- be willing to participate in teaching graduate level courses and seminars.

The GSC may approve exceptions and recommend limited graduate faculty status for non-mentoring roles, as needed for specific teaching and thesis examination responsibilities.

To maintain graduate faculty status, the faculty member must demonstrate adequate performance as a graduate advisor, produce graduate student research proposals of high quality as determined by the reviews of the GSC, demonstrate a record of peer-reviewed publication of graduate student research, and maintain good performance evaluations in teaching graduate classes.

Current Graduate Faculty and Research Interests

Baha Asefzadeh, O.D., M.S. – Ophthalmic Imaging in Eye Diseases (*Department of Veterans Affairs, Boston*)

Peter Bex, Ph.D. – Visual Function in Amblyopia and Eye Diseases (*Northeastern University*)

Alex Bowers, MCOptom, PhD – Vision Rehabilitation Research (*Schepens Eye Research Institute, Harvard Medical School*)

Nancy Coletta, O.D., Ph.D. – Visual Optics, Myopia and Night Vision

Haiyan Gong, M.D., Ph.D. – Hemodynamics of Aqueous Humor Flow (*MIT & Boston University Medical School*)

Jane Gwiazda, Ph.D. – Development of Vision and Myopia in Humans

Ji-Chang He, Ph.D. – Visual Optics and Visual Performance

Kevin Houston, O.D., M.S. - Vision Rehabilitation Research (*Schepens Eye Research Institute, Harvard Medical School*)

Steven Koevary, Ph.D. – Prevention of Autoimmune Diseases, Ocular Drug Delivery

Donald Korb, O.D. - Cornea and Contact Lens; Meibomian Gland Disease

Barry Kran, O.D. – Pediatric Vision, Cortical Visual Impairment

D. Luisa Mayer, Ph.D. – Clinical Testing of Pediatric Vision; Pediatric Low Vision

Glen McCormack, O.D., Ph.D. – Accommodation, Convergence, and Aniseikonia

Bruce Moore, O.D. – Refractive Development in Children

Amy Nau, O.D. – Cornea and Contact Lens; Meibomian Gland Disease

Debora Nickla, Ph.D. – Animal Models of Myopia

Athanasios Panorgias, Ph.D. – Mechanisms of Retinal Processing; Retinal Disease

Eli Peli, O.D., M.S. – Low Vision and Image Enhancement (*Schepens Eye Research Institute, Harvard Medical School*)

Nicole Ross, O.D., M.S. – Vision Rehabilitation Research

Jeffrey Ruberti, Ph.D. – Corneal Tissue Engineering (*Northeastern University*)

Frances Rucker, MCOptom, Ph.D. - Chromatic Mechanisms and Emmetropization

Jean Spencer, Ph.D. – Biochemical, Biophysical and Computational Techniques in Disease Pathways (*Boston University*)

Frank Thorn, O.D., Ph.D. – Development of Myopia and Effects of Visual Degradation

Fuensanta Vera-Diaz, O.D., Ph.D. – Myopia and Visual Performance

Erik Weissberg, O.D. – Pediatric Optometry, Binocular Vision

M.S. Program Time Table

Application deadlines

Stand-alone M.S. program – April 1 prior to Fall term of Year 1.

O.D./M.S. program (Regular Admittance) – December 15, during Fall term of Year 1.

Time Line For O.D./M.S. Program

Year One - Fall Semester

- Laboratory Research Survey required for all M.S. applicants
- Dec. 15 deadline for O.D./M.S. applications
- By the end of the semester...
 - Student should have chosen and ranked their research topics of interest and preferred thesis advisors

Year One - Spring Semester

- All candidates should be integrating into assigned laboratory
- Laboratory Research I
 - 4 hour/week minimal lab work required
 - Federal or College Work Study funds may be available for additional hours
- Any laboratory changes should be requested before end of the semester
- By the end of the semester...
 - Student should have a clear understanding of what the laboratory does and the potential projects available.
 - Plans for the summer research project should be formulated

Year One - Summer

- No course work in M.S. program, but coursework in the O.D. program
- Stipends available for laboratory research
- Attend Research Workshops
- By the end of the summer...
 - The student should have a sense of where the project is going and what needs to be done over the next year
 - Perhaps have data for presentation at a meeting

Year Two - Fall Semester

- Matriculation into O.D./M.S. program
- Required M.S. course work
 - Biostatistics and Research Design I
 - Research Colloquia
 - Graduate Research Seminar I or IV
 - Thesis Proposal Preparation – see elements of the Thesis proposal (below)
- Continue Laboratory Research
- By the end of the semester...
 - Continue to work on data collection and analysis
 - Have an outline for the Thesis Proposal

Year Two - Spring Semester

- Laboratory Research II
 - 4 hours/week minimal lab work required
 - Work Study funds may be available for additional hours
- Required M.S. course work
 - Research Colloquia
 - Graduate Research Seminar II or III
 - Thesis Proposal – see elements of the Thesis proposal (below)
 - Due end of semester
 - Include list of Thesis Committee members
- By the end of the semester...
 - Know what needs to be done to collect remaining data
 - Be prepared to develop the thesis proposal into the thesis

Year Two - Summer

- Stipends available for laboratory research; coursework in O.D. program
- By the end of the summer...
 - Most of data for the thesis project should be collected, much of the analysis should be underway

Year Three - Fall Semester

- Laboratory Research III
 - 4 hour/week minimal lab work required
 - Work Study funds may be available for additional hours
- Required M.S. course work
 - Biostatistics and Research Design II
 - Research Colloquia
 - Graduate Research Seminar IV or I
- By the end of the semester...
 - Data collection and analysis should be complete or near complete
 - Start working on thesis organization and preliminary writing (intro, methods, results to date)

Year Three - Spring Semester

- Laboratory Research IV
 - 4 hour/week minimal lab work required
 - Work Study funds may be available for additional hours
- Required M.S. course work
 - Research Colloquia
 - Graduate Research Seminar III or II
- By the end of the semester...
 - Continue working on data analysis, thesis organization, and preliminary writing

Year Three - Summer

- OD Program Clinical Rotations

- Data collection and analysis should be complete or near complete
- By the end of the summer...
 - Thesis writing should be underway

Year Four - Fall

- OD Program Clinical Rotations
- Thesis Preparation I – see Information for Thesis Examiners below
 - Thesis writing

Year Four - Spring

- OD Program Clinical Rotations
- Thesis Preparation II – see Information for Thesis Examiners below
 - Finish writing
 - Submit thesis to Thesis Committee and Director of Graduate Studies near end of February/early March
 - Thesis Examination by April 15 for Graduation in spring semester
 - Submit final version of thesis to Thesis Committee and Director of Graduate Studies by May 1

Time Line For Stand-Alone M.S. Program

Year One - Fall Semester

- Laboratory Research I
 - Students should be getting integrated into their advisors' labs
 - 4 hour/week minimal lab work required
 - Work Study funds may be available for lab work beyond 4 hours per week required in Laboratory Research I
- Required M.S. course work
 - Biostatistics and Research Design I
 - Cell Biology, Histology and Ocular Anatomy (depending on research area, can be taken Fall Year 2 and Optics I taken Fall Year 1)
 - Laboratory Research Survey course
 - Research Colloquia
 - Graduate Research Seminar I or IV
 - Thesis Proposal Development – see elements of the Thesis proposal (below)
- By the end of the semester...
 - Student should have a clear understanding of what the laboratory does
 - Have a good working knowledge of the literature in the project area
 - Plans for research project should be formulated
 - Have outline for the Thesis Proposal that will be submitted February 1

Year One - Spring Semester

- Laboratory Research II
 - 4 hour/week minimal lab work required
 - Work Study funds may be available for lab work beyond 4 hours per week required in Laboratory Research II
- Required M.S. course work

- Advanced Visual Sensation and Perception (with AODP)
- Research Colloquia
- Graduate Research Seminar II or III
- Thesis Proposal– see elements of the Thesis proposal (below)
 - Thesis Proposal ready to submit to GSC February 1
 - Include list of Thesis Committee
- By the end of the semester...
 - Data collection should be underway; know what needs to be done to collect remaining data
 - Be prepared to develop the thesis proposal into the thesis

Year One - Summer

- No required course work, but attend Research Workshops
- By the end of the summer...
 - Most of data for the thesis project should be collected, much of the analysis should be underway
 - Perhaps have data that can be presented at a meeting

Year Two - Fall Semester

- Laboratory Research III
 - 4 hour/week minimal lab work required
 - Work Study funds may be available for lab work beyond 4 hours per week required in Laboratory Research III
- Required M.S. course work
 - Biostatistics and Research Design II
 - Optics I (depending on research area, can be taken Fall Year 1 and Cell Biology taken Fall Year 2)
 - Research Colloquia
 - Graduate Research Seminar IV or I
 - Thesis Preparation I – see Information for Thesis Examiners below
- By the end of the semester...
 - Data collection and analysis should be complete or near complete
 - Start working on thesis organization and preliminary writing (intro, methods, results to date)

Year Two - Spring Semester

- Laboratory Research IV
 - 4 hour/week minimal lab work required
 - Work Study funds may be available for lab work beyond 4 hours per week required in Laboratory Research IV
- Required M.S. course work
 - Research Colloquia
 - Graduate Research Seminar III or II
 - Thesis Preparation II – see information for Thesis Examiners below
- By middle of the semester...
 - Finish thesis writing
 - Submit thesis to Thesis Committee and Director of Graduate Studies by end of February/ early March

- Thesis Examination by April 15 for Graduation in May
- By end of the semester...
 - Submit final version of thesis to Thesis Committee and Director of Graduate Studies by May 1

Elements of a Thesis Proposal

The thesis proposal is an important part of your M.S. requirements. It provides a measure of your progress and likelihood of success. In addition, the effort you put into your proposal is time well spent since it will help you to develop your project into final thesis form.

Your proposal should present a thesis. A thesis advances a point of view and will be supported or refuted by the results of your research efforts. Although your work may not be, strictly speaking, sufficient to create a thesis, it should still describe one or more tentative propositions (hypotheses) and the experiments designed to test each hypothesis.

Always give your best writing effort. A poorly written proposal will make even the best ideas look bad. Organization of thought is very important. A clear and concise proposal shows the reader/reviewer that you know what you are doing. Vague and disorganized writing suggests you don't. Never assume that the reader will know what you mean. You should always look for feedback on the clarity and significance of your proposal from your advisor and anyone else whose opinion you respect.

Expect to write several drafts. Be sure to work closely with your advisor on the development of the proposal. This is important. Your advisor must approve your proposal by signing the final version. Without this signature the proposal will not be accepted for review. For additional information please refer to your M.S. Program Policy Handbook. Past thesis proposals are available on the College intranet and from the M.S. program administrative assistant.

Components of a Thesis Proposal

Title Page:

Your project should have a title. If you can't come up with a title your work is probably too diffuse.

A short descriptive title is best. Have your advisor sign and date the title page when the proposal is completed.

Background and General Problem:

Use background adequate to show the reviewer the issues and relevance of your project. This should be developed with the assistance of your advisor during the semester before the proposal is due in your Thesis Proposal Preparation course. Don't ramble, but don't expect the reviewers will know why you are doing this project. Be sure to use up-to-date references where appropriate. This section may form the basis of your thesis introduction.

Specific Experimental Issue or Question:

In this section you should clearly state the specific aims and hypotheses of your project. This should be concise and to the point.

Design and Methods:

Clearly state the experimental design that is being used for each aim and experiment. Subject groups and measurement techniques should be described here in detail. Describe the comparisons to be made, how they will be tested (statistically), and how the possible outcomes will be interpreted.

Work to Date:

Describe briefly your progress and research efforts to date, and how they relate to your research proposal. If you have done work that is unrelated to the proposal you may briefly mention it here as well. Be sure to explain why you are changing the direction of your research project.

Plans for Completion:

Briefly describe what needs to be done to complete your thesis. State your plans for the upcoming year toward that end. Please also include a list of the members of your Thesis Committee in your proposal.

Information for Thesis Examiners

The student and advisor are responsible for providing the following information to thesis examiners when the copy of the thesis is submitted. A copy of this document is available to M.S. students from the M.S. program administrative assistant.

Requirements for M.S. Degree

All M.S. degree candidates are required to submit a written research thesis in partial fulfillment of the requirements for award of the degree. For the M.S. degree to be awarded, a completed thesis must be submitted to the Director of Graduate Studies.

Thesis Standards

The M.S. degree in Vision Science from New England College of Optometry establishes that the holder has undertaken and reported a substantial piece of original research under the supervision and guidance of a graduate faculty advisor. The thesis must provide evidence that the candidate is capable of independently conceiving, designing and carrying to completion a research program or project. Ideally, the thesis should report new knowledge either by the discovery of new facts from empirically derived data, or the development of new interpretations and innovative analysis of existing data and established ideas. Projects confirming the previously reported results may be satisfactory if the need for such confirmation is clearly stated and the project contributions useful information to those interested in the particular field of study.

In order to pass examination, and qualify for award of the M.S. degree, the thesis should have the following attributes:

- It demonstrates the candidate's command of knowledge in relevant fields.
- It shows that the candidate understands the appropriate methodologies and techniques, and is aware of their limitations.
- It makes a distinct contribution to the field because of the originality of the approach and/or interpretation of the findings.
- It demonstrates the candidates' ability to communicate research findings effectively in writing.
- It is a careful, rigorous and sustained piece of work demonstrating that a research "apprenticeship" is complete.

It is important that the Thesis Committee considers the candidate's thesis solely on its merits as an independent piece of supervised research, whether or not the thesis adopts an approach that may be considered as outside of established paradigms for the discipline, or whether or not the examiner might have done the project differently. It is also important to note that, given the relatively short time for data collection within this program, some projects may not yield fully conclusive data. In these cases the thesis may still be considered acceptable if the limitations of the data are carefully described and thoroughly discussed together with suggestions for future experiments.

Thesis Considerations

The Thesis Committee should consider the following in their review of the thesis.

- Does the candidate show sufficient familiarity with, and understanding and critical appraisal of, the relevant literature?
- Does the thesis provide an appropriate level of investigation of the topic to qualify for the M.S. degree?
- Are the methods and techniques adopted appropriate to the subject matter and are they properly justified and applied?
- Are the results reported well and accompanied by adequate interpretation?
- Are the conclusions and implications appropriately developed and clearly linked to the content of the research design and findings?
- Has/have the hypothesis/hypotheses been adequately tested?
- Is the written quality and general presentation of the thesis of a suitably high standard?
- Does the thesis constitute a contribution to the field with which it deals?
- Are deficiencies in the design and limitations of the data identified and thoroughly explained and discussed?

Additional comments by the thesis reviewer of a general nature that may help the candidate and advisor are encouraged. For example, examiners may wish to comment on potentially publishable content within the thesis. A list of errata can also be provided where appropriate.

The Thesis Examination

The thesis examination will consist of a short presentation by the candidate to the Thesis Committee summarizing the main points of the project. The public may be present for this part of the examination, but will not be present for the examination. In closed session, the examination involves the Thesis Committee asking the student questions on areas relating to the thesis and thesis topic area. The task of the Thesis Committee is to determine the completeness of the thesis project and examine the student's command of the subject matter relevant to the thesis topic.

Possible Outcomes and Recommendations

- **Accept (without further examination of amendment)**
The Thesis Committee is satisfied that no additional work is necessary for award of the degree. Amendments may be suggested for the candidate to use when finalizing the thesis and submitting the material for publication.
- **Accept (with minor revisions)**
The Thesis Committee finds the thesis acceptable subject to minor revisions identified. Final acceptance of the thesis with the specified revisions is subject to the satisfaction of the graduate faculty advisor. The Thesis Committee may make this recommendation even when they take issue with a candidate's subject-specific interpretations but accept the validity of a different view. In such cases the suggested revisions may include criticisms for the candidate and advisor to consider before completion and submitting the material for publication.
- **Revise with re-examination**
This recommendation is selected when the Thesis Committee concludes that major revisions to the thesis are necessary to correct serious flaws that render the thesis inadequate, or the student's knowledge of the subject area is deemed inadequate for completion and award of the degree, or both. This recommendation assumes that the problems can be corrected to a point that will fulfill the degree requirements but will require a re-review by the Thesis Committee. In such a case, the Thesis Committee may review the revised thesis by mail or, if re-examination of the student's command of the subject is necessary, during a second thesis examination.
- **Reject**
This recommendation is essentially a "failure" to complete the thesis requirement. This recommendation is only made when the Thesis Committee is of the opinion that the thesis has substantial, irredeemable flaws in scholarship or logic that render it inadequate as a basis for award of the M.S. degree. A decision to reject results in immediate dismissal from the program.

Elements of Final M.S. Thesis

The Directors of Graduate Studies and Library Services are sent an electronic copy of the thesis at least 30 days prior to the scheduled examination. They will review the thesis to determine that the student has met the requirements for the formatting of the final M.S. thesis as described below.

Title page (see example below)

Full Title – centered and in caps. (Times 14 point)

NOTE - In choosing a title, remember for your research to be used by others, they will probably locate it by searching. Use a title that is descriptive of the content of your research. Replace symbols, superscripts, Greek characters, and formulas with words that are searchable. If the title is longer than 60 characters (including spaces), the candidate must also supply a short title.

Statement – centered below Full Title.

“A thesis presented to the graduate faculty of New England College of Optometry in partial fulfillment of the requirements for the degree of Master of Science.”

Author – full name, centered.

Date – month and year, centered.

Statement – centered.

©Full name, all rights reserved.

Permission statement – centered.

“The author hereby grants New England College of Optometry permission to reproduce and to distribute publicly paper and electronic copies of the thesis document in whole or in part.”

Confirmation and signature page (see example below)

Space for Thesis Title and Author

Statement – centered below Thesis Title and Author.

“This manuscript has been read and accepted by the Thesis Committee in satisfaction of the thesis requirement for the degree of Master of Science.”

Spaces for date and signatures of the Thesis Advisor and Thesis Committee; include printed names and degrees of each member below their signature lines.

Spaces for date and signature of the Director of Graduate Studies

Abstract

Full Title – centered and in caps.

Author – full name centered.

Institution – New England College of Optometry, year.

Not longer than 2 pages.

Acknowledgements

Optional.

Not longer than 2 pages.

Table of Contents

By chapter and major headings.

List of Figures and tables

Figure number, figure title, page

Table number, table title, page

Main Text (by chapters)

Option 1

General Introduction.

Methods.

Results.

Discussion and Conclusions.

Bibliography.

Option 2 (to use with published papers or papers submitted for publication)

General Introduction.

Paper 1.

 Specific introduction

 Methods

 Results

 Specific conclusions

Paper 2... etc,

 Specific introduction

 Methods

 Results

 Specific conclusions

General Discussion and Conclusions

Bibliography

Miscellaneous

Text Font – Times 12 point, except where noted on first two pages

Line spacing – double, except where noted on first two pages

Margins:

Top 1.25"

Left 1.25"

Right 1.0"

Bottom 1.25"

Pagination:

Top right

0.75" from top

1.0" from right

Preliminary pages: Title and signature should be in a separate file without page numbers or header/footer page (see templates at the end of this document). In a second file, starting with the Abstract, use lower case Roman numerals starting with iii on the Abstract page at the top right. Use a section break/next page after the preliminary pages to re-start numbering of the thesis text pages.

Text pages: Use Arabic numbers at the top right starting with 1 to end of thesis including bibliography.

References in text (based on the guidelines for *Vision Research*):

All reference citations in the text should be listed as follows:

1. *Single author:* the author's name (without initials, unless there is ambiguity) and the year of publication;
2. *Two or three authors:* all authors' names and the year of publication;
3. *Four or more authors:* first author's name followed by "et al." and the year of publication.

Citations in text may be made directly (or parenthetically). Groups of references should be listed first alphabetically, then chronologically. Examples: "as demonstrated (Allan, 1996a, 1996b, 1999; Allan and Jones, 1995). Kramer et al. (2000) have shown"

Bibliography Style (based on the guidelines for *Vision Research*):

References listed in the bibliography should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters "a", "b", "c", etc., placed after the year of publication. Examples below:

Reference to a journal publication:

Gwiazda, J., Grice, K., Held, R., McLellan, J., & Thorn, F. (2000). Astigmatism and the development of myopia in children. *Vision Research*, 40(8): 1019-1026.

Van der Geer, J., Hanraads, J.A.J., & Lupton, R.A. (2000). The art of writing a scientific article. *Journal of Science Communication*. 163, 51–59.

Reference to a book:

Strunk Jr., W., & White, E.B. (1979). *The Elements of Style*, third ed. Macmillan, New York.

Reference to a chapter in an edited book:

Mettam, G.R., & Adams, L.B. (1999). How to prepare an electronic version of your article, in: Jones, B.S. & Smith, R.Z. (Eds.), *Introduction to the Electronic Age*. E-Publishing Inc., New York, pp. 281–304.

Figures

May be on separate page or incorporated into text within prescribed margins.
All figures to include Figure number and caption.

Tables

May be on separate page or incorporated into text within prescribed margins.
All tables to include Table number and title.

Submission

Before the thesis defense, an electronic copy (Word file or editable file) should be submitted via email to the thesis advisor, the thesis committee members and to the Director of Graduate Studies. A PDF file version of the document may also be submitted. The thesis committee may require edits to the thesis before final approval.

After the defense, and any edits have been completed and approved by the advisor and committee, send the final electronic version of the thesis as a Word file and preferably a PDF file to the Director of Graduate Studies. The Director will sign the signature page, insert that page into the final thesis PDF, and circulate the PDF to the student, advisor and library staff.

Printing and binding by the library staff

Paper: Alkaline-buffered, durable paper, 8 1/2" x 11" in size and of at least 20-pound weight must be used. Such papers are now widely available, and some acceptable paper brands are Permalife, Hollinger Alkaline Buffered Bond, Xerox Image Elite, or Hammermill Bond.

Copies

Original and one copy will be bound for the library.

Original to be stored in Library's Special Collection

Copy to be included in Library's Circulating Collection

The MS candidate should specify to the library staff if additional bound copies are desired, typically for:

Master candidate

Faculty advisor

Each member of Thesis Committee

Binding will be a maroon cover with gold lettering. Lettering will be vertical on the spine and can be up to 60 characters for every 0.75" of thickness of the thesis. This is equivalent to a thesis that ranges from 100-150 pages.

The format of the vertical spine will be:

Title – Author's last name -- Year

The candidate will need to provide a shortened form of the title for the spine if necessary.

TITLE AND SIGNATURE PAGE EXAMPLES FOLLOW

TITLE IN ALL CAPS AND 14 POINT TYPE – CAN BE MORE THAN ONE
LINE WITH SINGLE LINE SPACING

A thesis presented to the graduate faculty of
New England College of Optometry in partial fulfillment
of the requirements for the degree of Master of Science

Jane M. Doe

May, 2016

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The author hereby grants New England College of Optometry permission to reproduce and to distribute publicly
paper and electronic copies of the thesis document in whole or in part.

TITLE IN ALL CAPS AND 14 POINT TYPE – CAN BE MORE THAN ONE
LINE WITH SINGLE LINE SPACING

Jane M. Doe

This manuscript has been read and accepted by the
Thesis Committee in satisfaction of the
thesis requirement for the degree of Master of Science

Date

(Name with degrees)
Graduate Faculty Advisor

(Name with degrees)
Thesis Committee Member

(Name with degrees)
Thesis Committee Member

(Name with degrees)
Thesis Committee Member

Date

(Name with degrees)
Director of Graduate Studies

New England College of Optometry