

HANDBOOK
OF
GRADUATE STUDY
FOR
MASTER OF SCIENCE PROGRAM

DEPARTMENT OF BIOCHEMISTRY
&
MOLECULAR BIOLOGY

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THE UNIVERSITY OF OKLAHOMA HEALTH SCIENCES CENTER
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Note: This handbook is provided as a reference guide for the purpose of understanding the policies and procedures of the Biochemistry & Molecular Biology Master's Program. It is expressly written for students entering in the Fall 2018 semester. The Department reserves the right to amend its policies and procedures as deemed necessary by the Graduate Program Faculty and within the guidelines of the Graduate College and University policies.

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1. INTRODUCTION

Welcome to the Department of Biochemistry and Molecular Biology Master's Program. The general information about the Department is kept up-to-date on our web site <https://basicsciences.ouhsc.edu/bmb/Home.aspx>, and we recommend that you set your Internet Browser (Netscape, Safari or Explorer) to open with this page. In addition, we e-mail information about seminars, upcoming deadlines, etc. to all graduate students, so make sure you check your OUHSC e-mail at least twice a day.

This handbook is designed to supplement the Graduate College Bulletin and to summarize the goals and additional requirements of our Master's Program.

These guidelines follow a general sequence of events from joining the Biochemistry and Molecular Biology program through to graduation. However, individual students in our program come in with differing backgrounds, so our program has some flexibility to accommodate the specific needs of each student. In all cases, we are required to meet the Graduate College guidelines.

If this handbook does not address a particular question or problem, you should consult the Graduate College Bulletin, your mentor, the Graduate Program Director, Department Chair, or Graduate Dean.

2. OUTLINE OF MASTER'S DEGREE REQUIREMENTS

2.1. General Information

2.1.1 Credit Hours

A candidate for the Master's Degree must complete at least 30 credit hours of academic work, made up of coursework and research, and completes a research thesis.

Transfer of coursework: A student who has completed graduate courses in biochemistry or a related area may transfer up to 8 credit hours of letter-graded coursework from another University. Specific courses eligible for transfer will be determined by the Student Advisory Committee, BMB Graduate Program and Curriculum committee, and the Graduate College. *See the Graduate College Bulletin for further information.*

Classload Requirements: Students in the Department of Biochemistry & Molecular Biology are usually classified as *Graduate Research Assistants*. Minimum enrollment in Fall and Spring semesters is 6 credit hours. Minimum summer enrollment is 3 hours. Students should track their total credit hours closely and calculate the number of hours they need to enroll in thesis research.

2.1.2 Time Limitation.

The Department expects that a candidate will complete all requirements for the MS degree within 2.5 calendar years after first registering in the Graduate College. The Graduate College sets a 6 year limit on the number of years of enrollment permitted, but financial support is unlikely to be continued beyond 2.5 years.

2.1.3 Scholastic Requirements

All students must maintain a grade point average (GPA) of 3.00 or greater and satisfactory progress. Failure to do so will result in placement on probation by the Graduate College. A student who has been awarded a graduate assistantship may lose that assistantship until probation is removed. A student on probation will be denied further enrollment if by the end of the first probationary period (as defined in the Graduate College Bulletin) he/she fails to restore the average to 3.00 in all completed graduate-level work. The total number of credit-hours of C grade that can be applied toward a graduate degree cannot exceed 25% of the total letter-graded course work required for the degree.

Satisfactory progress means: (a) earning a B or higher in all letter-graded courses and S in all S/U courses and (b) satisfactory progress as documented by the student's Thesis Committee in designing and carrying out laboratory research work on a full-time basis. Failure to meet these standards or an adverse evaluation by the Advisory or Thesis Committee may result in termination of enrollment in the Biochemistry & Molecular Biology Graduate Program.

2.1.4 Financial Support of Graduate Students.

Students in good standing in the Biochemistry & Molecular Biology Graduate Program receive a stipend and a tuition waiver. Types of funding available for M.S. stipends are usually Research Assistantships from the mentor's research grants.

Minority students are eligible for a variety of fellowships including those on National Institutes of Health grants.

Research Space, Equipment, and Supplies. It is the responsibility of the Mentor to supply sufficient resources from grants or other funds for the student to perform the required Master's research.

2.1.5 Outside Employment.

M.S. studies in Biochemistry & Molecular Biology are demanding and time-consuming, and require commitment. Consequently, students may not work elsewhere, even part-time, while enrolled as full-time students in this graduate program. Assistantships and fellowships are available.

2.1.6 Holidays and Vacations

The full-time commitment includes semester breaks. Student stipends are paid for 12 months and students should be in the lab when classes are not in session, except for official holidays listed in the annual "University of Oklahoma Holiday Schedule" (MLK Day, Memorial Day, July 4, Labor Day, Thanksgiving 2 days and Winter break) and vacation time or other absence agreed to by the mentor (MS students and senior PhD students) or Program Directors (PhD students in rotations). If the time off exceeds 3 weeks, the mentor should consult the Department Chairman or Business Manager about suspending pay for additional time out of the lab.

2.2 Curriculum

2.2.1 Courses

Year 1— Fall Semester

Course Number	Credit Hours	Name	Coordinator
BIOC 5104	4	Introductory Biochemistry ¹	Li
BIOC 5224	4	Methods in Biochem & Molec. Biol.	DeAngelis
BIOC 6220	2-4	Advanced Biochemistry Lab	Mentor
BMSC 5001	1	Integrity in Scientific Research	Webb
BIOC 6221	1	Journal Club: Noddy Tern	Pioszak
BIOC 5970	Attendance Required ²	Student Seminar	Rodgers
BIOC 5970 (not for credit)		Departmental Seminar	

Year 1— Spring Semester

Course Number	Credit Hours	Name	Coordinator
BIOC 6220	2-4	Advanced Biochemistry Lab	Mentor
BIOC 6221 001	1 (S/U)	Journal Club: Noddy Tern	Pioszak
BIOC 5970	Attendance Required ²	Student Seminar	Rodgers
BIOC 5970 (not for credit)		Departmental Seminar	
BIOC 6321 BIOC 6341	3	Optional: Advanced Level Course	

¹ Students with excellent background may be permitted to take GPiBS courses instead.

² Presentation in final semester (thesis defense). Students enroll in student seminar every semester

Year 1— Summer Semester

Course Number	Credit Hours	Name	Coordinator
BIOC 5980	3	Research for Master's Thesis	Mentor

Year 2— Fall Semester

Course Number	Credit Hours	Name	Coordinator
BIOC 6220	2-4	Advanced Biochemistry Lab	Mentor
BIOC 6221 001	1 (S/U)	Journal Club: Noddy Tern	Pioszak
BIOC 5970	Attendance Required ²	Student Seminar	Rodgers
BMSC 5001	1	Integrity in Scientific Research	
BIOC 6XXX	2-4	Advanced Level Course if needed	

Year 2 - Spring Semester

Course Number	Credit Hours	Name	Coordinator
BIOC 5980	2	Research for Master's Thesis	Mentor
BIOC 6221 001	1 (S/U)	Journal Club: Noddy Tern	Pioszak
BIOC 6XXX	2-4	Advanced Level Course if needed	
BIOC 5970	1 Attendance Required	Student Seminar	Rodgers
BIOC 5970	Attendance Required	Visiting Seminar	

ADVANCED LEVEL COURSES (Note: Other departments also offer elective courses—check with your thesis committee to choose appropriate electives.)			
Students complete at least 3 hours of elective courses, approved by their Thesis Committee. You must complete 24 credit hours of coursework to graduate. All electives are subject to a minimum and maximum enrollment. Credit hours may change.			
(Fall) BIOC 6210	2-3	Physical Biochemistry of Macromolecules	Rodgers
BIOC 6970	2 (S/U)	Biotechnology	DeAngelis
BIOC 6320	1-3	Molecular Structure & Dynamics Modules	Various
BIOC 6310	1-3	Molecular Signaling & Regulation Modules	Various

2.2.2 Outline of Graduate Work

Students are required to file an *Outline of Graduate Work* within the first year of graduate study. This form, which is available from the Graduate College <https://graduate.ouhsc.edu/CurrentStudents/FormsandGuidelines.aspx>, is completed with the help of the mentor and Student Advisory Committee. It serves as the student's guideline for courses needed to complete degree requirements. Once filed, any changes in the *Outline of Graduate Work* must be explained and documented in writing and consistent with the *Admission to Candidacy* form. The *Outline of Graduate Work* form should be submitted to Chaney Davis in typewritten format.

2.2.3 Admission to Candidacy

Students who are doing satisfactory graduate work may normally be admitted to candidacy for a degree as soon as they have enrolled in sufficient hours for the degree. The *Admission to Candidacy* form should be filed with the Graduate College at the beginning of the semester in which the student expects to graduate. (Consult the class schedule for the specific deadline.) Also, at the time the *Admission to Candidacy* is filed with the Graduate College students should obtain instructions governing the completion of coursework, graduation and thesis preparation, if applicable.

2.3 Assessment of Progress

The Graduate College requires that the progress of all graduate students be reviewed annually. The Biochemistry & Molecular Biology Program requires that the review process be completed before June 30 each year.

First year students will meet with their Thesis Committee if it is assembled, otherwise with the Student Advisory Committee, and will complete the first year progress report and the Outline of MS work. (Section 10)

Students in their second year meet with their Thesis Committee at least twice before graduation. They should meet with this committee before starting to write their thesis. (Section 10)

Completed, signed Committee Meeting Reports and Progress Reports are sent to the Program Directors, who forward copies to the Graduate College. A summary of the annual Progress Reports is presented to the faculty by the Program Directors. If significant problems are apparent, the Program Directors will have written to the student, summarizing the problems and how these may be overcome. Copies are sent to the student's Mentor, Department Chair, and Dean of the Graduate College.

3. ATTENDANCE AT SCIENTIFIC MEETINGS

We strongly encourage students to attend and present their data at national scientific meetings in the student's area of research. The department has some funds set aside to assist with student travel costs as needed. Applications should be made to the Departmental Travel Committee.

4. THE MENTOR

The Mentor must be a member of the Biochemistry & Molecular Biology Graduate Program Faculty in full standing, under whose direction the student will conduct research leading to the M.S. degree.

The Mentor's primary duty is to assist the student in planning and completing a program of graduate study that will provide the student with suitable training for a career in research, teaching, biotechnology industry or science administration, and which satisfies the requirements of the Department and the Graduate College. The Mentor, with the Thesis Committee, must keep track of the student's progress at all times and ensure that the student maintains a program that appropriately exercises his or her capabilities. If the student's performance is unsatisfactory, the Mentor should counsel the student with regard to improving performance, changing mentor or program, or finding another career. The Mentor is expected to maintain close professional contact with the student at all times.

The Biochemistry and Molecular Biology graduate program does not presently limit the number of students that can be in any one faculty member's laboratory or that can enter a lab in the same year. The relevant consideration is the funding status of that laboratory and its ability to support the student's stipend and the student's research project. The student, however, should consider whether there are sufficient independent projects.

Changes in the Mentor and/or members of the Thesis Committee can be initiated by the student, the Mentor, or the Program Director and must be approved by the Graduate Program Committee and the current and proposed Mentors.

5. THE THESIS COMMITTEE

The student, in consultation with their mentor, should choose their Thesis Committee during their first year and have the composition of the committee approved by the Biochemistry and Molecular Biology Program Director. The committee is chaired by the Mentor, and includes at least two additional members of the Department's Graduate Program faculty. At least two of the three members must be Biochemistry & Molecular Biology primary faculty. The student should submit a list with names of selected committee members to Dr. Karla Rodgers. A form is available for this purpose.

The charge of the Thesis Committee is to provide expertise and scientific advice that will help the student carry out the research project, and it should regularly evaluate the student's progress. In addition, the Thesis Committee serves to safeguard the student if the research project fails or if the relationship between the student and the Mentor does not develop satisfactorily. The Thesis Committee must meet with the student regularly and can be called together at the request of the student, the Mentor, the Program Directors, or a majority of Committee members. A written summary of each meeting ("Report of MS Thesis Committee meeting") is completed and forwarded to the Program Director and placed in the student's file.

6. THE THESIS

The expectation is that the thesis will contain publishable data. The reading copy should be in an acceptable format and must include all figures and tables, numbered pages and a complete bibliography. It is the responsibility of the candidate to ensure the thesis format complies with the Graduate College standards as defined in the "Instructions for the Master's Thesis and Doctoral Dissertation." (*Section 10*) When the copy has received preliminary approval of the major professor, it should be submitted to the Graduate College along with a memorandum from the major professor indicating approval of the reading copy and listing the members of the reading committee. If a tentative defense date has been scheduled, it may be indicated in the memorandum from the major professor. The master's candidate distributes reading copies of the thesis to each thesis committee member. Reading copy deadlines are printed in the Class Schedule Bulletin for each semester. Students who wish to file an electronic thesis must submit their reading copy as a PDF document using Adobe Acrobat. Approval to submit in this format must be indicated by the major professor in a memorandum.

The committee will read and determine whether the thesis demonstrates the student's discipline. They may accept or reject it. If they reject it, the student will be given another opportunity to submit an acceptable thesis to the committee and the Graduate College. If they accept it, they may require changes and corrections. When the thesis is acceptable and a degree check indicates the student has completed all course work with acceptable grades, the student may schedule the final oral defense.

At least 10 working days *prior* to the defense of the thesis, the chair of the student's committee must send a memorandum including a list of all committee members, the date of the oral defense, and a request for the authority form to the Graduate College.

Only one attempt is afforded the candidate in defending the thesis. Within 72 hours after the thesis defense, the authority form must be returned to the Graduate College with the results and signatures of all committee members. A unanimous vote concerning the candidate's performance in defending the thesis is expected; however, some dissenting votes may be cast. See the Graduate College Bulletin for procedures.

7. THE FACULTY AND THEIR RESEARCH

7.1 Primary Faculty

Gillian M. Air, George Lynn Cross Professor; PhD, University of New South Wales (Australia), 1971. Molecular biology of influenza virus; mechanisms of antigenic variation; development of antiviral agents.

Paul DeAngelis, Professor; PhD, University of California, Irvine, 1990. Protein/carbohydrate interactions using the tools of biochemical analysis and molecular biology.

Jay S. Hanas, Professor; PhD, SUNY at Stony Brook, 1981. Molecular biology; expression and regulation of ribosomal genes.

Franklin A. Hays, Assistant Professor; PhD, Oregon State University, 2005. Mechanisms of anticancer drug efficacy and transport; membrane protein expression, purification, crystallization, and functional analysis

Martin Levine, Professor; B.D.S., 1964, PhD, 1973, University of Glasgow. Biochemical and immunological approaches to the study of dental caries and periodontal disease; immunochemistry.

Guangpu Li, Professor; PhD, Washington University (St.Louis), 1991. Vesicular transport of proteins and lipids: molecular mechanisms and role in virus infection and hormone secretion.

Jialing Lin, Associate Professor; PhD, University of Tennessee, Memphis, TN, 1994. Assembly and interaction of oncoprotein Bcl-2 at intracellular membranes; molecular mechanisms of programmed cell death; membrane protein integration into the endoplasmic reticulum.

Hiroyuki Matsumoto, Professor; PhD, Kyoto University (Japan), 1977. Molecular mechanism of visual excitation; role of protein phosphorylation in neuronal function; molecular biology of cellular regulation in neurons.

Blaine Mooers, Associate Professor; PhD Oregon State University, Corvallis, 1997. RNA Structure and Editing, Protein Structure, Stability, Evolution & Redesign, Crystallography at Atomic/Subatomic Resolution, *Ab initio* Structure Determination of Proteins by Direct Methods.

Ann Louise Olson, Professor; PhD, University of Iowa, 1986. Transcriptional regulation of the insulin-regulated facilitative glucose transporter (GLUT4) gene; mechanisms of insulin-mediated GLUT4 translocation.

Augen Pioszak, Associate Professor; PhD, University of Michigan, 2003. Structural biology of cell surface receptors and their ligands; molecular mechanisms of G protein-coupled receptor signaling; structure-based development of therapeutic agents.

Karla Rodgers, Associate Professor; PhD, University of Illinois, Urbana-Champaign, 1991. Biochemical studies of proteins that catalyze DNA recombination and repair. Biochemical and biophysical investigations of nucleic acid-interacting proteins.

7.2 Research Faculty Members with Graduate Appointments

William A. Rodgers, PhD, Associate Professor of Research, University of Illinois, Urbana-Champaign, 1992

7.2 Adjunct Faculty Members

Sanjay Bidichandani, Professor; MBBS., PhD, University of Glasgow (U.K.), 1994. Pediatrics. Molecular genetics and pathophysiology of Friedreich's ataxia; Molecular biology of the GAA triplet repeat expansion; Mutational mechanisms in inherited human disease.

Charles T. Esmon, Professor; PhD, Washington University (St. Louis), 1973. Coagulation Biology Laboratory, OMRF. Blood coagulation and endothelial cell function.

Timothy Griffin, Associate Professor; PhD, University of California, Berkeley, 2002. Aging and Metabolism Research Program, OMRF. Contribution of obesity to osteoarthritis development.

Kenneth M. Humphries, Assistant Professor; PhD, Case Western Reserve University, 2000. Aging and Metabolism Research Program, OMRF. Diabetes induced changes in cardiac mitochondria and metabolism.

Timothy Mather, Assistant Professor, Ph.D., Oklahoma, 1995. Coagulation protein structure and function.

Rodger P. McEver, Professor; MD., University of Chicago, 1974. Cardiovascular Biology Research Program, OMRF. Structure and function of blood and vascular receptors; interactions of leukocytes with platelets and endothelium; protein targeting.

Ray Rezaie, Professor, PhD Boston University, 1989. Cardiovascular Biology Research Program, OMRF. Blood clotting and thrombosis.

Jonathan Wren, Associate Professor; PhD, University of Texas Southwestern Medical Center, 2003. Arthritis and Immunology Research Program, OMRF.

Lijun Xia, Professor; MD, Binzhou Medical College, China 1982; PhD, Soochow University Medical College, China, 1995. Cardiovascular Biology Research Program, OMRF. Biological functions of O-glycans using global or tissue-specific gene-targeted mice as models.

8. THE GRADUATE PROGRAM COMMITTEES

These are the departmental committees that are involved in the MS program.
Please see our web site for more details.

Graduate Education Committee

Student Awards Committee

PROGRAM ADMINISTRATION

Chaney Davis, BMSB 553, phone: 271-8001, x45535, email: chaney-davis@ouhsc.edu

9. CHECKLIST FOR M.S. STUDENTS IN BIOCHEMISTRY & MOLECULAR BIOLOGY

Thesis	
X	No later than the end of the first year of graduate study, submit an Outline of Graduate Work to the Graduate College. No later than the Fall semester of your second year, select a thesis topic in conjunction with your advisor.
X	Enroll in a minimum of two credit hours of research (6224 or 5980) each semester. (See section 2.2.1 for courses).
X	Select the members of your thesis committee in conjunction with your mentor. All committee members must have a graduate faculty appointment. (See section 5) Schedule your first meeting during the fall of year 2.
X	At the beginning of the semester in which you expect to graduate, file an Admission to Candidacy form (<i>Appendix V</i>) for the master's degree in the Graduate College (consult the class schedule for specific deadlines).
X	In consultation with the chair of your committee, a memorandum must be submitted to the Graduate College identifying the committee members, the date of the defense or examination and a request for the Authority Form.
X	Prepare and distribute the reading copy of your thesis master's thesis to each committee member and the Graduate College. The reading copy deadlines are printed in the class schedule.
X	Within 72 hours after the thesis defense, or comprehensive exam, submit the report form with the results signed by all committee members to the Graduate College.
X	Within 60 days after passing the thesis defense, submit your thesis to the Graduate College (Deadlines to graduate in a specific semester are listed in the Graduation Deadline section of the Bulletin.)

1st Academic Year

Enrollment as in section 2.2

Attend all Department seminars

- (b.) Before June 30 meet with the First Year Advisory Committee to plan your program of study. Secure the signature of each committee member and forward the Outline of Graduate study and the First Year Progress report to the Program Directors. The Outline is sent to the Graduate College. (Progress Report form available on the department website: <https://basicsciences.ouhsc.edu/bmb/ResourcesandForms.aspx#308401461-student-forms>)

You may download the Outline of Graduate Work form at:

<https://graduate.ouhsc.edu/Portals/1056/Assets/documents/Current%20students/Forms%20for%20Current%20Students/Masters%20non-thesis%20forms/MSOutlineGradWork%208.10.15.pdf?ver=2015-08-11-171318-747>

Return completed Progress Report to Chaney Davis.

- (c.) Continue research project. Assemble your thesis committee.

2nd Academic Year

Year 2 Fall semester

Enroll as in section 2.2 Meet with your thesis committee.

Year 2 Spring semester

- (a.) Make sure you enroll in remaining required coursework! Journal Club, enroll in Student Seminar.
- (b.) At the beginning of the semester in which you expect to graduate, file an Admission to Candidacy form for the master's degree in the Graduate College (consult the class schedule for specific deadlines).

In consultation with your mentor and committee, decide the content and format of your thesis. When you have completed the reading copy and it has been approved by your mentor, a memorandum must be submitted to the Graduate College identifying a list of all committee members, the date of the defense or examination and a request for the Authority Form.

Year 2 Summer semester

- (a.) Complete enrollment form: electives, thesis research hours.
- (b.) Complete thesis research project, write and defend thesis.
- (c) Graduate!