Genetics PhD Program

Graduate Student Manual

(August 1, 2022)

Information contained in the accompanying pages is a summary of procedures and curriculum requirements that apply to graduate students in the Genetics PhD Program.

Contents

I. Introduction

A. *Greetings from Director*

Congratulations on your matriculation into the Interdisciplinary Graduate Program in Genetics! I would like to personally welcome you to the program and wish you all the best in your pursuit of the PhD in Genetics. We are committed to helping you make that happen, and this manual refers to many resources in the program and on campus that are available to you. Please seek those resources that can help you and don't hesitate to ask for help. We expect that you will succeed!

Undertaking a PhD in Genetics is a significant step in your career and a commitment that will fully occupy your life for several years. For most of you, the defining motivation is your quest for training in research. You will quickly find that along the road to completing your PhD degree, you must learn about many other aspects of scientific life. Beyond research productivity, these include learning a great deal about how to write, how to communicate your research to different audiences, how to think about ethical issues, administration in the program and Graduate College, and opportunities for teaching and for service.

This manual is intended to help you navigate many of these aspects of the path to PhD. The flowchart on the following page, developed by the Graduate College, and adapted for our Genetics program, depicts some of the major steps and considerations you will encounter along the path.

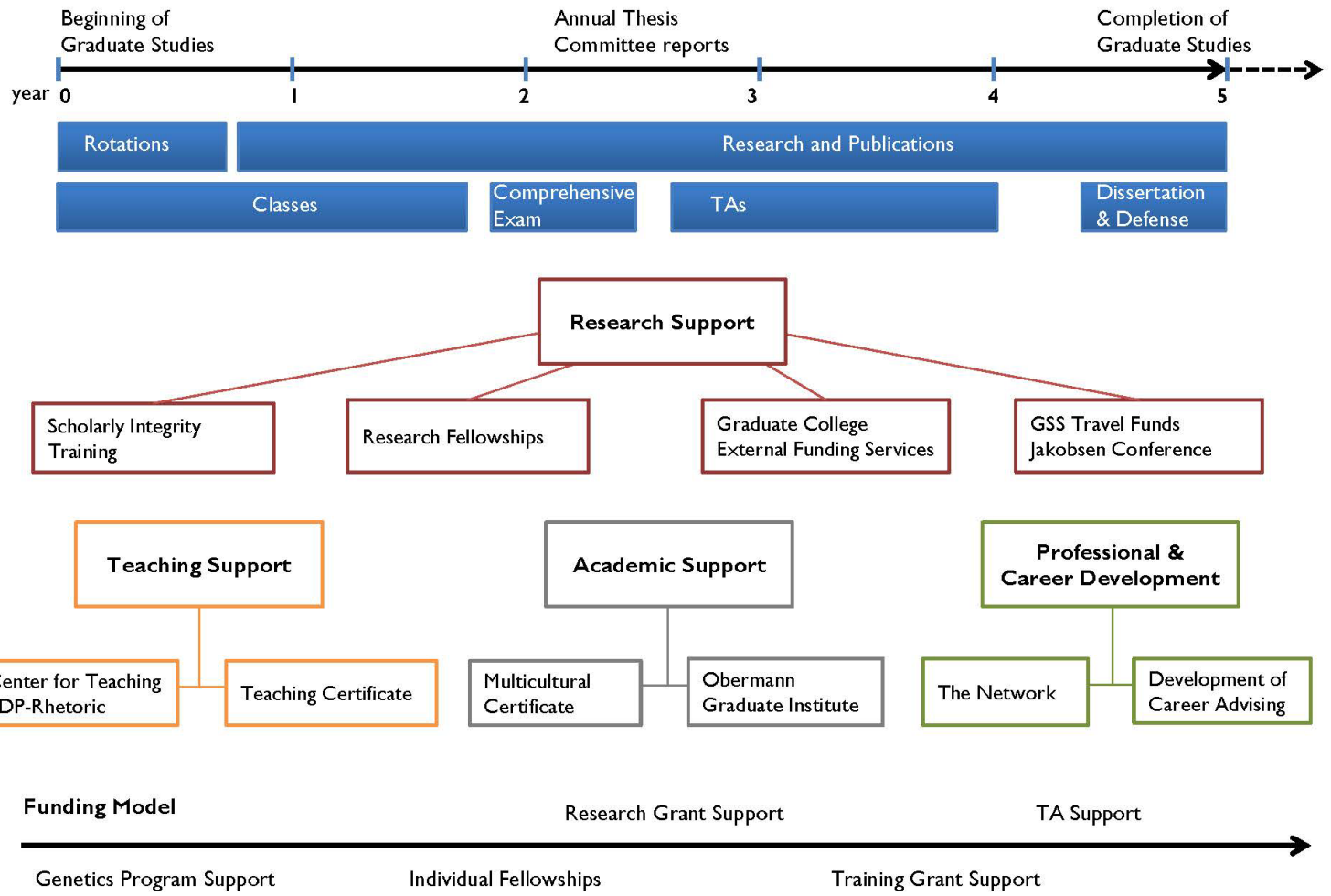
The guidelines in this manual reflect the operations and requirements of the Genetics program, taking into consideration the Graduate College requirements and procedures. As an interdisciplinary program student, you will have an affiliation with your mentor's primary department as well as the program. This can introduce some individual variation in administration of different students in the program, but we hope that this manual will serve to standardize the procedures and requirements as much as possible.

There will always be questions about the details in this manual, so I encourage you to contact the program office or me with your questions so we can help you optimally achieve your goal of graduating with the PhD in Genetics.

Enjoy the learning journey!

Daniel Eberl
Director, Interdisciplinary PhD Program in Genetics

Timeline to the Genetics PhD

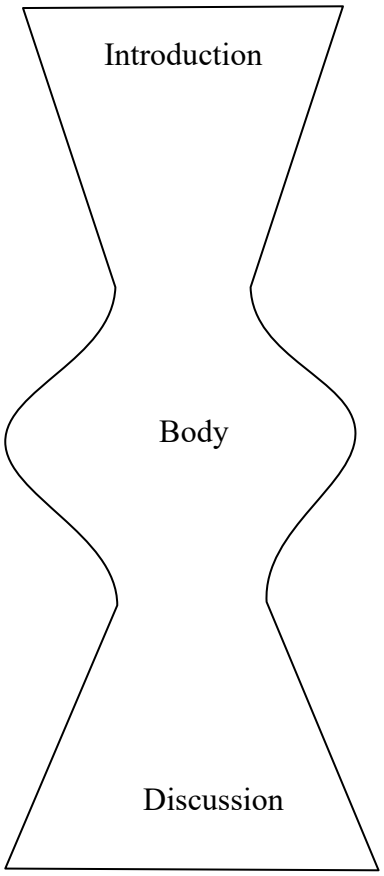


Aug 2014

C. *The "Keyhole* Model" as an aid to scientific writing. D.F. Eberl*

Writing is a major component of most activities in the lab. It is important to be able to communicate not only the minutiae of your experiments, but their significance and their contribution to the dynamic collective effort we call science. To achieve this goal of optimized communication in any writing project, whether it is a research prospectus, a presentation, a manuscript or a thesis, it is helpful to consider the "Keyhole Model" for composition. This uses the shape of the keyhole as an analogy for the scope of the writing as it proceeds from top to bottom, symbolizing from beginning to end of the written piece.

Let me describe how the keyhole analogy works:



The **Introduction** starts with the broad context. What is/are the main concepts to be addressed? What is currently known about the biological process? What are the major outstanding questions or problems?

Converging to the end of the introductory section, begin to narrow your focus onto your own work and how it addresses this big problem.

At this point the reader should say, "Wow that's a very important problem, and I can't wait to read how it gets solved."

The **Body** contains the description of the specific questions you are asking, your specific goals, approach and experimental design (and why you chose that over other possible approaches). Here is where you elaborate your expectations, the actual results and outcomes, and your interpretation of the specific experiments. Interpretation includes discussion of possible outcomes, and explanations of why the experiments turned out the way they did. What do your results mean for the specific question(s) you addressed?

The **Major Conclusion and Discussion** section transitions your specific work back into the broad context. What are the major conclusions from your work? This should not be just a rehash of your results, but an analytical consideration of how they impact the field. How should your experiments change the way people think about the problem or the biological process? What new predictions do they suggest? Where should the field go from here (especially, how does your work set the stage for future research)?

Remember that writing is telling a story. Establish and maintain a logical thread. A collection of unconnected ideas or factoids will not keep the reader's attention. Rather, direct the reader's thinking with clear transitions and connecting statements so they stay with you from beginning to end.

I believe that using this approach will improve your writing, and thereby greatly improve the efficacy of your communication. In the end, your improved communication will facilitate the maximum impact of your work on science and the community.

*This analogy is not my own idea. I don't recall which of my professors outlined this model to me when I was an undergraduate, but I have found it immensely useful, and so I pass it along. DFE.

II. Program Administration

A. *Contacts:*

Program Website:
http://genetics.grad.uiowa.edu/

Josep Comeron, Interim Program Director
Professor, Department of Biology
Department of Biology
212 Biology Building
University of Iowa
Iowa City, IA 52242

E-mail: josep-comeron@uiowa.edu
Office phone: 319 335 0628

Daniel Eberl, Program Director
Professor, Department of Biology and Department of Otolaryngology
Department of Biology
259 Biology Building
University of Iowa
Iowa City, IA 52242

E-mail: daniel-eberl@uiowa.edu
Office phone: 319-335-1323
Lab phone: 319-353-2055
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Rob DuBay, Program Administrator
Genetics Interdisciplinary Graduate Program
354 Medical Research Center
University of Iowa
Iowa City, IA 52242

E-mail: robert-dubay@uiowa.edu
Office Phone: 319-335-7748
Fax: 319-335-7656

Mackenzie Goss, Program Associate
Genetics Interdisciplinary Graduate Program
357 Medical Research Center
University of Iowa
Iowa City, IA 52242

E-mail: mackenzie-goss@uiowa.edu
Office Phone: 319-335-6512
Fax: 319-335-7656

East Side Office
The Program Administrator works in the Biology Building on most Tuesdays. If you work on the East side, and you need an appointment with Rob, he will gladly meet you in 314 BB.

Genetics Interdisciplinary Graduate Program
314 Biology Building
University of Iowa
Iowa City, IA 52242

Phone: 319-335-7748
Email: grad-genetics@uiowa.edu

B. *When are You Required to Contact the Program Office?*

Educational Milestones

Students need to contact the Program Office (copy both Rob and Mackenzie) at each of these milestones:

- Anytime your name, address, home phone number, cell phone number, or office/lab contact information changes
- When you make rotation mentor choices
- When you begin and complete TAships (the primary contact for this is Josep Comeron, but you should inform the office staff, too)
- When you choose your mentor
- Anytime your funding source changes
- When you choose your committees
- When you have changes in your committee membership
- When you need Mackenzie to schedule committee meetings
- If you prefer to schedule your committee meetings independently, immediately upon scheduling the meetings
- As soon as you know your comps date
- As soon as you know you plan to defend in a particular semester
- As soon as you know your defense date
- Alumni—whenever you have a change of position, institution, name, or other contact information

Noteworthy Accomplishments

For website updates and to assist the Program Administration with other Genetics Program public relations, promotional, and training grant goals, please contact the Program Office when:

Students

- You receive fellowships, grants, or other monetary awards
- You publish papers or chapters
- You receive any honors or awards
- You receive any positive media attention
- Anything else you think may be announcement worthy

Faculty

- You receive moderate or high level accolades of any sort
- You receive any positive media attention
- You receive any award related to your teaching
- You publish something particularly noteworthy
- You receive noteworthy grants or other monetary awards

C. *Whom Should You Contact?*

Although Rob and Mackenzie are both happy to assist you or guide you in the right direction, the table below lists the task distribution for some common Program Office requests.

First Contact	Question or Request
Rob	Registration changes (adds, drops, and change of hours forms)
Mackenzie	Website updates and corrections
Mackenzie	Research rotations and rotation evaluations
Mackenzie	Room reservations
Mackenzie	Travel arrangements and reimbursements
Mackenzie	Meeting arrangements
Mackenzie	Invoice payments (e.g. restaurant or supply bills)
Mackenzie	Reports for Committee meetings
Mackenzie	Reports for Comprehensive Committee meetings
Mackenzie	Poster printing
Mackenzie	Course evaluations
Rob	Budget questions
Rob	Policy questions
Rob	Stipend questions
Rob	U-Bill questions
Rob	Grant and fellowship questions
Rob	Complaints/concerns/problems
Both Rob and Mackenzie	At educational milestones listed above

D. *Additional Contacts*

Office of the Ombudsperson

The Office of the Ombudsperson (3rd floor of Jefferson Building, 129 East Washington Street) provides conflict management and problem solving to the entire campus community. Their services are confidential, neutral, informal, and independent. Appointments are suggested and can be scheduled by phone, 319-335-3608, or by email, ombudsperson@uiowa.edu. Detailed information is available on their website: https://uiowa.edu/ombuds/.

III. Financial Support (stipend, tuition, covered fees)

Graduate students in the Genetics Program at the University of Iowa are normally fully supported (stipend, tuition, covered fees) throughout their training in the Program, contingent on satisfactory progress, for a period that normally runs 4 to 6 years (total expected training time). Support commitments are reviewed annually, and are normally renewed each year if the student is making satisfactory progress. Whether the student is making satisfactory progress is determined by the student's mentor and Thesis Committee, the Graduate Affairs and Post-Comps Advisory Committees, and the Program Director.

Graduate student appointments include a stipend, which is subject to change each year commensurate with recommendations of the Research Advisory Committee of the College of Medicine. The stipend is set to be competitive with peer institutions. Stipends for students appointed to federal training grants (T32s, F31s, see below) are typically capped at levels below the University of Iowa biomedical stipend level, and in such cases, the difference is made up by the Program, mentor, or from other funds. For students appointed to the Genetics Training Grant (appointments normally run from 7/1 through 6/30), the stipend difference will be the responsibility of the mentor.

Tuition and covered fees include the following: (1) Base tuition and associated mandatory fees (arts & cultural events, mental health, professional enhancement fee for grad students, recreation fee, student activities fee, student health fee, student services fee, student union fee, international student fee [if applicable]); (2) All fees associated with core, required, and directly relevant elective coursework; (3) All fees associated with registration changes, credit hour changes, and other changes that occur in connection with required and directly relevant courses; (4) ITS printing fees (beyond the allotted amount).

Fees that are NOT covered by the Program include: (1) Key deposits; (2) Fees associated with extracurricular or other elective courses not relevant to the program of study in Genetics; (3) International tax withholding fee (4) Fines, penalties, parking tickets, and other such violation-associated fees; (5) Mandatory fees associated with submitting a dissertation, including a degree application fee, a publication and binding fee, and a thesis fee; (6) Fees and regalia rental charges associated with participating in commencement; (7) Costs associated with providing the Program Office and your mentor with bound copies of final thesis.

Stipend, tuition, and covered fees are paid by either University and/or departmental funds, and/or by extramural sources. Graduate students receive support through the following mechanisms:

A. *Training Grants*

Students in the early years of training may be appointed to federal traineeships, including the Genetics Training Grant (T32). Such appointments are based on merit, and thus should be listed as honors on your C.V.

Eligible students may be appointed to the Genetics Training Grant. Applications for Trainee slots on the Genetics Training Grant are solicited annually by the Executive Committee and the Program Director. Students may be eligible for other T32s (training grants), such as the Interdisciplinary Training Program in Pain Research and the

Predoctoral Training in Pharmacological Sciences. Applications to training grants normally require submission of specific materials by certain deadlines, and interested students are encouraged to consult with their mentor, the Genetics Program Director, and Program Directors of other potential T32s.

B. ***Genetics Program Graduate Research Assistantships***

Students in the first year of training may be appointed to graduate research assistantships and awarded tuition scholarships, from funds allocated to the Genetics Program by the Graduate College. On occasion, students beyond the first year may be appointed to such graduate research assistantships, at the discretion of the Director.

C. ***Other Graduate Research Assistantships***

Students may be appointed to a graduate research assistantship from a research grant, or may receive funding from the department in which their research is being performed, or may be awarded support from funds provided by the Graduate College.

D. ***Teaching Assistantships***

Students may be appointed to a graduate teaching assistantship from funds provided indirectly through affiliated Departments and Programs (e.g. Biology).

E. ***Other Means of Support and/or External Funding***

Students may receive support from other sources, including, Lulu Merle Johnson Graduate Fellowships, Graduate College Fellowships (Post Comprehensive Research Award, Summer Fellowship, Ballard Seashore Dissertation Fellowship, etc), and a variety of nationally competitive NIH, NSF, and other individual awards.

Students are encouraged to solicit external funding. The University of Iowa provides numerous resources to assist students in the identification and pursuit of extramural funding. Two excellent consultation resources are: 1) The Graduate College Office of Graduate Success (http://www.grad.uiowa.edu/external-grants-and-fellowships), and 2) The Division of Sponsored Programs (http://dsp.research.uiowa.edu/). The Scientific Editing and Communication Core in the Carver College of Medicine is also a great resource for editing your fellowship applications.
https://medicine.uiowa.edu/sercc/resources

The Graduate College sponsors a Fellowship Incentive Program for UI graduate students (including students of the Genetics Program) and offers a stipend incentive to apply for some competitive grants and fellowships (see https://grad.uiowa.edu/fellowship-incentive-program)..

Students who receive extramural fellowships of $10,000 or more are eligible for an Supplement for External Fellowship from the Carver College of Medicine.
https://medicine.uiowa.edu/biomed/admissions/ui-internal-fellowships

F. *Summer Registration*

Graduate students in the Program normally do not register for summer term. There are three exceptions to this: (1) First-year students, some of whom will take courses during their first summer in order to maintain progress in satisfying the required core and elective coursework; (2) Students taking the Comprehensive Examination during the summer term; and (3) Students who are defending their PhD during the summer term. Outside of these exceptions, students will not register for the summer. (This policy is broadly in effect for all of the bioscience-related programs at the University of Iowa.)

G. *Tax Information*

To receive tax advice, consult a professional income tax preparer. Information regarding how your paycheck may be impacted by taxes can be found at this University website.

Students should be aware that a tightening of IRS regulations has led to FICA withholding for summer stipend checks for students not registered for the summer term. This income loss can be substantial, depending on the student's particular circumstances.

For students who are on a training grant or other fellowship (e.g., T32, Post-comp fellowship, Summer fellowship, Ballard & Seashore, etc.), it is recommended that you talk with a tax professional to determine the impact your appointment may have on your tax obligation. Information regarding taxes of Fellowship payments can be found on this University website..

If you are awarded Federal financial aid through the Office of Student Financial Aid, you should check with that office regarding the potential impact of training grant appointments and other fellowship's stipend and tuition on your financial aid award (loans, etc.). You may contact the office via email (financial-aid@uiowa.edu), telephone (319-335-1450) or walk-in (2400 UCC).

H. *University Bills – Program Specific Set-up Requirements*

Students may **not** enroll in automatic U-bill payment methods offered by the University. Prohibited programs include: payroll deduct of your U-bill from your paycheck and automatic payment from your checking/savings accounts. The Program Office does not have direct control of your tuition payments at all points in your academic career. Tuition payment delays are common for a variety of reasons.

If you enroll in these programs, your tuition and stipend bill (sometimes over $4,000) could be automatically deducted from your paycheck or your bank account. While the University of Iowa would eventually reimburse you for the tuition and fees deducted, most students do not have an extra $4,000 available to tie up in bureaucratic delays.

IV. Curriculum

This section outlines the pre-requisite and required courses for Genetics PhD students, some example schedules, as well as policies and procedures. Courses listed under Electives, and under Seminars, should be not be considered restrictive—if there is a course that you and your advisor believe would enhance your training in relation to your research, you can submit a request to the Curriculum Committee for the course to be considered for credit under one of these categories. The request should include the course number and title, the course description, a copy of the syllabus if available, and a note from your advisor indicating how this course will enhance your training. All students are required to register for GENE:6200: Special Topics in Genetics every spring. Pre-comps students will receive a letter grade, post-comps students will be graded on a S/U basis unless they use this course to contribute to the seminar requirement (section D below). All students are required to register for GENE:6210: Seminars in Genetics every semester.

A. *Courses Required as Prerequisites*

Biochemistry (BIOC:3110 or BIOC:3120 *and* BIOC:3130 or equivalent)	3-8 sh
Organic Chemistry (2 semesters)	6-8 sh
Fundamental Genetics	3-4 sh
Introductory Physics, one year, college level	6-8 sh
Calculus or Statistics, one year of either	6-8 sh

B. *Courses Required for all Genetics PhD Students*

GENE:6150 FA	Genetic Analysis of Biological Systems[1]	3 sh
BMED:5207 FA	Principles of Molecular and Cellular Biology	3 sh
GENE:6200 SP	Special Topics in Genetics (graded for pre-comps students; counts toward the 5 required seminar hrs)	1 sh
GENE:6210 FA/SP	Seminars in Genetics[2]	1 sh
GENE:6234 SP[3]	Basic Biostatistical Methods with Genetics Applications	1 sh
GENE:7191 SP even yr	Human Molecular Genetics *or*	3 sh
BIOL:3172 FA/SP	Evolution *or*	4 sh
BIOL:3713 FA	Molecular Genetics *or*	3 sh
BIOL:4333 SP	Genes and Development	3 sh
BMED:7270 FA	Scholarly Integrity/Respon. Conduct of Research I	0 sh
BMED:7271 SP	Scholarly Integrity/Respon. Conduct of Research II	0 sh

C. *Electives (7 sh chosen from the following courses)*[4,5]

BIOL:3172 FA/SP	Evolution[3, 4]	4 sh
BIOC:3310 SP	Practical Data & Bioinformatics	3 sh
BIOL:4333 SP	Genes and Development[3, 4]	3 sh
BIOL:3713 FA	Molecular Genetics[3, 4]	4 sh
MICR:6268 SP	Biology and Pathogenesis of Viruses	2 sh

[1] Must satisfy this requirement during the first year as a graduate student. In exceptional cases, credit will be allowed at the discretion of the Graduate Affairs Committee for an equivalent advanced course taken previously.

[2] Must be taken each semester as a graduate student. Does not count toward requirements in part D.

[3] Not required for students completing Computational Sub-track

[4] Must be taken as a graduate student.

[5] The same course cannot be used to satisfy a requirement in part B and the elective requirement in part C.

GENE:7191 SP	Human Molecular Genetics[3, 4]	3 sh
EPID:6250 FA odd yr	Genetics & Epidemiology	3 sh
EPID:5241 SP	Statistical Methods in Epidemiology	4 sh
MMED:6220 FA	Mechanisms of Cellular Organization	3 sh
MMED:6225 SP	Growth Factor Receptor Signaling	1 sh
MMED:6226 SP	Cell Cycle Control	1 sh
MMED:6227 SP	Cell Fate Decision	1 sh
BIOC:5243 FA	Biophysical Chemistry Module I	1 sh
NSCI:7235 FA	Neurobiology of Disease	3 sh
FRRB:7001 SP	Molecular and Cellular Biology of Cancer	3 sh
GENE:4213 FA	Bioinformatics	4 sh
BME:5335 SP	Computational Bioinformatics	3 sh
STAT:4580 SP	Data Visualization and Data Technologies	3 sh
IGPI:6480 FA	Knowledge Discovery	3 sh
CS:5430 SP	Machine Learning	3 sh
BIOC:4310 FA	Computational Biochemistry	3 sh
BIOS: 7700 SP	Special Topics: Machine Learning for Biomedical Data[6]	3 sh
BIOS:7330 FA	Advanced Biostatistical Computing	3 sh

D. ***Seminars (5 sh chosen from the following courses)*** [2,7]

ACB:6237 FA	Critical Thinking in Biochemistry and Molecular Biology	1 sh
ACB:6238 SP	Critical Thinking in Genetics	1 sh
ACB:6239 FA	Critical Thinking in Cell Biology	1 sh
ACB:6248 FA/SP	Critical Thinking in Development	1 sh
ACB:6249 SP	Critical Thinking in Cellular Physiology	1 sh
BIOL:5117 FA/SP	Topics in Molecular Genetics	1, 2 sh
BIOL:6188 SP	Seminar in Writing in the Natural Sciences	2 sh
GENE:6200 SP	Special Topics in Genetics**Error! Bookmark not defined.**	1 sh
RHET:7500 SP	Science Communication in the Digital Age	2 sh

E. ***Scholarly Integrity / Responsible Conduct of Research***

BMED:7270	*Scholarly Integrity/Responsible Conduct of Research 1 (fall)*
BMED:7271	*Scholarly Integrity/Responsible Conduct of Research 2 (spring)*

Students will enroll in these courses in their second year in the Genetics Program. During their first year they must complete web-based training modules of Collaborative Instruction Training Initiative (CITI).

F. ***ESL Requirement for Foreign Students***

All foreign students for which an English proficiency evaluation is required must pass to the "B" level on the "University Request for Evaluation for TA Certification" form by the end of their 2nd year. If the student does not, they will be considered to be making insufficient

[6] For non-Biostatistics majors

[7] For purposes of this requirement, the same seminar course(s) cannot be repeated if taught by the same instructor(s) without special permission from the Curriculum Committee. Seminar course offerings are quite dynamic, so additional courses may be included each year at the discretion of the Curriculum Committee. Other seminar courses may be used to satisfy the seminar requirement when approved on a year-by-year basis by the Curriculum Committee

progress and can be terminated. They will need to petition to the Executive Committee to continue, but there will be no guarantee that they will be allowed to do so.

G. *Individual Development Plan (IDP)*

The IDP is a tool to assist trainees with career and professional development. The IDP provides a platform for trainees to identify professional goals, assess competencies relevant to these goals, and develop a plan to achieve specific objectives related to their career goals. The trainee-developed IDP becomes a platform for discussion with their Ph.D. mentor, to foster communication important for the trainee's professional development.

1. **Basic steps for Trainees**
    a. Conduct a self-assessment
        (1) Define your time commitment to various components of the graduate experience.
    b. Assess your skills and interests.
    c. Use outside resources to get feedback on your skills, strengths, and weaknesses.

The following self-assessment tools provide a nice resource for this self-assessment.

(1) http://myidp.sciencecareers.org
(2) https://www.grad.uiowa.edu/individual-development-plan

d. Survey opportunities with mentor
    (1) identify career opportunities that interest you.
    (2) Define differences between your current skills and additional skills needed for your identified career objectives.
    (3) Prioritize areas for development and discuss strategies for addressing objectives with your mentor.
e. Write/update your IDP, share it with your mentor, and review together
    (1) Identify specific skills that you need to develop in the short-term (e.g. 1 – 2 years)
f. Define strategies to develop each skill. Use the "SMART" principle:
    (1) **S**pecific – is it focused and unambiguous
    (2) **M**easurable – define metrics to know whether the objective is achieved
    (3) **A**ction-oriented – identify concrete steps to achieve the objective.
    (4) **R**ealistic – is the strategy feasible.
    (5) **T**ime bound – define a deadline.
g. Discuss draft with mentor
h. Implement the plan, and revise as needed
    (1) Review your plan with your mentor on a regular basis. Completion of the IDP is required on a yearly basis and after completion must be submitted to the Program no later than July 1.
    (2) Revise as necessary.

2. **Basic steps for mentor**
    a. Be familiar with training requirements and opportunities.
    b. Discuss opportunities with trainee.
    c. Review your trainee's IDP and help revise. Provide written comments at the end of the document.
    d. Establish regular periods for IDP review and revisions, as needed but at least annually.

H. *Teaching*

1. **Teaching Requirement**

During the course of their graduate studies, students are expected to gain experience in teaching and to establish their credentials in teaching excellence. Students are required to teach in at least two different courses during their graduate career with their teaching assignment being 1/4-time or greater in each case. MSTP students are required to do one teaching assignment. **It is recommended that students complete their teaching assignments during their 3rd and 4th year.** The Graduate Affairs Committee determines which Teaching Assistantships fulfill this requirement. Students who are ready to pursue their required TAships may either contact the Graduate Affairs Committee Chair or they may independently pursue Teaching Assistantships by contacting instructors directly. When a student secures a TAship independently s/he must still contact the Graduate Affairs Committee, who will still need to determine if the TAship satisfies the program requirement. The Genetics Graduate Affairs Committee will try, as possible, to balance hard/easy assignments, and diversity of teaching experiences.

2. **Office of Graduate Teaching Excellence**

Additional instruction in teaching, designed specifically for graduate students, is offered through the Office of Graduate Teaching Excellence. The College of Education (COE) opened the Office of Graduate Teaching Excellence (OGTE) in Fall 2008. In partnership with the COE and the Graduate College, OGTE enables all University of Iowa doctoral students to complement their home discipline's curriculum and research training with the development of effective teaching skills. OGTE provides doctoral students with the knowledge and skills needed for success in the classroom when they accept academic positions upon graduation and/or after completion of post-doctoral training. OGTE's goal is to provide students who intend to enter academia with the tools and preparation to be effective teachers.

3. **Graduate Certificate in College Teaching**

The Graduate Certificate in College Teaching is offered through the University of Iowa Graduate College. In some cases, Genetics Program students will be allowed to complete the certificate's requirements during their time in the program. See Appendix III: Certificate in College Teaching at the back of this Graduate Student Manual for more information.

I. *Laboratory Rotations*

1. Purpose

The purpose of the rotation system is to provide students with information that will help them in the choice of a research sponsor. It is also intended to educate students about more than one approach to doing genetics research and provide them with personal contacts with as many of their peers and mentors as possible.

2. The Rotation System

a. All students will be required to rotate among three laboratories during their first year in graduate school.

b. The choice of laboratories will be determined by the student in consultation with the Graduate Affairs Committee and is subject to approval by the head of the laboratory. The committee will encourage the student to speak to as many faculty members as necessary to make an informed decision that takes into account the student's likely research interests. Students will be encouraged, but not required, to do one rotation in a laboratory that may not be directly related to their probable areas of research interest.

c. Students will register for research credit in each fall and spring term (see Section I.4 for more information on summer registration). It is expected that students devote a significant portion of their time to their rotation research. Faculty members in whose labs the student rotates should establish in advance the method by which the student's work will be evaluated. This may include a presentation or written report. Since students will rotate in more than one laboratory each semester, the two faculty supervisors involved will consult with each other to arrive at a joint evaluation of the student's work.

d. For students beginning work with the start of the fall semester, the rotation schedule will be set up to permit ~12 weeks in each laboratory (e.g., August 24 – November 13; November 16 – February 12; and February 15 – May 7). The middle rotation includes 1 week for winter break (e.g. December 24 – January 1). Students should discuss with their rotation sponsor an acceptable arrangement for time away from the laboratory.

e. Near the end of the third rotation, students will give a short presentation on the rotation of their choice. This need not be selected based on the laboratory of affiliation. Students can present from any rotation they made, with the rotation mentor’s approval.

f. Alternative arrangements can be made (subject to approval by the Graduate Affairs Committee) for MSTP students or DSA fellows, for students with extensive graduate training prior to coming to Iowa, and for students who have a strong reason to begin their thesis research immediately.

g. The student must affiliate with a research sponsor immediately upon completion of the third rotation, at which time the research sponsor will assume responsibility for the student's stipend support. (The student's eventual choice of research sponsor need not be limited to faculty members in whose labs the student rotated, in consultation with the Program Director.)

h. It is strongly recommended that Computational Subtrack students acquire some experience in a wet lab. This may have occurred during an undergraduate or masters experience. If a Computational Subtrack student does not have wet lab experience, they should work with their mentor to gain the experience.

J. ***General Requirements (Hours, GPA, Summer Registration, etc.)***

1. Students are required to take 15 semester hours each semester during their first two years in the program. Additional genetics or other biology, chemistry, mathematics, and physics courses will increase the number of hours taken toward the degree. These courses should be selected by students after consultation with their advisers and/or thesis committees. Such course programs will be tailored to fit individual students' research interests, abilities, and career objectives. As additional courses become available, the Curriculum Committee will add them to the groups of electives. In addition, the student must meet Graduate College requirements (minimum of 72 hours of registration, plan of study, etc.).

2. The student must maintain a cumulative grade point average (GPA) of 3.0 in coursework. No research or independent study taken during a student's graduate training counts in the GPA for this purpose.

    a. In calculating the GPA required for purposes of meeting the Program's 3.0 requirement, plus and minus grades will be considered. Grades received for courses below the 3000 level (in the instance of a student making up deficiencies) should not count in the student's GPA; if the grade is a D or F, the student is required to repeat the course. Students who repeat a course will have both grades counted in calculating the GPA required for purposes of meeting the Program's 3.0 requirement.

    b. The student shall be placed on academic probation by the Graduate College if, after completing 9 hours of graded (A, B, C, D, F) graduate work at The University of Iowa, the student's cumulative grade-point average falls below 3.00. A student will be returned to good standing when his or her cumulative grade-point average becomes equal to or greater than 3.00. If, after completing 9 more semester hours of graded (A, B, C, D, F) graduate work at this University, the student's cumulative grade-point average remains below 3.00, the student shall be dropped from the degree program and denied permission to reregister within any Graduate College doctoral degree program. The student may apply for and be accepted into a nondoctoral degree or certificate program.

3. All students must inform the Program Office if they make registration changes (i.e. add or drop courses) following the deadline provided by the program. After the semester begins, no student will be allowed to drop a course without authorization by the program.

4. Summer Registration

    Graduate students in the Program normally do NOT register for summer term. There are 3 exceptions to this: (1) First year students, if they take summer courses, need to be registered. (2) Students taking the Comprehensive Examination, who are registered for the summer. (3) Students who are defending their PhD during the summer term. Outside of these exceptions, students will NOT register for the

summer. (This policy is broadly in effect for all of the biomedical-related programs.)

5. Student Seminar

   The Genetics Student Representatives coordinate a Student Seminar. Attendance at the Genetics Student Seminar is **required** for ALL Genetics PhD Program students. If a student has a legitimate schedule conflict that prevents her/him from attending Student Seminar, s/he should request a waiver from the Student Representative.

K. *Example schedule*

First Year

First semester:	*sh*	*Notes*
GENE:6150 Genetic Analysis (GABS)	3	Required
BMED:5207 Principles of Molecular and Cellular Biology	3	Required
GENE:6210 Seminars in Genetics	1	Required
GENE:7301 Graduate Research in Genetics	8	Research rotation
Total:	15	

Second semester:	*sh*	*Notes*
BIOL:4333 Genes and Development	3	One of 4 courses to fulfill requirement
GENE:6200 Special Topics in Genetics	1	Required
GENE:6210 Seminars in Genetics	1	Required
GENE:6234 Basic Biostatistical Methods with Genetics Applications	1	Required
MMED:6226 Cell Cycle Control	1	Elective
GENE:7301 Graduate Research in Genetics	7	Research rotation
Total:	15	

International Students will fulfill ESL requirements during summer session

Second Year:

First semester:	*sh*	*Notes*
BIOL:3172 Evolution	4	Used here to fulfill elective
BIOL:5117 Topics in Molecular Genetics	2	Seminar elective
ACB:6238 Critical Thinking in Genetics	1	Seminar elective
BMED:7270 Scholarly Integrity/Responsible Conduct of Research 1	0	Required
GENE:6210 Seminars in Genetics	1	Required
GENE:7301 Graduate Research in Genetics	7	Research
Total:	15	

Second semester:	*sh*	*Notes*
GENE:7191 Human Molecular Genetics	3	Used here to fulfill elective
GENE:5173 Computational Genomics	3	Elective
GENE:6200 Special Topics in Genetics	1	Required
GENE:6210 Seminars in Genetics	1	Required
BMED:7271 Scholarly Integrity/Responsible Conduct of Research 2	0	Required
GENE:7301 Graduate Research in Genetics	7	Research
Total:	15	

V. Genetics Program Subtrack: Computational Genetics

The recent explosion of data generated by the fields of genetics and molecular biology has created a demand for sophisticated computational methods to extract meaningful information. Bioinformatics has emerged as an important discipline in the biosciences promoting a close working relationship between genetics and the computational sciences. To meet the needs of students interested in this area of research, a subtrack was formulated within the Genetics PhD program that leads to a PhD in Genetics with a specialization in Computational Genetics.

Due to the present shortage of researchers with bioinformatics skills, the training of scientists whose primary professional identification and disciplinary affiliation is bioinformatics and computational biology has been identified by NIH as an urgent need. This area includes the use of theory, computer implementation and application to the broad spectrum of molecular research in biological and biomedical fields including molecular sequence and structure, molecular function, cellular function, physiology, genomics, genetics, computational modeling, population biology, mathematical biology, and analysis of complex systems. The demand for bioinformatics professionals is most pronounced among biotechnology and pharmaceutical companies. The requirements are for people who have substantial training in computer science and are well grounded in genetics. In particular, there is a significant demand for people who can communicate with both geneticists and computer scientists.

Essential details concerning the subtrack are summarized below. For more information or to express interest in becoming a Computational Genetics subtrack student, please contact the Director of the Genetics Program.

A. *Computational Genetics Curriculum*

All students in the Computational Genetics subtrack, regardless of their disciplinary origin, are required to master a set of core concepts in (1) Genetics; (2) Computing; (3) Statistics; (4) Bioinformatics Tools and Applications and (5) Seminar and Responsible Conduct. These requirements can be met by enrolling in upper level undergraduate courses prior to

matriculation or by a combination of undergraduate and graduate courses selected to address individual student needs after matriculation. Satisfactory completion of the prescribed courses is to be accomplished during the first two years of the program. Special topics courses in areas of direct impact to the thesis may be taken as electives in post-comp years.

1. Prerequisites[8]

Biochemistry (BIOC:3110 or BIOC:3120 *and* BIOC:3130 or equivalent)	3-8 sh
Organic Chemistry (2 semesters)	6-8 sh
Fundamental Genetics	3-4 sh
Introductory Physics, one year, college level	6-8 sh
Calculus or Statistics, one year of either	6-8 sh

2. Genetics (9 sh) (assuming Fundamental Genetics and Biochemistry are taken as prerequisites)
    a. Principles of Molecular and Cellular Biology (BMED:5207; 3 sh)
    b. Core Genetics (BIOL:3713, BIOL:3172, BIOL:4333, GENE:7191, or equivalent; 3-4 sh)
    c. Genetic Analysis of Biological Systems (GENE:6150; 3 sh)

3. Computing (6-9 sh) (credit for previous classes available, see IV.M.a.2)
    a. Programming Languages and Tools (CS:3210, may be taken multiple times)
    b. Other appropriate computing courses (e.g., Intro to R programming: BIOS:5510, CS:5110)

[8] Note: These prerequisites would be typical for a student entering with a Biology background. Students entering with a Computational background may need to make up missing courses; the trade-off is that these students will typically require fewer computer language courses, for example.

4. Statistics (3 sh)
    a. Biostatistics (STAT:3510 or equivalent)

5. Bioinformatics Electives (12 sh)
    a. Bioinformatics (BIOL:4213)
    b. Bioinformatics Techniques (BME:5320)
    c. Computational Genomics (GENE:5173)
    d. Data Visualization and Data Technologies (STAT:4580)
    e. Advanced Biostatistical Computing (BIOS:7330)
    f. Knowledge Discovery (MSCI:4480)
    g. Machine Learning (CS:5430)
    h. Deep learning (IE:6380)
    i. Special Topics: Machine Learning for Biomedical Data (BIOS:7700)[5]
    j. Regression and ANOVA for the Health Sciences (BIOS:5120)

6. Seminar and Scholarly Integrity (2 sh)
    a. Scholarly Integrity/Responsible Conduct of Research (BMED:7270 & BMED:7271)
    b. Special Topics in Genetics (GENE:6200) taken at least twice

B. *Computational Genetics Example Schedules*

Example 1. Students entering with a computational background
(assuming Biochemistry already taken as prerequisite)

First Year

First semester:	sh	*Second semester*:	sh
BIOL:2512 Fundamental Genetics (as pre-req)	4	STAT:3510 Biostatistics	3
BME:5335 Computational Bioinformatics	3	BIOL:3172 Evolution	4
BMED:7270 Scholarly Integrity/Responsible Conduct of Research 1	0		
Required		Required	
GENE:6200 Special Topics in Genetics	1	GENE:6200 Special Topics in Genetics	1
GENE:7301 Graduate Research in Genetics	7	GENE:7301 Graduate Research in Genetics	7
Total:	15	Total:	15

Second Year:

First semester:	sh	*Second semester*:	sh
xxxx:xxxx Elective in Bioinformatics	3	GENE:5173 Computational Genomics	3
GENE:6150 Genetic Analysis of Biological Systems	3	xxxx:xxxx Elective in Bioinformatics	3
BMED:5207 Principles of Molecular & Cellular Biology	3	GENE:6200 Special Topics in Genetics	1
GENE:6200 Special Topics in Genetics	1	GENE:7301 Graduate Research in Genetics	8
GENE:7301 Graduate Research in Genetics	5	BMED:7271 Scholarly Integrity/ Responsible Conduct of Research 2	0
Total:	15	Total:	15

Example 2. Students entering with a genetics/life science background

First Year

First semester:	sh	*Second semester*:	sh
GENE:6150 Genetic Analysis of Biological Systems	3	xxxx:xxxx Elective in Computing or Informatics	3
BMED:5207 Principles of Molecular & Cellular Biology	3	STAT:3510 Biostatistics	3
BMED:7270 Scholarly Integrity/Responsible Conduct of Research 1	0	GENE:6200 Special Topics in Genetics	1
GENE:6200 Special Topics in Genetics	1	BIOL:3713 Molecular Genetics	3
		GENE:7301 Graduate Research in Genetics	5
GENE:7301 Graduate Research in Genetics	8		
Total:	15	Total:	15

Second Year:

First semester:	sh	*Second semester*:	sh
xxxx:xxxx Elective in Bioinformatics	3	GENE:5173 Computational Genomics	3
BME:5320 Bioinformatics Tech & Tools	3	xxxx:xxxx Elective in Bioinformatics	3
CS:3210 Programming Languages and Tools	3	GENE:6200 Special Topics in Genetics	1
GENE:6200 Special Topics in Genetics	1	GENE:7301 Graduate Research in Genetics	8
GENE:7301 Graduate Research in Genetics	5	BMED:7271 Scholarly Integrity/ Responsible Conduct of Research 2	0
Total:	15	Total:	15

C. *Computational Genetics Course descriptions*

(a) Core Group

1) Genetics

BIOL:2512 Fundamental Genetics (4 sh): Pre-requisite coursework on nature, function of genetic material: classical, molecular, developmental aspects.

One of:

- Evolution (4 sh; BIOL:3172)
- Genes and Development (BIOL:4333)
- Molecular Genetics (BIOL:3713)
- Human Molecular Genetics (GENE:7191)

BMED:5207 Principles of Molecular & Cellular Biology (3 sh): Protein structure, genomes, nuclear organization, prokaryotic transcription, eukaryotic transcription, epigenetics, RNA processing, protein translation/modification, biomembranes, membrane trafficking, cell biology methods, cell migration, signaling, and cell cycle.

GENE:6150 Genetic Analysis of Biological Systems (3 sh): Genetic techniques and approaches for analysis of biological processes; comparison of strengths, weaknesses of a variety of experimental systems.

2) Computing

Demonstrated competency in at least one programming language [e.g. Java (ECE:3330) or C++ (CS:3620)]. Full credit for this course requirement (up to 6 sh of credit) can be approved for coursework already taken, at the discretion of the Graduate Affairs committee.

3) Statistics

STAT:3510 Biostatistics (3 sh) Statistical methods primarily for research in health sciences and related fields; descriptive statistics, estimation, test of hypotheses. A student may select a more advanced statistics course in coordination with their advisor, and with approval by the Curriculum committee.

4) Bioinformatics Electives

Elective in Genomics or Bioinformatics. These electives should be chosen in consultation with your advisor from available courses to strengthen your tools and techniques in computational genetics. See the listing in section IV.K (Computational Genetics Curriculum) for a list of potential/suggested electives. Other elective courses can be substituted, with approval of the Curriculum Committee.

5) Seminar and Scholarly Integrity

GENE:6200 Special Topics in Genetics (1 sh): Current research in a selected field of genetics: different topic each year; companion to a genetics seminar series.

BMED:7270 Scholarly Integrity / Responsible Conduct of Research 1 (0 sh)

BMED:7271 Scholarly Integrity / Responsible Conduct of Research 2 (0 sh)

VI. Genetics Program: MSTP Curriculum

MSTP students affiliating with the Genetics PhD Program have some unique characteristics that call for specialized curriculum requirements. These students enter the Genetics program with 2 years of medical school coursework completed.

Compliant to the MSTP MOU regarding preclinical medical curriculum included in MSTP students' plan of study. The following courses are approved by the Graduate College for inclusion in total number of PhD hours required to graduate (72 sh).

Medical Gross Anatomy	5 sh
Foundations of Medical Science	5 sh
Mechanisms of Health and Disease I	5 sh
Mechanisms of Health and Disease II	5 sh
Mechanisms of Health and Disease III	5 sh
Mechanisms of Health and Disease IV	5 sh

For these, the Genetics Program will allow 10 sh of credit. Thus, the core requirements will be considered as satisfying the Genetics Program electives.

Mechanisms of Health and Disease I	5 sh
Mechanisms of Health and Disease III	5 sh

The course requirements for the Genetics PhD Program will be satisfied by taking 9 additional sh of coursework relevant to genetics or computational genetics approved by the Graduate Affairs Committee on an individual basis.

The seminar requirement, normally 5 sh, will be satisfied by taking the Special Topics in Genetics course (GENE:6200) twice for graded credit. Thereafter, all students will register for this course each spring on a S/U basis. Grand Rounds will satisfy the remaining 3 sh of the seminar requirement. MSTP Students will also register for Seminars in Genetics (GENE:6210) each semester.

MSTP students are required to take the Scholarly Integrity / Responsible Conduct of Research 1 & 2 courses (BMED:7270 & BMED:7271).

VII. Choosing a Thesis Committee and the First Meeting

The Thesis Committee, which is normally chosen and approved by the end of the second academic year in the program (May 15th of second year), will be chaired by the research adviser.

Four of the five Thesis Committee members must be members of the Genetics PhD Program, and one member must be tenure-track University of Iowa Graduate Faculty from outside the Genetics Program. To represent a reasonable diversity of research interests, no more than three members may be from any one department.

The research adviser does not participate in any aspect of the Comprehensive Examination. Instead, an additional ad hoc member must be chosen from the Genetics Program Faculty to participate in the Comprehensive Exam in place of the research adviser. The proposed composition of the Thesis Committee and the Comprehensive Exam Committee must be submitted to the Graduate Affairs Committee for approval.

The student must schedule a pre-comps THESIS committee meeting approximately six months prior to anticipated date of the comprehensive exam (the ad hoc member should attend as well if possible). This is typically before the end of the second year in the program (May 15th). The thesis committee meeting will be chaired by the research adviser. In preparation for this meeting the student will submit the completed thesis proposal to the committee. The thesis proposal will obviously have significant input from the thesis advisor. This meeting, and the thesis proposal itself, will NOT be evaluated as part of the Comprehensive Examination. Rather, this meeting will achieve three major goals. First, it will encourage the student to think about the thesis project early (including literature review), rather than postponing this until after the Comprehensive Examination. Second, it will allow the student to practice writing a proposal (with adviser's help) and to present it to the committee. Third, it will inform the Comprehensive Examination Committee of the thesis topic, so this committee can make an informed decision regarding relatedness of the Comprehensive Examination proposals. In addition to these benefits, writing a formal thesis proposal also better prepares the student for the thesis project, and can form the basis of an individual fellowship application, which is also strongly encouraged.

It is highly recommended that the thesis proposal is prepared in the format (and on actual forms, if available) of a doctoral fellowship application appropriate to your research and eligibility. This will serve the purpose of the thesis proposal AND it will facilitate your actual submission of the fellowship application after polishing in response to your thesis committee feedback. Length of this proposal is 20 double-spaced pages, 11 point font, not including figures and references, OR as dictated by the fellowship application instructions. The thesis proposal should be distributed to the thesis committee two weeks prior to the scheduled meeting, or when requested by the committee.

VIII. The Comprehensive Examination

A. *Requirements for the Timing of the Comprehensive Examination*

1. Graduate students who enrolled initially for a summer session or a fall semester must take the comprehensive examination (defend their proposals) by January 15th following the second year. Students who fail to meet this deadline will not be eligible to continue in the program. For students who enroll initially in a spring semester, the deadline will be 6 months after completing 4 full semesters of graduate work (not including summer sessions). MSTP students will schedule their comprehensive exam in consultation with their research advisor and the Program Director, typically during their second year in the Genetics Program.

B. *Requirements for Membership of Comprehensive Examination Committee*

1. The Comprehensive Examination Committee shall consist of 5 members who will be the same as members of the Thesis Committee, with the exception that the thesis adviser is replaced by an ad hoc member on the Comprehensive Examination Committee. Four of the Comprehensive Examination Committee members must be members of the Genetics PhD Program. To represent a reasonable diversity of research interests, no more than three members may be from any one department and one member must be tenure-track University of Iowa Graduate Faculty from outside the Genetics Program.

2. The ad hoc member will be chosen by the student and the student adviser with the approval of the Graduate Affairs Committee (GAC) chairperson. The ad hoc member ordinarily will not be a permanent member of the Thesis Committee. Students must leave sufficient time to achieve GAC approval of their committee membership prior to the pre-comps meeting.

3. The student and their thesis adviser will select one member of the Comprehensive Examination Committee to act as chair during administration of the comprehensive examination. It is recommended that a faculty member familiar with the Genetics Program comprehensive exam procedures be chosen as chair.

4. The proposed Comprehensive Examination Committee, with ad hoc member and chair designated, will be submitted to the Graduate Affairs Committee for approval.

5. The Comprehensive Examination Committee must be in place prior to submission of propositions.

6. The thesis adviser will not be present during administration of the comprehensive examination.

REQUIRED DEADLINES:

These are the required deadlines to be met PRIOR TO JANUARY 15th of your THIRD year.

Comprehensive Exam Schedule

[60-day limit from date student is notified of accepted abstract to final submission]

Students must work with program office and their committee to have exam completed by January 15th

Time line **Dates below give last possible dates for each step, (assuming propositions are accepted with no revisions required)**				
Sept. 16	Oct. 21	Oct. 28	**Minimum 2 weeks before oral**	Jan. 15

Notify Program Office of exam plans and complete Plan of Study	Submit abstracts to Committee	Student notified of committee decision in 1 week	Submit final proposals to Committee by the end of December.	Oral Exam Scheduled by January 2

C. *Proposals*

The Chair of the Comprehensive Exam Committee will meet with the student to discuss the examination format. The student will prepare two original research propositions (up to 4 double-spaced pages, not including figures and references) on topics chosen from the literature unrelated to their major research interest, and will submit them to the committee Chair. "Unrelated" is to be interpreted by the Comprehensive Examination Committee using the following considerations. A typical thesis project involves three major properties:

1. The biological problem or process
2. The research organism
3. The techniques or methodological approaches

Ideally, the comprehensive exam proposition topics will differ from the thesis project in all three of these properties. It is suggested that at least two of these be different. Final determination of what is sufficiently unrelated will be left to the Comprehensive Examination Committee, and the student may consult with the Comprehensive Exam Committee Chair for more specific guidance in preparation of the propositions.

The basic ideas and concepts in the unrelated written proposal should be original thoughts from the student. However, the student is free to consult with faculty members and other graduate students concerning the details of certain techniques or the feasibility of a particular approach. The input of faculty should be limited to factual information. The thesis adviser should not be involved in preparation of the unrelated written proposal. In addition, students are encouraged to organize "mock comps" involving other graduate students as part of the preparation process.

The Chair will distribute the propositions to the committee. After reviewing the propositions (1 week), the student will be notified if the abstracts are accepted and if so, which one of the propositions is to be expanded into a detailed proposal to serve as the basis for the comprehensive examination. If one of the two propositions is deemed unsatisfactory, then the student must improve this proposition to meet the committee's standards within a time-frame specified by the committee. If both propositions are deemed unsatisfactory by the examination committee then the student is required to prepare two new propositions within a time frame to be specified by the committee. If the second set of propositions are also deemed unsatisfactory by the examination committee, then this will be considered a fail for the student and s/he must wait 4 months prior to the second and last attempt at the comprehensive examination (see section G-5).

Since the proposal is a major component of the examination, it should be of the highest quality. A poor proposal can (in exceptional cases) be rescued by a good oral examination. In preparation of the full proposal, the student must meet the 2 week timeline to allow the committee sufficient time to consider the proposal. Failure to do so will result in failure of the comprehensive exam.

There is a sixty-day limit between the notification of which proposition to expand, and the final submission of the complete Comprehensive Examination proposal. This is a maximum limit, and can often be done in a shorter time.

D. ***Proposal Preparation***

The construction of an experimentally feasible research proposal is a test of both imaginative and critical ability of the candidate. The following statements provide additional information and direction for a graduate student submitting a proposal for the comprehensive examination.

The proposal should include the following:

1. A concise summary of the pertinent information upon which the proposal is based, adequately but not exhaustively referenced. This summary should logically develop a point of view to be used in stating the hypothesis. It should not contain lengthy quotations from the literature.

2. A concise and precise statement of the proposal.

3. A concise statement of the experimentation to be performed including the purpose of each experiment, a general summary of protocol, and interpretation of the anticipated results.

4. A statement of the significance of the project.

The maximum length of the proposal is 20 pages, double-spaced with 11 point font, not counting references or figures. While some flexibility in the exact length can be justified (in consultation with the Comprehensive Examination Committee Chair), it cannot be emphasized too strongly that the written presentation should show clarity, simplicity, and precision. **Proposals will be submitted to the examination committee at least <u>two weeks</u> prior to the scheduled date of the examination**. An oral examination will be conducted on whatever is submitted; there is no opportunity for revision.

E. ***Criteria for Evaluation of the PhD Comprehensive Examination***

1. *Clarity of written proposal:* Is it easy to see what is being presented? Is the background information clear enough to understand the problem? Is the proposed solution to the problem developed in a logical sequence? Are highly specialized terms or abbreviations explained?

2. *Importance of proposal*: Is the problem relatively minor or would its solution result in an important contribution? Is the problem so narrowly conceived that only a few approaches are possible to solve it? Is the project too vast to be solved by alternative sets of experiments? What is the value of a solution to the problem? What are the biological or practical implications of the research?

3. *Creativity:* Is the approach entirely new in respect to the problem? Are the ideas novel and imaginative or ordinary? Does the solution require the development of a new technique or instrument or a new way to use existing equipment?

4. *Knowledge of the subject and methods:* Does the student understand the genetics of the problem area; what is known and what is not? Is the student's knowledge superficial or is it relevant to solving the problem? Is the student sufficiently aware of the limitations of the methods used to solve the problem?

5. *Suitability of methods:* Are the proposed methods the best ones? What are alternatives? Does the student recognize experimental difficulties in the selection or use of methods?

Would these methods be suitable for solution of the problem in a reasonable period of time?

6. *Reasoning and data interpretation:* Can the student interpret all reasonable data so as to come to a conclusion or to suggest another experiment? Have alternative interpretations been considered sufficiently? When presented a set of data, can the student interpret it properly?

7. *Ability to explain difficult or unusual concepts:* This pertains to the student's oral performance rather than the written proposal which was evaluated according to criteria listed above. Is the student understandable or confusing in explaining difficult material?

8. *Knowledge of material peripheral to the proposition:* Are there serious gaps in the student's knowledge of genetics when questioned about material somewhat removed from the proposition?

F. *Oral Comprehensive Examination*

The oral comprehensive examination should normally be taken at the end of the second year and must be completed no later than January 15th of the third year. It will be approximately 2-3 hours in length ***and will cover the full proposal prepared for this purpose, and any other areas of genetics the committee feels are relevant.*** Following successful completion of the comprehensive examination and courses in the plan of study, the committee will certify the student to the program as a candidate for the PhD degree.

A formal report of the student's performance on the comprehensive examination will be placed in his/her permanent file. This report should be sufficiently detailed and approved by all members of the committee for the first and, if applicable, the second attempt (see section G-5).

G. *Protocol for Taking the Oral Comprehensive Examination*

1. It is the responsibility of the student and research sponsor to notify the Genetics Program Office of the intention to take the Comprehensive Examination. The Program Office completes and submits the Plan of Study along with the Request for Doctoral Comprehensive Examination to the Graduate College at least two weeks prior to the scheduled date of the oral examination.

2. It is the responsibility of the Comprehensive Examination Committee Chairperson to obtain the student's file (from the Program Office), including the form that must be signed by the members of the examination committee, in advance of the examination. The student's file must be kept confidential and must be returned along with the signed form to the Program Office ***within 24 hours*** after the examination.

3. Four of the five committee members must vote positively ("satisfactory") that a student has passed the examination for the student to receive a passing grade. If two members vote unsatisfactory, the grade reported to the Graduate College will be an "unsatisfactory," regardless of the votes of the remaining members of the committee.

4. If one faculty member votes unsatisfactory, and one or more of the remaining faculty members vote reservations, the student will receive ***"reservations". The Comprehensive Exam Committee will set the specific conditions required for lifting the reservations and the time limit within which these conditions must be met.*** The conditions and time limits

must be presented to the student in writing and must be sent by the Program Office to the Graduate College ***no more than 3 working days*** after the exam is taken. If the conditions are not met satisfactorily in the specified time, the comprehensive exam decision will be "unsatisfactory", and will be considered a fail for the student.

5. *Second attempt:* If a student fails the Comprehensive examination s/he may be allowed, with the advisor's support, to begin the comprehensive exam process again for a second attempt after a minimum of 4 months.

   For the second attempt, an additional committee member will join the Comprehensive Examination Committee and is expected to be an active participant during the Oral Comprehensive examination although with no formal satisfactory/unsatisfactory vote. Thus, as before, two "unsatisfactory" votes in this second attempt will be considered an "unsatisfactory" and the grade reported to the Graduate College, regardless of the votes of the remaining members of the committee.

   This additional member will be assigned by the Director of the Genetics program and customarily be a member of the Graduate Affairs committee (GAC) to provide similar evaluation criteria among students. The limitation of no more than three members from any one department is maintained when considering this sixth, *ad hoc*, Comprehensive Examination Committee member.

   A student must pass the comprehensive exam by the second attempt in order to remain in the program.

6. Once the student has passed the Comprehensive Examination and has completed 72 semester hours in residence, he or she will be eligible to register in subsequent semesters as a post-comprehensive student (i.e., Doctoral Continuous Registration GRAD:6002:0001).

H. ***Additional Recommendations in Preparing for the Oral Comprehensive Examination***

1. You will be expected to know the most important literature. One recommendation is to identify the 10 most important papers from your reference list and make notes regarding the salient information in those papers, so that you can quote (author/date) as you respond to questioning during your oral exam. For the remaining papers, identify the key bits of information that are relevant to your proposal.

2. Use a basic genetics textbook, and spend some time browsing through it to refresh your memory of how some of the basic principles work. You should already know these principles, but it may have been some time since you studied them, and this approach will make them more accessible to you when you are on your feet in front of the committee. You will not remember everything, but you should be able to remember some important basics and demonstrate a working knowledge of them.

3. The subject of the oral exam will be based directly on your written comprehensive exam proposal (not your thesis proposal), AND any other areas of genetics the committee feels are relevant. Therefore, it is important to know some basic genetics background, especially any areas with some connection to your comprehensive exam proposal.

I. *Responsibilities of the Comprehensive Examination Committee Chair*

1. Read and understand the Genetics Program Comprehensive Exam procedures.

2. Provide consultation and general direction about procedures, formats, relatedness to thesis, etc.

3. Refrain from providing guidance about specific experiments proposed, though some general guidance as to proposed approaches or scope may be provided.

4. Provide consultation regarding changes to the proposal after the proposition has been approved. The student should stick roughly to the proposition, with flexibility to make minor changes in specific proposed experiments. However, sometimes a more major change is required, usually based on further reading, to generate a defensible proposal—these should be discussed with the committee chair.

5. Responsible for enforcing submission deadlines, receiving submissions from the student, circulating proposals to committee members, assimilating feedback from committee members, and corresponding with the student.

6. Collect signatures from committee members on exam form, and submit form and report to the Genetics program office.

IX. The Thesis

A. *The Thesis Committee*

As described on page 23, the Thesis Committee, which is chosen and approved by the end of the second academic year in the program (May 15th of second year), will be chaired by the research adviser.

Four of the five Thesis Committee members must be members of the Genetics PhD Program, and one member must be tenure-track University of Iowa Graduate Faculty from outside the Genetics Program. To represent a reasonable diversity of research interests, no more than three members may be from any one department.

The proposed Thesis Committee must be submitted to the Graduate Affairs Committee for approval.

The first committee meeting will be held before the end of the second year, typically by May 15th). In preparation for this meeting, the student, with the help of the adviser, will prepare the thesis proposal and distribute it to the Thesis Committee. (See Section IV.A. for more information about preparation of the thesis proposal.) During this meeting the thesis research plan will be presented and the format for the upcoming Comprehensive Exam will be discussed. The ad hoc member chosen to replace the thesis advisor on the Comprehensive Exam Committee, will normally attend this meeting.

The Thesis Committee serves as an advisory body for preparation of the thesis. The Thesis Committee's responsibilities are as follows:

1. To assist the student in deciding on a plan of study.

2. To meet with the student at least annually to review progress in research (and courses) and provide a written report to the Graduate Affairs Committee (copy of the report should be sent to the student).

3. To administer the oral dissertation examination (thesis defense) upon completion of all other degree requirements.

The student, thesis advisor or thesis committee may request a meeting at any time.

B. ***Protocol for Taking the Thesis Examination***

1. It is the responsibility of the student and research adviser to notify the Genetics Program Office of the place, date, and hour of the Thesis Examination and to provide a thesis title 4-6 weeks prior to the exam date. The Program office must submit the Request for Final Examination and the thesis title to the Graduate College *at least* 3 weeks prior to the thesis exam.

2. The student must give the final draft to all members of the Thesis Committee at least **2 weeks** before the final examination. Failure to meet this deadline will require re-scheduling the final examination so that all committee members have at least two weeks to read the thesis.

3. When a thesis chapter includes work from others, it is the responsibility of the student and research adviser to include an introductory page indicating the specific contribution of the student. This is particularly important when the work is, or is prepared to be, a published article.

4. Although the Genetics program does not establish a firm minimum number of publications as requirement to be awarded the Ph.D. degree, it is the expectation of the program that all students will have their thesis research published in peer-reviewed journals. When no thesis-related research has been published or submitted for review at the time of the thesis defense, the research advisor and thesis committee should include a brief description of the causes for this anomaly to the program office together with a final copy of their dissertation.

5. The final PhD examination consists of a formal seminar presented to the public, including opportunity for questions, comments and discussion. The seminar will be followed by a meeting with the thesis committee for the final thesis defense.

6. The PhD degree is not awarded until the thesis is signed with all required revisions being completed before this signing.

7. ***Graduates of the Genetics PhD Program are required to submit a final printed copy of their dissertation to the Genetics Program office. This includes the signed abstract page. The copy can be submitted bound or unbound.***

Thesis Exam Schedule

4-6 months prior to exam	**4-6 weeks prior to exam**	**2 weeks prior to exam**
Meet with Thesis Committee	Notify Program Office of date, time, place and thesis title	Submit final draft of thesis to Thesis Committee

X. Dismissal of Graduate Students from the Genetics PhD Program

A. *Committee Responsibilities*

Two committees are responsible at different stages for the primary review of the progress of individual graduate students. These are initially the Graduate Affairs Committee and subsequently the student's Thesis Committee. The Graduate Affairs Committee will also be responsible for advising the student and reviewing the student's progress if at any time it becomes necessary for the student to form a new thesis committee.

B. *Procedures*

If, in the judgment of the responsible committee, the student is not making satisfactory progress toward the PhD degree, the procedure shall be as follows:

1. The student will be advised by the committee of potential dismissal and will be given an opportunity to meet with the committee and defend his/her work. Following any such meeting the committee will forward to the Director and to the student its written conclusions and recommendations. These recommendations may be for no action, for a probationary period to be followed by a new review, or for dismissal.

2. If the committee recommends dismissal, the Executive Committee must review the matter with the student and with the recommending committee. For example, the Executive Committee could resolve some cases by helping the student form a new Thesis Committee. Any member of the Executive Committee who participated in the original recommendation shall abstain in subsequent decisions.

3. If, after the review of the Executive Committee, the student continues to believe that dismissal is improper, the student may request in writing that an ad hoc Appeals Committee be established to consider the case. In this request, the student will nominate five faculty members and two graduate students in the Genetics PhD Program for the Appeals Committee.

4. From among those nominated, the Executive Committee shall appoint three faculty members to the Appeals Committee and designate its chairperson. The Executive Committee shall also appoint one of the nominated graduate students to be a reviewer who will meet with the Appeals Committee in all of its work but who will not vote.

5. The Appeals Committee chairperson shall convene the committee promptly. The committee will give the student an opportunity to discuss his/her grievances with it and will review all pertinent materials.

6. Upon completion of its review, the Appeals Committee shall communicate its findings and decision in writing to the student and to the Executive Committee. These reports should include the major considerations in the decision.

   Note: This procedure does not apply to an appeal of a decision on passage or failure of the comprehensive examination or PhD Thesis defense.

XI. Best Practices for Graduate Students and their Research Advisors

The progress, development and success of a graduate student hinges on the commitment of both the student and the research advisor. Basic principles of best practices in mentoring and graduate student life appear in the two lists that follow. Graduate students should be aware of what is necessary for their success and their advisors likewise should be aware of practices that promote their students' best interests.

Although the concepts of commitment and responsiveness underlying the lists of expectations apply to all disciplines, the specifics of these principles vary considerably among the biological sciences, physical sciences, social sciences, and humanities. The following guidelines are generally construed and are generally appropriate for students in the Genetics Program, but not every detail will apply to every student.

A. *Expectations of Graduate Students*

1. A graduate student has the primary responsibility for successful completion of his or her degree. A graduate student should be committed to his or her graduate education and should demonstrate this by efforts in the classroom and in research. A graduate student is expected to maintain a high level of professionalism, self-motivation, engagement, excellence, scholarly curiosity, and ethical standards.

2. A graduate student should meet regularly with the research advisor and provide updates on the progress and results of ongoing research.

3. A graduate student should be knowledgeable of the policies and requirements of the graduate program, the graduate college, and the institution. The student should strive to meet these requirements, including teaching responsibilities.

4. A graduate student should work with the research advisor to develop a thesis/dissertation project. This will include establishing a timeline for each phase of the work. The student should strive to meet the established deadlines.

5. A graduate student should work with the research advisor to select a thesis/dissertation committee. The student should meet with this committee at least annually (or more frequently, according to program guidelines) and be responsive to the advice of and constructive criticism from the committee.

6. A graduate student should discuss policies on authorship and attendance at professional meetings with the research advisor. The student should work with the advisor to submit all relevant research results that are ready for publication in a timely manner prior to graduation.

7. A graduate student should attend and participate in meetings, seminars and journal clubs that are part of the educational program.

8. A graduate student should seek opportunities for career enhancement, including individual fellowships. The student should work with the research advisor in the preparation and submission of the fellowship applications.

9. A graduate student should contribute to maintaining a research environment that is intellectually stimulating, emotionally supportive, safe, and free of harassment.

10. A graduate student must participate in the institution's Responsible Conduct of Research Training Program and practice those guidelines in conducting thesis/dissertation research.

11. A graduate student should discuss policies on work hours, sick leave and vacation with the research advisor or graduate director. The student should consult with the advisor in advance of any planned absences.

12. A graduate student should acknowledge primary responsibility to develop a career following the completion of the doctoral degree. The student should seek guidance from available resources, including the research advisor, the post-comps advising committee, career counseling services, thesis/dissertation committee, and any other mentors.

13. A graduate student should comply with all institutional policies, including academic program milestones. The student should comply with both the letter and spirit of all best practices and policies of the institution.

B. ***Expectations of Research Advisors***

1. The research advisor should be committed to the education and training of the graduate student as a future member of the research community.

2. The research advisor should meet one-on-one with the student on a regular basis. The advisor should provide timely feedback on the student's written work to facilitate ongoing progress on the thesis/dissertation.

3. The research advisor should be knowledgeable of the requirements and deadlines of his/her graduate program as well as those of the institution, including teaching requirements and human resources guidelines. The research advisor should guide the student in these areas to ensure academic and professional success of the student.

4. The research advisor should help to plan and direct the graduate student's project, set reasonable and attainable goals, and establish a timeline for completion of the project. The research advisor should anticipate conflicts between the interests of externally funded research programs and those of the graduate student, and should help keep these interests from interfering with the student's thesis/dissertation research.

5. The research advisor should help a graduate student select a thesis/dissertation committee. The advisor should help assure that the committee meets at least annually (or more frequently, according to program guidelines) to review the graduate student's progress.

6. The research advisor should discuss authorship policies regarding papers with the graduate student. The advisor should acknowledge the graduate student's contributions and work with the graduate student to present and publish his/her work.

7. The research advisor should encourage the graduate student to attend scientific/professional meetings and make an effort to secure and facilitate funding for such activities.

8. The research advisor should encourage the student to seek appropriate individual fellowships and work with the student in the preparation and submission of the fellowship applications.

9. The research advisor should provide an environment for his/her graduate students that is intellectually stimulating, emotionally supportive, safe, and free of harassment.

10. The research advisor should discuss intellectual policy issues with the student regarding disclosure, patent rights and publishing research discoveries.

11. The research advisor should not require the graduate student to perform tasks unrelated to his/her academic and professional development.

12. The research advisor should provide career advice and assist in finding a position for the graduate student following his/her graduation. The advisor should provide honest letters of recommendation and be accessible for advice and feedback on career goals.

13. The research advisor should lead by example and facilitate the training of the graduate student in complementary skills needed to be a successful researcher, such as oral and written communication, grant writing, lab management, animal and human research policies, the ethical conduct of research, and scholarly professionalism. The advisor should support the student's opportunities for teaching to meet the requirements of the program.

14. The research advisor is primarily responsible for providing or securing financial resources for the graduate student to facilitate the student's thesis/dissertation research. Advisors have the prerogative to pay their student's mandatory fees associated with submitting a dissertation, including a degree application fee, a publication and binding fee, and a thesis fee. However, they are not required to do so.

XII. Scientific Ethics: Guidelines/Other Resources

A. *Policy on Authorship of Publications*

(The following guideline has been suggested by Virginia Commonwealth University, Dean S. G. Bradley.)

To merit authorship, an individual should:

- Contribute significant ideas and experimental design to the project,
- Take part in the actual experimentation and data analysis,
- Be able to present and defend the work at a scientific meeting. (Exceptions may be made when one author has carried out a unique, sophisticated study or analysis.)

Students should also read *"Ethical Obligations of Authors"* in Accounts of Chemical Research 18(12), pp. 356-57 (1985).

This is one example of a *guideline*; the major point to remember is that in the event of allegations of scientific fraud, all authors can be held accountable.

B. ***Scientific Misconduct***

The U.S. Public Health Service has a formal policy dealing with misconduct. It is described in a special July 19, 1985, issue of the *NIH Guide to Grants and Contracts*. At the very least we must respect this statement. It says in part:
It is the policy of the PHS to maintain high ethical standards in research and to investigate and resolve promptly and fairly all instances of alleged or apparent misconduct.

As defined by the policy, "misconduct" is: (1) Serious deviation from accepted practices in carrying out research or in reporting the results of research. This includes fabrication, falsification, or plagiarism of data. (2) Material failure to comply with Federal requirements affecting specific aspects of the conduct of research; e.g. the protection of human subjects and the welfare of laboratory animals.

Misconduct does not include errors of judgment, errors in the recording, selection, or analysis of data or differences in opinions involved in the interpretation of data.

Scientific misconduct is grounds for dismissal from the Genetics PhD Program.

C. ***Academic Misconduct***

Any form of cheating or plagiarism in respect to curricular requirements is grounds for dismissal. Plagiarism is taking another's ideas, words, or creative works and presenting them as your own, or presenting them without proper attribution (giving credit to the original source).

D. ***Sexual Harassment***

The University of Iowa has clearly stated guidelines and regulations pertaining to sexual harassment. A copy of these rules is available and is considered required reading for all incoming students. The Genetics Program will follow and adhere to these guidelines and regulations.

E. ***Counseling Resources***

We need to be constantly vigilant about not only the scientific health and status of our students and faculty, but also about their mental health. Graduate school is an extremely stressful time for students and faculty alike. We would like to remind our students and faculty that if concerns arise about their mental health status, for whatever reason, that it is appropriate to seek help. The University offers counseling services for students at University Counseling Service (3223 Westlawn, 335-7294) and for faculty at Faculty Services (5101A D, 335-2085). Individual faculty or students should feel free to contact those services directly or, if they feel it appropriate, to talk with the Director of the

Genetics Program or any member of the Graduate Affairs Committee about the possible need for interventions.

XIII. Resources for Equal Opportunity and Diversity

The Genetics PhD Program is committed to equal opportunity and diversity. For more information and resources, see the following website:

http://www.uiowa.edu/~eod/

XIV. Appendices

Appendix I: Genetics PhD Program Committees

Executive Committee

Assists and advises the Director in the administration of program. Composed of: 1) the Director of the Genetics PhD Program (appointed by the Graduate College Dean for a 3-year term); 2) one member of the Program elected at large (for a 3-year term); 3) a student member of the Program elected by the students (for a 2-year term); 4) the PI of the Training Grant (if distinct from the Program Director); 5) The Genetics Program Director of Wellness and Disability; 6) the Chair of the Admissions Committee, 7) the Chair of the Curriculum Committee, 8) the Chair of the Graduate Affairs Committee, 9) Chair of Post-Comps Advising Committee. The last four positions will be appointed by the Program Director.

Admissions Committee

Reviews and evaluates qualifications of applicants; invites outstanding applicants to interview; recommends admission decision to program Director. (Annual appointments made by Genetics Program Director.)

Graduate Affairs Committee

Advises first-year students on requirements and registration; assists them in lab selection and arranging rotations. Advises students until they have a research sponsor and a thesis committee; may advise students who are in the process of changing research sponsors. Monitors progress of all students and reviews GPAs once per semester; notifies students of academic probation; handles all student appeals. (Annual appointments made by Genetics Program Director.)

Post-Comps Advising Committee

Meets at least annually with each post-comps student to advocate for student career development, and research and publication progress. (Annual appointments made by Genetics Program Director.)

Curriculum Committee

Conducts yearly review of curricula. Evaluates new courses for appropriateness of inclusion. Recommends addition (and category) or deletion of courses to Director. (Annual appointments made by Genetics Program Director.)

Seminar Committee

Selects speakers for the Genetics seminar series by polling the Genetics community. (Annual appointment of Seminar committee members made by Genetics Program Director.)

Retreat Committee

Schedules speakers and makes all arrangements for annual student/faculty retreat. (Annual appointment made by Genetics Program Director.)

Recruitment and Outreach Committee

Coordinates program activities aimed at expanding and communicating with a broad and diverse applicant pool, at conferences, visits to campuses, recruitment fairs, and networking with alumni. (Annual appointments made by the Genetics Program Director.)

Faculty Membership Committee

Reviews new faculty applications before submission to Executive Committee. Monitors faculty participation and makes recommendations to the Director regarding faculty 3-year reappointments. (Annual appointments made by Genetics Program Director).

Website Committee

Responsible for Program website content, design and presentation. (Annual appointment of Website committee members made by Genetics Program Director.)

Financial Outreach Committee

Responsible for soliciting funds to support the student-run seminar and events hosted by the student-run Social Activities Committee.

Genetics PhD Program Director

Appointed for a three-year term by the Dean of the Graduate College.

Appendix II: Certificate in College Teaching

The Graduate Certificate in College Teaching is offered through the University of Iowa Graduate College. For some students, completion of this certificate is a possibility during their time in the program, with eligibility determined on a case-by-case basis. Prior to affiliating with a lab, a student who is interested in pursuing the Graduate Certificate in College Teaching must discuss their interest with their potential advisor and complete the *Certificate in College Teaching Completion Agreement for Genetics Students* (see Appendix). Advisors have the prerogative to allow or deny students to pursue the certificate. The *Certificate in College Teaching Completion Agreement for Genetics Students* requires signatures from the student, advisor and program.

As of August 21, 2014, the requirements for the Graduate Certificate in College Teaching are: 1) students must complete courses in each of the 3 categories listed below, and 2) minimum of 12 semester hours of approved coursework is required for the Graduate Certificate in College Teaching. Previous teaching experience will not be permitted to waive any of these requirements.

For additional information and to enroll in the certificate program, please contact Dr. Dennis R. Maki, Director, or Mitchell Kelly, Associate Director.

Category 1

Minimum of 6 s.h. required, at least one of the following courses MUST be taken:

- Teaching and Learning in Higher Education (3 sh) GRAD:7385
- Seminar in College Teaching (1-3 sh) PSQF:6217
- Teaching Sociology (3 sh) SOC:7010
- Teaching Epidemiology (3 sh) EPID:7200
- Design of Instruction (3 sh) PSQF:6205

One of the following courses MAY be taken

- Universal Design and Accessibility for Online Learning (3 sh) PSQF:6211
- Web-Based Learning (3 sh) PSQF:6215
- Tools and Utilities for Online Teaching (3 sh) PSQF:6216

Note: By completing one Category 1 course, Genetics students enrolled in the Graduate Certificate in Teaching fulfill 1 of the 5 seminar credits required in the standard Genetics Program curriculum.

Category 2

Minimum of 3 sh required.
Must enroll twice, under the supervision of TWO different professors.
•Enroll in EDTL/EPLS/HHP/RCE:7380 Practicum in College Teaching (1-3 sh) when supervised by a College of Education faculty member.
•Enroll in GRAD:7400 Practicum in College Teaching, (1-3 sh) when supervised by a faculty member in a College other than Education.

Note: By completing the Practicum in College Teaching, Genetics students enrolled in the Graduate Certificate in Teaching may fulfill one of the two TAships required in the standard Genetics Program curriculum, provided that the conditions outlined in the *Certificate in College Teaching Completion Agreement for Genetics Students* are met.

Category 3

Minimum of 3 sh required.
•ePhD Portfolio in College Teaching (3 sh) EALL:7475

Certificate in College Teaching Agreement for Genetics Students

Student: _____

Research Mentor: _____

For details of the Certificate, the student and mentor should consult the GCCT website: https://education.uiowa.edu/services/office-graduate-teaching-excellence-ogte/graduate-certificate-college-teaching

The student plans to complete the Graduate Certificate in College Teaching by enrolling in the courses checked below.

Category 1: Coursework (2 courses/6 sh minimum)

At least one of the following courses MUST be taken:

- ☐ EDTL/EPLS/GRAD/RCE/PSQF:7385 Teaching and Learning in Higher Education 3 sh
- ☐ GRAD/PSQF:6217 Seminar in College Teaching 3 sh
- ☐ EPID:7200 Teaching in Epidemiology 3 sh
- ☐ SOC:7010 Teaching Sociology 3 sh
- ☐ PSQF:6205 Design of Instruction 3 sh

One of the following courses MAY be taken:

- ☐ PSQF:6211 Universal Design and Accessibility for Online Learning 3 sh
- ☐ PSQF:6215 Web-Based Learning 3 sh
- ☐ PSQF:6216 Tools and Utilities for Online Teaching 3 sh

Note: By completing one Category 1 course, Genetics students enrolled in the Graduate Certificate in College Teaching fulfill 1 of the 5 seminar credits required in the standard Genetics Program curriculum.

Category 2: Required Teaching (2 practica/3 sh minimum)

Please fill out the semester hours you plan to take for each practicum (1-2 sh per practicum).

- ☐ EDTL/EPLS/RCE/PSQF:7380 Practicum in College Teaching supervised by a College of Education faculty member. Number of practica:___, Total sh: _
- ☐ GRAD:7400 Practicum in College Teaching, supervised by a faculty member outside of the College of Education. Number of practica:_____, Total sh: _____

By completing the Practicum in College Teaching, Genetics students enrolled in the Graduate Certificate in College Teaching may fulfill one of the two TAships required in the standard Genetics Program curriculum, provided they satisfy both the practicum requirements and at least two of the following:

1. Hold weekly office hours
2. Lead a weekly discussion section
3. Contribute to materials for assessment (quizzes, exams, clicker questions, etc.)

Note: Like all TA positions, the use of a teaching-certificate practicum to fulfill a TA requirement must be approved in advance by the Graduate Advising Committee.

Category 3: Required Portfolio (3 sh minimum)

☐ EALL:7475 PhD ePortfolio in College Teaching 3 sh

Tuition Agreement

Tuition for Teaching Certificate Coursework will be paid by:

☐ Student

☐ Mentor

☐ Other (describe) _____

By signing below, I agree to complete the Graduate Certificate in College Teaching as prescribed above.

Student Signature:_____ Date: _____

By signing below, I agree to the student completing the Graduate Certificate in College Teaching as prescribed above.

Mentor Signature:_____ Date: _____

The Genetics Program approves this plan and consents to student completion of the Graduate Certificate in College Teaching.

Program Signature:_____ Date: _____