Graduate Student Handbook

2014-2015

Department of Microbiology & Immunology
Montana State University - Bozeman

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INTRODUCTION

This handbook has been written so that each graduate student in this department may have a copy of the policies and procedures of the Department of Microbiology & Immunology ("the Department") that affect the Graduate Programs. Microbiology & Immunology ("MBI") students who are affiliated with other research units on or off campus (*e.g.*, Center for Biofilm Engineering) must also abide by these policies and procedures.

We have attempted to answer the most frequently asked questions. The policies and procedures of The Graduate School are detailed on their MSU website. The information in this *Graduate Student Handbook* is consistent with the latest version of the catalog. Both documents are subject to revision and students are encouraged to obtain current information.

The Graduate Program Committee, appointed by the Head of the Department, is responsible for administration of the MBI Graduate Program. Apparent conflicts in procedures should be resolved by first consulting the chairperson of the Graduate Program Committee, then the Department Head, and finally the Dean of The Graduate School.

The requirements outlined in this manual should be considered minimal and may be modified by the student's Doctoral or Masters Committee according to the student's need. Students entering the graduate program must meet the requirements of The Graduate School and the requirements of the Department contained in this *Graduate Student Handbook*.

Students are expected to put forth the necessary commitment and effort to progress at a satisfactory pace. A graduate degree from this Department is granted on demonstrated scientific productivity and excellence. Our goal is to assist graduate students to attain competence in their chosen field.

THE DEPARTMENT OF MICROBIOLOGY & IMMUNOLOGY OFFICE

The Office of the Department is located in Room 109 Lewis Hall. The office staff is always pleased to welcome students and to try to help them solve problems. Graduate students should consider the Departmental Office as the focus of information and official action on campus. The office is open from 8:00 AM to 12:00 Noon and from 1:00 PM to 5:00 PM, Mondays through Fridays. The office is not accessible at other times.

Please consult the MSU Departmental website for more information.

Addresses and Telephone Numbers

The office maintains an up-to-date list of addresses (physical and email), and telephone numbers of faculty, staff, and students. Each student must provide the office staff with such information as soon as possible and keep the office informed of any changes.

Mail

Graduate students are assigned mailbox space in Lewis Hall, Room 109. Special notices, telephone messages and letters received in care of the Department are placed in the mailbox. Students should check daily to ensure prompt receipt of this material.

Computer Services

Computers in the main office are for Departmental business. Generally, graduate students also have access to computer facilities in the laboratories of their major professor. The University supplies computer facilities for student use in Reid, Roberts and Cheever Hall as well as in the Renne Library.

Photocopy Policy

The departmental photocopy machine is available to graduate students at the Department's expense only for copying related to teaching activities. Photocopying related to grant-funded activities should be billed to one of your advisor's accounts. Other photocopying will be billed to you at a rate established by the department.

FAX

A FAX is available in the Department office. The number is 406-994-4926.

Poster Printing

The office houses a printer capable of printing large format posters for presentation of your research. Please make arrangements with the office staff ahead of time to have your poster printed as it can get quite busy at times.

PERSONNEL

Head, Dept. of Microbiology & Immunology
Mark Jutila

Microbiology & Immunology Graduate Curriculum Committee
Mensur Dlakic, Co-chair
Matthew Taylor, Co-chair
Matthew Fields
Kari Cargill
Joshua Obar
Jovanka Voyich-Kane
Eric Boyd

Dean, The Graduate School
Karlene Hoo

Microbiology & Immunology Graduate Student Representative
Lauren Franco
(Chosen from current graduate students to attend Departmental faculty meetings and meetings of the Graduate Curriculum Committee.)

ADMISSION TO GRADUATE STUDY

General Statement of Policy

Inquiries concerning graduate study in the Department are referred to the Chair of the Departmental Graduate Program Committee and evaluated by appropriate faculty members. Students accepted for the Master of Science or the Doctor of Philosophy degree programs in the Department must conform to the requirements and regulations of The Graduate School and to those of the Department. The Department and the student's Doctoral/Masters Committee will specify additional requirements for the degree. All of these requirements must be fulfilled before a student is awarded a degree from the University.

Application Requirements

The procedures for admission are as stated in The Graduate School Application Requirements. A brief outline is as follows:

1. **Application form**

2. **Three letters of recommendation**

3. **Graduate Record Examination (GRE)**
   The Graduate Record Examination General Test must be taken prior to making an application for admission to The Graduate School *No subject test is required.*

   The result of the examination is one of the several criteria used to estimate a student's potential to succeed in graduate school.

4. **Official Transcripts**

5. **Personal Statement**
   The most important part of your statement is to convey why you want to study the field you have chosen, and why you want to study it at MSU. Develop a story that focuses on you and how your personal experiences have shaped your future goals. It would be helpful if you can identify a faculty member within the Department whose work best matches your interests.

Additional materials required from International Applicants:

1. **English Proficiency exams**
   If English is not the official language of the student's country of citizenship, the student is required to take either the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS).

   These exams are not required if the applicant has received an undergraduate or graduate degree from an institution in the U.S.

2. **International Student Financial Certificate**

APPLICATION and ADMISSION PROCESS

The complete application packet for admission is available online at The Graduate School.

The Department has set **deadlines** by which complete applications must be received for consideration. These are:

- for Fall Semester
  - December 15
- for Spring Semester
  - September 15

After receipt of the completed application, the Department Graduate Committee and faculty will review the application and invite promising candidates for on-campus interviews. A Skype interview is acceptable if arrangements cannot be made for a visit. Based on interviews, the Graduate Committee will make initial recommendations about the suitability of all applicants. The Department Head will then make a firm recommendation to the Dean of The Graduate School concerning admission to the Department. The Dean will make the final decision on the application.

The Department may choose any of the following:

- ***Accept*** *(Regular Admission)*. The student has satisfied all of the requirements of The Graduate School and those of the Department. The GRE scores indicate a high probability of success in graduate school. The academic record and recommendations of the student meet the standards established by the Department. A mentor in the student's area of interest is likely to be available.

- ***Accept with Provisions*** *(Provisional Admission)*. Many provisions are possible and no attempt will be made here to list all possible provisions. Rather, a few examples are given. A provision may be that the student is admitted to a specific program, e.g., Master of Science - option B. In other cases, the provision may be that a student must take certain courses to correct deficiencies in undergraduate preparation.

- ***Refuse***. Admission may be refused because: (i) the record of the student does not meet the desired standards; (ii) the potential for success in graduate school is considered to be doubtful; (iii) the Department may have more students than the faculty can reasonably guide; (iv) the Department cannot support the research of the student; or (v) a mentor in the student's area of interest is unavailable.

Students will be considered for direct admission into Department only if there is a professor willing to support them for the duration of their studies. These students will undergo the same application procedures.

If you are accepted by The Graduate School, you must fill out and return the Admissions Response form, stating whether or not you intend to attend Montana State University.

GENERAL DEPARTMENTAL REQUIREMENTS

- **New Student Orientation**

Prior to the first week of the semester the department holds an orientation for all new graduate students. This will entail an overview of our graduate program.

- **Classwork**

Students will be expected to take a combination of core and elective coursework to provide adequate background in both general and discipline-specific microbiology. Prior to orientation, students should register for the core curriculum courses offered in their first semester.

- **Rotations**

Students brought in under the rotation umbrella will be expected to complete three 8-week laboratory rotations in potential research laboratories. Rotations are the student's chance to experience research in the lab of potential mentors and determine if both opportunities and personalities will fulfill the student's needs for a successful dissertation project. Students who are directly admitted into MBI labs are not required to complete rotations, although they will be expected to perform comparable academic activities as determined by their Doctoral/Masters committee.

- **Research**

All students will be expected to develop a rigorous program of laboratory-based research in conjunction with their chosen laboratory. The research will need to produce primary, peer-reviewed research articles that will form the basis of the dissertation.

- **Participation in the annual Departmental Retreat**

The Department holds a retreat in late summer to promote intradepartmental exchange for all faculty, staff and graduate students. All graduate students are expected to attend and participate.

- **Teaching Experience**

All graduate students are expected to teach, or to assist in teaching, an undergraduate course for two semesters, dependent on availability. The goal is to provide an important professional experience for the student.

- **Departmental Seminar Presentation**

All graduate students are required to formally present their research **annually** to the faculty in the Departmental Seminar. Please consult with the faculty member in charge of the seminar, prior to or early in, the semester in which you would like to present.

- **Annual Committee Meetings**

The student's Doctoral/Masters Committee meets with the student annually (at a minimum) to monitor progress towards the degree.

- **Printed copies of thesis/dissertation**

Hardbound copies of Thesis/dissertation, labeled on the spine with the student's name and title of document, as dictated by the Graduate School and the Department. Copies must be supplied to the major professor and to the Department.

CREDIT GUIDELINES

The regulations of The Graduate School with respect to registration are found at Credit Guidelines. Important considerations are:

- **Tuition waivers**
  - If the student is on a fellowship, traineeship, or assistantship, s/he must be registered for at least six credits each semester to be eligible for tuition waivers.
  - Please note that tuition waivers do not cover associated university fees. These must be paid by the student or by their major faculty member.

- **Graduate Teaching or Research Assistants (GTAs/GRAs)**
  - Students employed as GTA's and GRA's pay in-state tuition rates.
  - GRA's are limited by The Graduate School to no more than 12 credits per semester if working more than 15 hours per week. GRA's who are appointed to fewer than 15 hours per week may carry up to 15 credits per semester. Special permission is required to take more than 15 credits.
  - Our TA's are appointed to a 19 hour per week workload (class time, preparation and grading included).

- **International Students**
  International students must register for at least nine credits each semester.

- **Financial Aid**
  Usually requires 6 credits per semester.

- **Montana residency**
  - Out-of-state students wishing to become Montana residents must begin a process that takes a full 12 months.

  - Consult the Registrar's Office for Residency requirements.

- **Continuous enrollment**
  All graduate students who have passed their comprehensive exams or have completed their program coursework must be enrolled for a minimum of 3 credits of MB 590/690 while working on their thesis/dissertation.

- **Comprehensive exams, defense of thesis/dissertation, graduation**
  Registration for at least three credits is required during the semester in which the student is taking oral examinations, defending a thesis/dissertation and also during the semester of graduation.

- **One credit final semester registration**
  A student who has completed all requirements for their degree (coursework, defense, approval of thesis/dissertation by the Vice Provost of DGE) on or before the day of the following semester may register for a minimum of 1 credit. This allows additional time past the intended semester of graduation but prior to the first day of the following semester. Graduation will officially be that following semester. Students who intend to do this should contact The Graduate School. Please refer to

section 5.7.2 (One-credit Extension) from the Graduate School.

DOCTORAL/MASTERS COMMITTEE

- **Selection of thesis/dissertation advisor**

The selection of a **major professor** is an important step in the process of graduate education. The student should have discussions with as many members in the Department as possible before making a decision. The decision must be based on a mutual agreement between the student and the professor. The faculty member may reject a student if, for example:

a. s/he has too many students, or,
b. s/he has insufficient funds to support the research of the student, or,
c. s/he judges that the student does not have the motivation, initiative, or ability to succeed.

After a student is accepted by a faculty member, the student is responsible to his/her major professor to perform in a satisfactory manner. *Failure to perform may result in dismissal from graduate school or in termination of work under the guidance and support of the major professor.*

- **Doctoral/Masters Committee Make-up**

The **Committee** is appointed by the Dean of The Graduate School after receiving recommendations from the student and Department.

- Committee Chair — A tenured or tenure-track faculty member serves as the chair of the student's committee and acts as a channel of communication within the degree-granting department.
- Committee Composition — A Doctoral Committee is composed of a minimum of four members. The majority of the committee should be made up of faculty from the degree-granting department, but due to the interdisciplinary nature of many degrees, is not limited to the degree-granting department. The graduate committee chair and the department head recommend the committee composition to The Graduate School. Final approval of committee composition rests with The Graduate School.
- Graduate Representative - The Graduate School will assign a graduate representative to the student's Doctoral/Masters Committee. See Graduate Representative
- Non-Tenure Track Committee Members — Committee members not holding tenure or tenure-track faculty status at MSU must submit documentation of their qualifications, including a vita and a letter of recommendation from the student's department head to The Graduate School. In some cases, these committee members may act as co-chair of a student's committee.
- Changes to the Committee — The student may make changes to their committee, using the Committee Revision form. Changes in committee composition may not be made due to examination scheduling problems.
- Committee Appointment Deadline — The committee composition must be submitted to The Graduate School by the end of the student's third (3rd) semester of graduate attendance. See Graduate Program of Study & Committee form. See Fees & Holds.

For more information, please refer to Graduate School Policy.

The composition of the Doctoral/Masters Committee and the Graduate Program must be

submitted on Official Forms to The Graduate School by the end of the second semester for Master's students and by the end of the third semester for Ph.D. students, which includes summer session.

All **changes** in the composition of the Doctoral/Masters Committee must be submitted on Official Forms .

GRADUATE PROGRAM OF STUDY

The general requirements of The Graduate School can be accessed online.

Graduate students must meet with their Doctoral/Masters Committee and develop a Program of Study to be approved and signed by the student's Committee and the Department Head.

The Program must then be submitted to The Graduate School. Deadlines for this are:

- M.S. students – before the end of the second semester of study
- Ph.D. students – before the end of the third semester (including summer semester)

The Program is submitted on the Graduate Program of Study and Committee Form for approval by the Graduate School.

All **changes** in the composition of the Graduate Program must be submitted on Official Forms to The Graduate School.

Once a course has been taken, it cannot be removed from the Program.

GRADES IN GRADUATE SCHOOL AND EVALUATION OF PROGRESS

Grades

The graduate student must maintain at least a 3.0 grade point average (GPA) in all courses which are taken for graduate credit and which are listed on the student's program of study.

Any course listed in the major, minor or supporting areas in which a grade less than a "B-" has been received is considered by the Department as a failing grade. The student will be placed on **academic probation** and **must retake the course** earning a "B-" or better. A second "failing" grade will result in expulsion from the graduate program.

The Graduate School has also established a policy regarding grades in graduate school. The details of the policy are at Graduate Student Grades.

Evaluation of Progress / Annual Review

After each year of residence, every graduate student will be evaluated by the student's thesis/dissertation committee and the Department Head. In evaluation of students we include performance in courses, teaching, contributions to formal and informal seminars, progress in research projects, independence, and initiative. After completion, the results of the evaluation will be shared with the student and added to the permanent file.

If progress in the graduate program meets or exceeds expectations, the student will be encouraged to continue in the program to completion. However, if progress does not

meet expectations, the student will again be reviewed in six months to determine if s/he should continue in the program or be advised to pursue a different discipline.

- **Graduate Student Activities**

  Professional Affiliations
  Graduate students are encouraged to join a professional organization that is representative of their area of interest such as the American Society for Microbiology. Student rates are available.

  Professional Meetings
  Students are encouraged to attend and participate in at least one major scientific meeting each academic year. Funds from the Department or the major professor's research program may be available to help defray travel expenses for students presenting papers.

GRADUATE PROGRAMS

Doctor of Philosophy

- **General Information of Program of Study**

  - A minimum of 60 post-baccalaureate credits are required for graduation.
    - Students who already have an applicable Master's degree may be able to apply up to 30 credits toward the 60 credits for the PhD.
  - A minimum of 24 credits of coursework as defined below in the Core Curriculum and Elective Coursework is required, which should be chosen in consultation with your research advisor and Doctoral/Masters committee.
  - A minimum of 18 dissertation credits (MB 690) are required.
  - Two-thirds of the minimum 60 credits must be at the 5XX-level or above. (Undergraduate courses at the 4XX-level are allowed, but not 3XX-level).
  - Credit in seminar (500), individual problem (570) and internship (576) courses may not exceed 1/3 of credits required. A maximum of 6 credits for MB570 may be applied toward the program.
  - Course work more than 10 years old cannot be applied toward the program.
  - Transfer credits – see policy at Transferring Credits
  - Course work taken more than 6 years prior to admission into the graduate program may not be applied to the program.

- **Core curriculum**

  All Ph.D. students who are not directly admitted into one of MBI labs are required to conduct **three** laboratory rotations during the Fall and Spring semesters of their first year in the MBI graduate program. Students will be expected to balance coursework and labwork during their rotations. Students may petition the MBI Graduate Committee to be exempt from one rotation if they find a suitable lab and the PI is able to accommodate the student. All modifications from curriculum must be petitioned to the MBI Graduate Committee and Department Head for approval.

Course	Start	Finish
IMID 521 – Rotation 1	Aug. 24th, 2015	Oct. 16th, 2015
IMID 522 – Rotation 2	Oct. 19th, 2015	Dec. 11, 2015
IMID 523 – Rotation 3	Jan. 13, 2016	Mar. 11th, 2016

Students who are directly admitted will not take rotations, and these credits must be replaced by appropriate academic classes, as determine by the Doctoral Committee.

All Ph.D. students are required to take these **two** courses which constitute the core curriculum of the MBI graduate program (see Table on following page).

	Course	Semester
General	MB 520 – Microbial Physiology	Fall
Ethics	BIOB 524 – Ethical Practice of Science	Spring

- **Electives Coursework (subject to change)**
  All Ph.D. students are required to take at least one course in **four** of the seven areas of the topic specific curriculum. See the Table below for the core groups and course opportunities to fulfill the requirements.

	Courses	Semester
Bioinformatics	MB 535 – Genomic Analysis MB 537 – Advances in Molecular Evolution MB 544 – Advanced Bioinformatics	Fall (not 2015) Fall (not 2015) Spring (Even)
Biochemistry	BCH 543 – Proteins BCH 544 – Molecular Biology MB 527 – Toxicology: Science of Poisons	Fall (Odd) Spring (Odd) Spring
Immunology	MB 525 – Advanced Immunology	Spring (Even)
Microbial Evolution & Ecology	MB 515 – Advanced Microbial Ecology MB 552 – Advanced Soil & Environmental Microbiol. MB 591 – Precambrian Biosphere ERTH 505 – Geomicrobiology	Spring (Odd) Spring (Even) Fall (Odd) Spring (Even)
Microbial Genetics	MB 528 – Advanced Genetics IMID 505 – Eukaryotic Gene Regulation ENVE 566 – Fundamentals of Biofilm Engineering	Spring (Odd) Spring (Odd) Fall
Microbial Pathogenesis	MB 530 - Virology MB 505 – Host-associated Microbial Ecosystems	Fall Fall
Scientific Writing	MBSP/DGE 613 – Scientific Proposal Writing	Summer

Teaching Assistantships

All Ph.D. students will complete two teaching assistantships, based on availability. This typically will be done in the student's second year in the program

A Teaching Assistant (TA) workload is considered to be 19 hours per week. This consists of actual class time as well as time spent in preparation and grading.

Students who are acting as a TA for the first time in the Microbiology Department also must register for **BIOM 497 – Educational Methods: Microbiology** (2 cr.). This course is meant to give new teachers assistance in developing effective teaching techniques, training in preparing laboratory materials and help with classroom management and

grading.

TA tuition waivers, covered by the department, cover only tuition costs and not associated university fees.

- **Doctoral Committee**
  All Ph.D. students are required to form their doctoral **committee within one semester** of joining their Ph.D. laboratory, but no later than the end of their first summer semester. The chair of Doctoral Committee will be the student's PI. The Doctoral Committee must include at least 3 other faculty members of the Department, plus a Graduate School representative, assigned by the Graduate School. The Doctoral Committee is expected to meet annually, typically after the student's Research In Progress (RIP) presentation. Moreover, the student must meet with the Department Head annually.

- **Seminar Series and Journal Club**
  - **Departmental Research Seminar Series**
    - All students are required to attend the **Departmental Seminar** (MB500 section 01) each semester in residence.
    - Students are encouraged to register for these each semester, if possible, although there are limits to the number of MB500 credits allowed in a Graduate Program (3 for Ph.D.)
    - Have the office staff register you online – there are conflicts when taking multiple MB500 sections.
  - **Student Research-in-Progress (RIP) Series**
    - All students are required to attend and present in the **Student RIP Series** each year in residence starting in their second year.
  - **Journal Clubs**
    - All students are required to enroll in one of three BioM 592 Journal Clulb sessions each semester in residence.
    - Prior to each semester, the instructors and topics of the three Journal Club will be announced. The topics will vary, but will either cover environmental or biomedical research topics or synchronize with the Departmental Research Seminar Series schedule.

- **Ph.D. Qualifying Exam**

The qualifying exam allows the student's graduate advisory committee to assess the development of the dissertation research plan and evaluate the student's capabilities for the comprehensive exam. This exam will consist of two parts: 1) A written proposal on your future dissertation research, 2) a 50 minute chalk talk for the graduate committee. Students will be expected to complete the qualifying exam by the end of the 4th semester in the program.

Students will write-up their dissertation proposal, in the form of an appropriate Pre-doctoral Fellowship application, and disseminate to their graduate committee a minimum of one week before the chalk talk presentation. Your written dissertation proposal will conform to one of the application guidelines of a national funding agency, with the intent that suitable proposals will be submitted. Suggested application guidelines can be found from NIH, USDA, DOD, NSF, among others.

Agency	Program	Website
NIH	F31	http://grants.nih.gov/training/F_files_nrsa.htm
USDA	NNF grants	http://nifa.usda.gov/
DOD	NDSEG	http://ndseg.asee.org
NSF	various	http://www.nsf.gov/funding/education.jsp?fund_type=2

The student's graduate committee will agree upon a format based on the topic and applicability of research. It is expected that the student will develop and write the majority of the dissertation proposal, with input and guidance from their faculty mentor.

The student will then present a chalk-talk style presentation of the dissertation proposal to the committee. This presentation should summarize the stated goals of the dissertation proposal and provide context for the research plans, expected outcomes and alternative strategies. During the chalk-talk, the committee will evaluate and challenge the student's capacity to present their research plan, their comprehension of relevant background material, and the rigor of their hypotheses. The graduate committee will then decide whether:

1) The student has passed the qualifying exam.

2) The student must revise their written dissertation proposal, but can continue toward the Comprehensive Exam.

3) The student must significantly revise and re-present their dissertation proposal and/or needs further classwork prior to taking the Comprehensive exam.

Upon successful completion of the Qualifying Exam, the graduate committee and the student will generate a timeline for the completion of the Comprehensive Exam.

- **Ph.D. Comprehensive Exam**

All Ph.D. students must successfully complete a comprehensive examination no later than the 5th semester (excluding summers) after enrollment in the Ph.D. program. The Department of Microbiology & Immunology utilizes a comprehensive examination involving written and oral components to assess breadth of knowledge in their Ph.D. training. The exam design evaluates a student's ability to generate and organize scientific concepts, present those concepts in a written and oral format, and support and defend the proposal from external critical analysis.

The comprehensive exam will consist of 3 components: 1) A departmental presentation of your proposed dissertation research, 2) An off-topic (different from dissertation projects) written research proposal, and 3) Oral defense and exam of off-topic proposal and general knowledge by the graduate committee.

The oral presentation is a 45-50 minute presentation to a public audience. The student will present the pertinent background, preliminary data, and future plan in a formal presentation style. Afterward, the committee will convene with the student to examine the students understanding of the proposed research and provide critical commentary on the merits of the written proposal and oral defense. It is up to the committee to accept or reject the dissertation proposal with the understanding of possible modifications, or ask the student for major or minor revisions. At the end of this meeting, the student and committee will discuss the off-topic proposal.

For the off-topic research proposal, the student will develop three potential topics and

present them to the committee with the dissertation research proposal. These topics will be written up as a one-two paragraph proposal that briefly summarizes the important background information, question(s) to be asked and an overall strategy that will be taken in putting together the proposed work. These topics will be written up and presented to the graduate committee no later than one week prior to the oral presentation. The graduate committee will review and discuss the three topics and decide if some or all of the topics are acceptable. Once decided, the student will have 3 weeks to thoroughly and independently research and design a research proposal to address the problem(s). The proposal will be a six-page research proposal. The student cannot seek advice or input on the off-topic proposal from their mentor, members of the graduate committee or other departmental faculty.

The student will provide the committee with the written off-topic proposal 1 week in advance of the examination date. The student will present a 15 to 20 minute presentation of the proposed research to the committee, at which point the oral examination begins. Questions will pertain to the proposed research as well as general knowledge pertinent to the student's class background and proposed dissertation research areas. When evaluating the performance of the student, the graduate committee can choose to:

1) Pass the student on both written and oral aspects.

2) Request written revisions to the off-topic proposal or a new oral presentation be provided. In the event of re-write or re-take of oral questioning, the committee decides format and timing to address the student's needs.

3) The student has summarily failed both the written and oral examination. In which case, the committee will provide feedback as to what will be required of the student prior to retaking the exam. The student has a single chance to re-take the exam within a 3-month time frame. A second failure will result in dismissal from the academic program.

- **Publications**

  All Ph.D. students must have one manuscript accepted and at least one manuscript submitted for publication in peer-reviewed journals before the dissertation defense. The Ph.D. student must be first author on at least one of the two manuscripts.

- **Dissertation & Defense**

  The student is required to present a public, oral defense of their dissertation research, followed by a critical examination by their Doctoral Committee.

  Please refer to the Graduate School for all timelines, requirements and paperwork.

  The primary role of the major professor and Doctoral Committee is to guide the student throughout their dissertation research. It is required that the student's Doctoral Committee meet at least once each year following a formal presentation of the student's research to discuss the student's progress.

  Dissertation must be prepared and submitted electronically in the format described in the latest version of the *Electronic Thesis and Dissertation (ETD) Initiative*. Previously

published electronic theses and dissertations may be viewed at the View ETDs link.

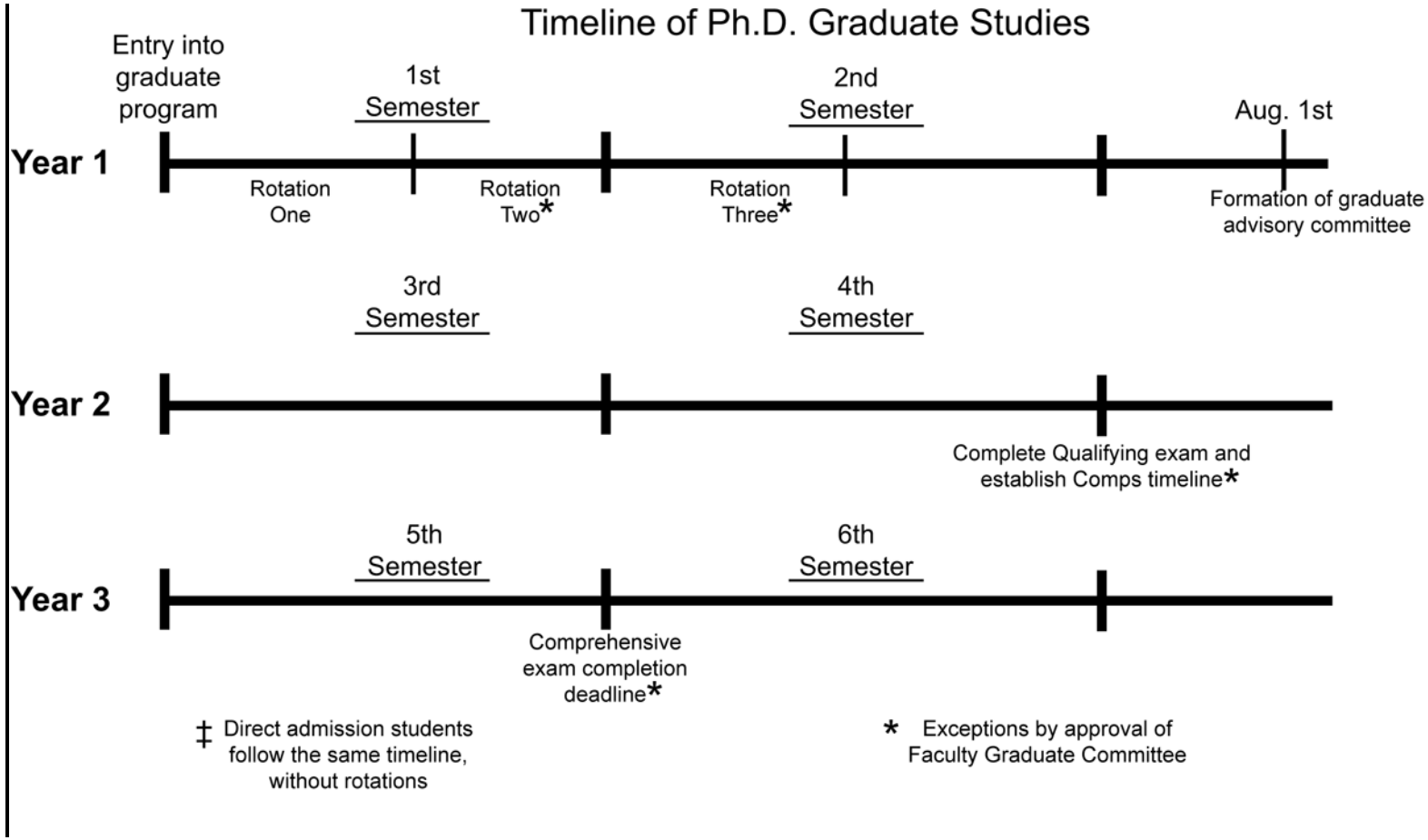
Dissertation draft must be approved by the major professor before it is submitted to the Committee. The student must defend Dissertation orally no sooner than two weeks after submission of Dissertation to the Committee. The oral defense consists of a public seminar followed by a detailed examination of the student and dissertationby the Doctoral Committee.

Notification of oral defense must be made, at least two weeks prior to defense, to The Graduate School and to the Department so that proper posting can be made well in advance.

Final approval of Dissertation rests with The Graduate School. That office reads Dissertation for formatting, grammar and content.

A dissertation approved by the Doctoral Committee, Department Head, and the Dean of The Graduate School is required. This must be submitted as an electronic dissertation not later than 14 days before the end of the semester.

- A hardbound copy of the dissertation must be provided to the Department for inclusion in the Cotner-Morris library.


Timeline of Ph.D. Graduate Studies
Entry into graduate program
1st Semester
2nd Semester
Aug. 1st
Year 1
Rotation One
Rotation Two*
Rotation Three*
Formation of graduate advisory committee
3rd Semester
4th Semester
Year 2
Complete Qualifying exam and establish Comps timeline*
5th Semester
6th Semester
Year 3
Comprehensive exam completion deadline*
‡ Direct admission students follow the same timeline, without rotations
* Exceptions by approval of Faculty Graduate Committee

Master of Science (Plan A)

- **course credits**
  - A minimum of 30 credits is required for graduation of which 20 must be for course work and not thesis credit.
  - At least half of these 20 credits must be in the major subject area.
  - A minimum of 10 thesis credits must be successfully completed.
  - Two-thirds of the minimum 30 credits must be at the 5XX-level. (Undergraduate courses at the 4XX-level are allowed but not 3XX-level).
  - Credit in seminar (500), individual problem (570) and internship (576) courses may not exceed 1/3 of credits required.
  - Course work more than 6 years old cannot be applied toward the program.
  - Transfer credits – see policy at Transferring Credits
- **pass-fail**

No more than 3 credits taken on Pass/Fail basis may be applied to a M.S. program (aside from thesis credits).

- **Core curriculum (subject to change)**

All M.S. students are required to take at least one course in **three** of the six areas of the core curriculum. The six areas of the core curriculum and the courses which can be used to satisfy the requirement are Bioinformatics, Biochemistry, Immunology, Microbial Evolution & Ecology, Microbial Genetics, and Microbial Pathogenesis (see Table below).

	Courses	**Semester**
Bioinformatics	MB 535 – Genomic Analysis MB 537 – Advances in Molecular Evolution MB 544 – Advanced Bioinformatics	Fall (not 2015) Fall (not 2015) Spring (Even)
Biochemistry	BCH 543 – Proteins BCH 544 – Molecular Biology MB 527 – Toxicology: Science of Poisons	Fall (Odd) Spring (Odd) Spring
Immunology	MB 525 – Advanced Immunology	Spring (Even)
Microbial Evolution & Ecology	MB 515 – Advanced Microbial Ecology MB 552 – Advanced Soil & Environmental Microbiol. MB 591 – Precambrian Biosphere ERTH 505 – Geomicrobiology	Spring (Odd) Spring (Even) Fall (Odd) Spring (Even)
Microbial Genetics	MB 528 – Advanced Genetics IMID 505 – Eukaryotic Gene Regulation ENVE 566 – Fundamentals of Biofilm Engineering	Spring (Odd) Spring (Odd) Fall
Microbial Pathogenesis	MB 530 - Virology MB 505 – Host-associated Microbial Ecosystems	Fall Fall
Scientific Writing	MBSP/DGE 613 – Scientific Proposal Writing	Summer

Teaching Assistantships

- M.S. students may be asked to complete one teaching assistantship if the need arises. This typically will be done in the student's second year in the program. Please see general TA guidelines above in PhD section.

- **Seminar Series and Journal Club**
  - **Departmental Research Seminar Series**
    - All students are required to attend the **Departmental Seminar** (MB500 section 01) each semester in residence.
    - Students are encouraged to register for these each semester, if possible, although there are limits to the number of MB500 credits allowed in a Graduate Program (3 for Ph.D.)
    - Have the office staff register you online – there are conflicts when taking multiple MB500 sections.
  - **Student Research-in-Progress (RIP) Series**
    - All students are required to attend and present in the **Student RIP Series** each year in residence starting in their second year.
  - **Journal Clubs**
    - All students are required to attend and participate in the **Journal Club** each semester in residence.
    - Journal Club discussion will synchronize with the Departmental Research Seminar Series schedule

Master's Degree Comprehensive Examinations.

- **Comprehensive Examination for Plan A Master's Degree**
  Before the end of the 4th semester (excluding summers), and once 2/3's of the course work has been completed, the student should schedule an oral exam with their Masters Committee. This should follow a seminar presented by the student in Journal Club. The Journal Club presentation will serve as a focus for questions. However, other questions will be included in the examination to test breadth of comprehension.

If the student fails the examination, at least 2 months must pass before repeating it. A second failure will result in dismissal from the academic program.

THESIS AND DEFENSE

A thesis approved by the Masters Committee, Department Head, and the Dean of The Graduate School is required. In Plan A, an oral thesis defense examination is required. The student's approved Masters Committee carries out this examination. The student should have prepared and distributed a draft of the thesis to the committee at least fourteen (14) business days prior to date of defense.

Please refer to the Graduate School for all timelines, requirements and paperwork.

The primary role of the major professor and Doctoral Committee is to guide the student throughout their thesis research. It is required that the student's Doctoral Committee meet at least once each year following a formal presentation of the student's research to discuss the student's progress.

Thesis must be prepared and submitted electronically in the format described in the latest version of the *Electronic Thesis and Dissertation (ETD) Initiative*. Previously published electronic theses and dissertations may be viewed at the View ETDs link.

Thesis draft must be approved by the major professor before it is submitted to the Committee. The student must defend Thesis orally no sooner than two weeks after submission of Thesis to the Committee. The oral defense consists of a public seminar followed by a detailed examination of the student and thesis by the Doctoral Committee.

Notification of oral defense must be made, at least two weeks prior to defense, to The Graduate School and to the Department so that proper posting can be made well in advance.

Final approval of Thesis rests with The Graduate School. That office reads Thesis for formatting, grammar and content.

A thesis approved by the Doctoral Committee, Department Head, and the Dean of The Graduate School is required. This must be submitted as an electronic thesis no later than 14 days before the end of the semester.

- A hardbound copy of the thesis must be provided to the Department for inclusion in the Cotner-Morris library.

Master of Science (Plan B)

Under this option, course work is substituted for Thesis requirement.

- **course credits**
  - A minimum of 30 credits is required for graduation.
  - At least half of these 30 credits must be in the major subject area (MB).
  - Two-thirds of the minimum 30 credits must be at the 5XX-level. (Undergraduate courses at the 4XX-level are allowed but not 3XX-level)
  - Credit in seminar (500), individual problem (570) and internship (576) courses may not exceed 10 credits required.
  - Credit for a Professional Paper (MB 575) may not exceed 6 credits.
  - Course work more than 6 years old cannot be applied toward the program.
  - Transfer credits – see policy at Transferring Credits
- **pass-fail**

  No more than 3 credits taken on Pass/Fail basis may be applied to a M.S. program (aside from thesis credits).
- **Core curriculum (subject to change)**

  All M.S. students are required to take at least one course in **three** of the six areas of the core curriculum. The six areas of the core curriculum and the courses which can be used to satisfy the requirement are Bioinformatics, Biochemistry, Immunology, Microbial Evolution & Ecology, Microbial Genetics, and Microbial Pathogenesis (see Table below).

	Courses	Semester
Bioinformatics	MB 535 – Genomic Analysis MB 537 – Advances in Molecular Evolution MB 544 – Advanced Bioinformatics	Fall (not 2015) Fall (not 2015) Spring (Even)
Biochemistry	BCH 543 – Proteins BCH 544 – Molecular Biology MB 527 – Toxicology: Science of Poisons	Fall (Odd) Spring (Odd) Spring
Immunology	MB 525 – Advanced Immunology	Spring (Even)
Microbial Evolution & Ecology	MB 515 – Advanced Microbial Ecology MB 552 – Advanced Soil & Environmental Microbiol. MB 591 – Precambrian Biosphere ERTH 505 – Geomicrobiology	Spring (Odd) Spring (Even) Fall (Odd) Spring (Even)
Microbial Genetics	MB 528 – Advanced Genetics IMID 505 – Eukaryotic Gene Regulation ENVE 566 – Fundamentals of Biofilm Engineering	Spring (Odd) Spring (Odd) Fall
Microbial Pathogenesis	MB 530 - Virology MB 505 – Host-associated Microbial Ecosystems	Fall Fall
Scientific Writing	MBSP/DGE 613 – Scientific Proposal Writing	Summer

- **Seminar Series and Journal Club**
  - **Departmental Research Seminar Series**
    - All students are required to attend the **Departmental Seminar** (MB500 section 01) each semester in residence.
    - Students are encouraged to register for these each semester, if possible, although there are limits to the number of MB500 credits allowed in a Graduate Program (3 for Ph.D.)
    - Have the office staff register you online – there are conflicts when taking multiple MB500 sections.
  - **Student Research-in-Progress (RIP) Series**
    - All students are required to attend and present in the **Student RIP Series** each year in residence starting in their second year.
  - **Journal Clubs**
    - All students are required to attend and participate in the **Journal Club** each semester in residence.
    - Journal Club discussion will synchronize with the Departmental Research Seminar Series schedule

Master's Degree Comprehensive Examinations.

- **Plan B Master's Degree Review and Oral Examination**

Plan B Master's Degree students must write a review of a topic in Microbiology or Immunology. The topic will be assigned by the student's Masters Committee. This review should be completed and approved before the end of the 4th semester (excluding summers), and once 2/3's of the course work has been completed. The review shall be written using the guidelines found in the instructions to authors for the journal *Microbiology and Molecular Biology Reviews.* An oral exam is then scheduled within two weeks of the submission of the review. The review will serve as a focus for questions. However, other questions will be included in the examination to test breadth of comprehension.

If the student fails the examination, at least 2 months must pass before repeating it. A second failure will result in dismissal from the academic program.

FINANCIAL AID

Acceptance into a graduate program does not imply a commitment to provide financial assistance. However, students of high scholastic standing are encouraged to consult the Head of the Department for information about Assistantships, Fellowships and technical aid positions. Most of our graduate students are continuously supported through teaching or research assistantships if progress is satisfactory.

Assistantships

Assistantships are awarded for either teaching or research. Teaching Assistants may teach one or more sections of an undergraduate class or laboratory, and/or help with laboratory preparation. Research Assistants are assigned to a research project being conducted by a staff member. Research done on an assistantship may or may not be applied to the student's thesis.

It is not acceptable for a graduate student to receive a full RA-ship and a full departmental TA-ship at the same time. However, since a TA stipend may be less than that earned by an RA, a faculty member may provide a partial RA-ship in order to ensure the student receives full stipend support while acting as a TA.

A number of teaching and research assistantships are available for the regular school year (August-May), and opportunities are available during the Summer Semester. The usual term of appointment for a Graduate Teaching Assistant is August 15 through May 15. The Graduate School has established minimum requirements for the award of a teaching or research assistantship.

Fellowships

Fellowships are graduate scholarships obtained from off-campus sources and carry stipends. A student holding a Fellowship may carry a full graduate credit load and usually selects and works on research directed towards a thesis. However, the terms of some Fellowships are somewhat restrictive, and the student is expected to honor the objectives of the granting agency. Each Fellow is required to meet the academic requirements of The Graduate School and the Department. Inquire at Personnel and Payroll Services to determine if your assistantship is tax exempt.

Students are usually required to write a research proposal in order to obtain a fellowship. While this may seem like a lot of work, there are several benefits to students and the host lab: 1) Fellowships may provide students with higher salary than what a PI can pay; 2) Fellowships free up funding that can be used to improve student’s training and provide additional travel opportunities; 3) Obtaining an independent funding increases student’s prestige in all future job and funding applications.

Technical Aid

Most of the staff members obtain research grants which include funds for graduate assistants and technical help. Pay schedules for graduate assistants are generally based upon a semester or a year. Technical employees are paid on either an hourly or monthly basis. In general, graduate students do not receive technical assistance towards the completion of their thesis project.

General Financial Aid

Loans and work study opportunities may be available through Financial Aid Services.

Tuition Waivers

TA tuition waivers, covered by the department, cover only tuition costs and not associated university fees. GRA tuition waivers are covered by the major professor from grant monies. These may or may not cover associated university fees as well as tuition.

APPENDIX: MSU POLICY ON ACADEMIC MISCONDUCT

The administration, faculty and students of Montana State University believe that academic honesty and integrity are fundamental to the mission of higher education. The University has a responsibility to promote academic honesty and integrity and to assure the highest ethical and professional standards and behavior in the classroom. Accordingly, the University has developed procedures that address instances of academic dishonesty. Students who violate these standards commit academic misconduct and will be subject to academic and/or disciplinary sanctions.

410.00 ACADEMIC MISCONDUCT

Includes cheating, plagiarism, forgery, falsification, facilitation or aiding academic dishonesty; multiple submission, theft of instructional materials or tests; unauthorized access to, manipulation of or tampering with laboratory equipment, experiments, computer programs, or animals without proper authorization; alteration of grades or files; misuse of research data in reporting results; use of personal relationships to gain grades or favors, or otherwise attempting to obtain grades or credit through fraudulent means.

420.00 DESCRIPTIONS AND EXAMPLES

A description of some forms of academic dishonesty and some examples are provided to help the student understand his or her responsibilities for academic honesty:

A. ***Cheating*** - giving, using or attempting to use unauthorized materials, information, notes, study aids or other devices in any academic exercise including unauthorized communication of information. Examples of cheating include copying from another student's paper or receiving unauthorized assistance during a quiz, test or examination; using books, notes or other devices such as calculators, unless authorized; acquiring without authorization copies of tests or examinations before the scheduled exercise; or copying reports, laboratory work or computer programs or files from other students.

B. ***Falsification / fabrication*** - the invention or unauthorized alteration of any information or citation in an academic exercise. Examples of fabrication include inventing or counterfeiting data or research procedures to give the appearance of results being achieved from procedures that were not undertaken. Examples of falsification include the false citation of a source of information; altering the record of, or reporting false information about practicum or clinical experiences; altering grade reports or other academic records; submitting a false excuse for absence or tardiness; or altering a returned examination paper and seeking a better grade.

C. ***Tampering*** - interfering with, altering or attempting to alter university records, grades, assignments, laboratory experiments or other documents without authorization. Examples of tampering include using a computer or false-written document to change or affect the grade recorded for a student; forging the signature of a university official on a drop/add sheet or other official university record; erasing records or information of a student; unauthorized access to a university record by computer or unauthorized entry into an office or file; or obtaining information from the university without proper authorization.

D. ***Plagiarism*** - presenting the work of another as one's own without proper acknowledgment. Examples of plagiarism include submitting as one's own work the work of another student, ghost writer or commercial writing service; directly quoting from a source without acknowledgment; paraphrasing or summarizing another's work without acknowledging the source; or using facts, figures, graphs, charts or information without acknowledging the source. Plagiarism may occur orally or in writing and may involve computer programs and files, research designs, distinctive figures of speech, ideas and images or any other information that belongs to another person and is not acknowledged as such. Inadvertent or unintentional misuse or appropriation of another's work (such as relying heavily on source material that is not expressly acknowledged) is still considered plagiarism.

E. ***Facilitating academic misconduct*** - giving assistance or attempting to assist another in the

commitment of academic misconduct.

F. ***Multiple submission*** - submitting the same paper or oral report for credit in two courses without the instructor's permission; making minor revisions in a paper or report for which credit has already been received and submitting it again as a new piece of work.

G. ***Other Academic Misconduct*** - Examples of academic misconduct include allowing another student to copy from one's paper during an examination or test; distributing test questions or substantive information about the material to be covered on a test before the scheduled exercise; collaborating on work with the knowledge that the collaboration is not authorized or will not be reported; or taking an examination or test for another student or signing a false name on an academic exercise.

430.00 SANCTIONS

The following sanctions may be imposed for academic misconduct:

A. oral reprimand;
B. written reprimand;
C. an assignment to repeat the work or an alternate assignment;
D. a lower or failing grade on the particular assignment or test;
E. a lower grade or failing grade in the course;
F. removal of the student from the course in progress;
G. removal of the student from a major, college or program;
H. withdrawal of degree or academic credit previously bestowed; and
I. any sanction that may be imposed for violation of the Student Conduct Code (reference Section 660.00), including disciplinary probation, suspension or expulsion from the University.

431.00 DISRUPTIVE STUDENT

The primary responsibility for managing the classroom environment rests with the faculty. Students who engage in any prohibited or unlawful acts that result in disruption of a class may be directed by the instructor to leave the class for the remainder of the class period. The term "prohibited acts" includes behavior prohibited by the instructor, including but not limited to, smoking in the classroom, persistently speaking without being recognized or called upon, refusing to be seated, and disrupting the class by leaving and entering the room without authorization.

Longer suspensions from a class or dismissal from a course on disciplinary grounds must be preceded by a charge of a violation of the Student Conduct Code and by a Student Conduct Hearing as set forth in Section 650.00 of the Student Conduct Code, if requested by the student or the instructor. A student dismissed from a class as the result of a Student Conduct Hearing will be assigned a grade of F (Failing). The student may register to re-take the course at a later date in accordance with existing University policy.

It must be emphasized that this provision is not designed to be used as a means to punish classroom dissent. The expression of disagreement with the instructor or classmates is not in itself disruptive behavior.

440.00 ACADEMIC MISCONDUCT PROCEDURES.

441.00 Instructor Imposed Academic Sanctions.

If an instructor has reason to believe that a student has engaged in academic misconduct, the following procedures apply:

441.01 Informal meeting.

The instructor should personally and privately advise the student that there is reason to believe that the student has committed an act that constitutes academic misconduct. The student should be allowed a reasonable opportunity to respond or explain.

If, after hearing the student's response (if any is provided), the instructor continues to believe the student engaged in academic misconduct, he or she will inform the student of his or her determination and of any intended sanction (s). An instructor is limited to imposing sanctions within the scope of the academic activity (sanctions A through E of Section 430.00). The instructor will prepare the Academic Misconduct Notification form and submit a copy to the student, the Department Head, Graduate Dean (if a graduate student) and the Dean of Students. The instructor has the right to refuse to sign a drop form for the class in question.

442.00 Additional Sanctions under Student Conduct Code

442.01 Referral by Instructor.
In addition to the imposition of the academic sanctions, an instructor may request in writing that the Dean of Students file a charge against the student for violation of the Student Conduct Code. If the student is found in violation of the Student Conduct Code, sanctions F-I of Section 430.00 may be imposed in addition to the academic sanctions.

442.02 Recurrence of Academic Misconduct.
A student who has been sanctioned by instructors more than once at MSU will be charged with a violation of the Student Conduct Code and subject to additional disciplinary sanctions.

442.03 Right to Appeal.
A student who receives an Academic Misconduct Notification under this section may request a hearing before the Student Conduct Board to contest the instructor's determination that academic misconduct occurred. The student must file a written request with the Dean of Students within five (5) working days of receipt of the Academic Misconduct Notification.

442.04 Grade Pending Resolution.
If the student appeals the instructor's academic misconduct determination, an incomplete grade ("I") will be assigned until the matter is concluded. A grade assigned before the instructor's knowledge of academic misconduct may be changed after it was assigned if the grade was obtained through academic misconduct or by fraud.

442.05 Appeal Procedures.
If a student appeals the instructor's academic misconduct determination, the procedures under the Student Conduct Code (Section 650.00) will be followed, as modified below.

a. Decision of Student Conduct Board. In cases of alleged academic misconduct, the Student Conduct Board will determine whether the student engaged in academic misconduct and will recommend any non-academic sanction outlined under Section 430.00 above. The decision of the Student Conduct Board will be forwarded to the Dean of Students (or designee) and to the relevant instructor (s).
b. If the Student Conduct Board finds the student committed academic misconduct, the instructor imposed academic sanction will stand. If the Student Conduct Board finds the student did not commit academic misconduct, the instructor will have ten (10) working days to report his or her grade for the student's work. The instructor will forward his or her grade determination to the Dean of Students (or designee), and the Graduate Dean (if a graduate student).
c. The Dean of Students will send a copy of the decision, the grade and the sanction (s) imposed to the student and the instructor, and the Graduate Dean if applicable. Either party may appeal the decision directly to the Provost subject to the criteria set forth in Section 670.00 of the Student Conduct Code. The decision of the Provost is the final decision of the University.