Genetics Ph.D. Program
Spring 2015 Courses

For up to Date course information please check ISIS
For more information on Genetics Ph.D. Program requirements please check the Graduate Student Manual

Required Core Courses for all Genetics Ph.D. students

BIOL:3172:0A04 (Discussion) **Evolution** 4 SH
002:131:0A04

Instructors: TBA
Course Supervisor: Ana Llopart
Lecture Time & Location: 10:30A - 12:15P Th 106 BBE
Description: This is one of the required courses for biology majors. Evolution is change in biological populations over generations. The course reviews the following material: mechanisms of evolution (including natural selection and chance), forms of adaptation, evolution of mating systems and sexual selection, the genetic basis of evolutionary change, speciation, systematics and phylogeny, and molecular evolution. The course is taught through lectures and workshops. Workshops can include assigned papers, exercises, computer simulations, and presentation of papers from the professional literature by individual students. Grades are based on exams over lecture material and workshop exercises. The text is used as backup for the lectures.

CLICKER INFORMATION: in this course we will use the UI clicker system.

Mid-term Exams: 6:30P - 8:30P Th ARR
Prerequisites: 002:031 (BIOL:1411), 002:032 (BIOL:1412), 002:128 (BIOL:2512), and 22M:016 (MATH:1460) or 22M:025 (MATH:1850) or 22M:031 (MATH:1550) or 22S:030 (STAT:2010) or 22S:101 (STAT:3510).

BIOL:3172:0AAA **Evolution** (Lecture: **This section is automatically added**) 0 SH
002:131:AAA

Instructors: Ana Llopart (Primary Instructor) , Samuel James (Team Teacher) , Maurine Neiman (Team Teacher)
Lecture Time & Location: 11:30A – 12:20P MWF 101 BBE
Exam 6:30P- 8:30P TH ARR
Description: This is one of the required courses for biology majors. Evolution is change in biological populations over generations. The course reviews the following material: mechanisms of evolution (including natural selection and genetic drift), types and levels of selection, evolution of mating systems and sexual selection, the genetic basis of evolutionary change, phylogeny, and molecular evolution. The course is taught through lectures and workshops. Workshops can include assigned papers, exercises, computer simulations, and presentation of papers from the professional literature by individual students. Grades are based on exams over lecture material and workshop exercises. The text is used as backup for the lectures.

CLICKER INFORMATION: in this course we will use the UI clicker system.

Midterm exams will be held from 6:30-8:30pm in 101 BBE on:

Thursday, February 12, 2015
Thursday, March 12, 2015
Thursday, April 16, 2015

Prerequisites: 002:031 (BIOL:1411), 002:032 (BIOL:1412), 002:128 (BIOL:2512), and 22M:016 (MATH:1460) or 22M:025 (MATH:1850) or 22M:031 (MATH:1550) or 22S:030 (STAT:2010) or 22S:101 (STAT:3510).

BIOL:4333:0001 **Genes and Development** 3 SH
002:168:001

Instructors: Instructors: Daniel Eberl (Primary Instructor) , Jim Lin (Team Teacher)

Lecture Time & Location: 2:00P - 3:15P TTh 106 BBE

Description: This course is designed for senior undergraduates majoring in the life sciences and graduate students. How multicellular animals develop has long been a central area of study in the biological sciences. Technological innovations in recent years have stimulated a virtual explosion of new information and conceptual breakthroughs, providing molecular mechanisms for fundamental developmental processes. The object of this course is to provide an intellectual foundation for understanding the current research literature in developmental biology through in-depth analysis of selected systems. As noted in the course title, a major emphasis is to explore the genetic regulation of developmental pathways and processes. However, organismal, cellular, and biochemical perspectives are discussed when appropriate. The course provides an in-depth examination of topics in pattern formation, cell fate specification, and differentiation. Readings are primarily from research articles and reviews, providing a particularly detailed study of selected processes, in development, drawing on examples primarily from Drosophila and vertebrate systems. Emphasis is on understanding development through molecular genetic technologies. Attendance is required. Grades are based on three take-home exams.

Restrictions: None

GENE:6234:0001 **Basic Biostatistical Methods in Genetics Apps** 1 SH
127:234:001

Instructor: Deborah Dawson (Primary Instructor)

Lecture Time & Location: 10:30A – 11:20A T 5-664 BSB

Description: Introduction to terminology, fundamental concepts, and methods of biostatistics as applied to genetic research; genetic investigation examples used to illustrate statistical approaches.

GENE:6200:0001 **Special Topics in Genetics**
127:200:001 *"The Genetics of Neurodevelopmental Disorders"* 1 SH

Instructor: John Manak (Primary Instructor), Ben Darbro (Team Teacher)

Course Supervisor:

Lecture 4:00P - 5:00P M 2117 MERF
2:30P - 3:30P F 106 BBE
5:00P - 6:00P M 1117 MERF

Description: The 2015 Genetics Seminar series topic is *"The Genetics of Neurodevelopmental Disorders".*

TEACHING ASSISTANT-Lisa Harney.

Registration Information: DISCUSSIONS Meets every Friday 1:30 P - 2:20P BBE 106
SEMINARS Meets on Monday as scheduled 4:00P - 5:00P MERF 2117
DISCUSSIONS Meets on Monday as scheduled 5:00P- 6:00P MERF 1117

BIOL:2512:0A01 **Fundamental Genetics** 4 SH
002:128:A01
BIOL:2512:0AAA **Fundamental Genetics (This section is automatically added)** **0 SH**

002:128:AAA

Instructor: Robert Malone (Primary Instructor)

Lecture Time & Location: 2:30P - 3:20P M B20 BB (A01)
Time & Location: 10:30A – 11:20A MWF 101 BBE (AAA)
Exam: 6:30p – 8:00P M ARR

Description: Fundamental Genetics is required for all biology majors. The course will cover all major concepts in genetics (classical transmission genetics, molecular genetics, developmental genetics, genomics) except population genetics. In-class time will consist of a mix of clicker quizzes, lectures, and group problem-solving and concept activities. Additionally, TA-led discussion groups will meet to supplement in-class learning. Three midterm exams and a final will be given. Course grades will be based on clicker quiz scores, discussion group assignments and quizzes, and exam scores.

Mid-term Exams: 6:30P - 8:00P MF ARR

CS:3110:0001 **Introduction to Informatics** 3 SH
22C:104:001

Instructor Tianbao Yang (Primary Instructor)

Lecture Time & Location: 11:30A - 12:20P MWF 210 MLH

Description: An introduction to programming, computing principles and fundamental aspects of computer science. Topics covered include programming in Python, fundamentals of relational databases, algorithmic idioms, computational complexity, and example applications. This fall 2014 offering serves as an introduction to informatics for selected students in the IGPI graduate program by special arrangement only. For more information and registration authorization, please contact your IGPI director of graduate studies. All other graduate or certificate students should enroll in the spring 2015 offering; undergraduates should enroll in CS:2110 (22C:080).

Textbooks and Materials: *The following textbook and material information is for planning purposes only and could be modified. Final textbook information will be available four weeks before the start of the semester. Please check then to finalize your textbook and material purchases:*

- Introduction to Computation and Programming Using Python, Revised and Expanded Edition
  Guttag
  The MIT Press
  ©2013
  $25.0
  ISBN: 9780262525008
- Iowa book
- University Book Store

•University Book Store
•Iowa Book

CS:3210:0SCA **Programming Languages and Tools** 3 SH
22C:109:SCA

Instructor TBD (Primary Instructor), Padmini Srinivasan (Course Supervisor)

Lecture Time & Location: 6:30P - 7:45PTTh 117 MLH

Description: This course offers rotating sections covering different programming languages (C, C++, Java, COBOL) and tools (Visual Studio). The topics covered in a section vary by programming language. The goal of this course is to expose students to the latest

technology and allow students to learn a new programming language once they understand the fundamentals of programming. Students are assumed to have previous programming experience at the level of CS:1210 (22C:016). The course does not count for credit towards a CS major or minor. The sections are taught by an instructor or a TA.

GENE:6280:0IND **Directed Study in Genetics** ARR SH
127:280:---

Instructor: Staff
Lecture ARR
Description: If you have not received permission from the instructor to add this section, your enrollment may be administratively dropped.

GENE:7301:0IND **Graduate Research in Genetics** ARR
127:301:---

Instructor: Staff
Lecture ARR
Description: If you have not received permission from the instructor to add this section, your enrollment may be administratively dropped
Registration Information: GENE:7301:_ _ _. Please select the instructor's name from the drop down menu. The instructor's number will be automatically added. Once you have registered for your courses hours, you will need to register for research hours.
PRE-COMPS Students: Your total registered hours must equal 15 for the fall and spring semesters.

GRAD:6002:001 **Doctoral Continuous Registration** 0 SH
000:002:001

Instructor: Staff
Lecture ARR
Description: Post Comp students, with Graduate College approval.

GRAD:6003:0001 **Doctoral Final Registration** 0 SH
000:003:001

Instructor: Staff
Lecture ARR
Description: Special permission is automatically granted for students who have passed their comprehensive examinations.
Restrictions: Post Comp students, with Graduate College approval

GRAD:7270:0002 **Principles of Scholarly Integrity** 0 SH
650:270:002

Instructor: Minnetta Gardinier (Primary Instructor)

Lecture ARR

Description: This course provides training in the ethical and responsible conduct of research and scholarly activities. Students starting graduate study after 8/1/10 - course registration is required for all doctoral and master's degree students who are (or will be) engaged in research activities that are funded by NIH or NSF. This funding may be from individual faculty investigator research grants, individual student fellowships, or institutional training grants. Students should enroll in this course during their first year of graduate work.

Doctoral students attend and participate in the introductory four-hour orientation workshop and eight 90-minute topical workshops (2 workshops per semester with continuing registration over four semesters). Master's students attend and participate in the introductory four-hour orientation workshop and four 90-minute topical workshops (2 workshops per semester with continuing registration over two semesters). Students enroll in the appropriate Section based on their degree objective: Section 001 - PhD students, I sh; Section 002 - MS/MA students, 0 sh.

The introductory and topical workshops use didactic presentations and small group discussions of case studies to open dialogues in the following areas: student/mentor responsibilities for the pursuit of scholarly work (ownership, authorship, plagiarism/falsification/fabrication of data); student/mentor relationships and promoting an intellectual dialogue (communication, collaboration, grievance management); student responsibilities involving the institution/scholarly community/society (intellectual property, conflict of interest, fiscal responsibilities, human/animal subjects).

A required four-hour introductory workshop is offered in the week prior to the start of classes and introduces principles of scholarly integrity (August, January - contact the course director for specific dates and times.) It must be completed before attending the more in-depth topical workshop discussions.

Students are assigned to a small group of 9-12 students with a faculty facilitator, who promotes the discussion of assigned case study readings. Each small group meets twice per semester for the topical workshops. You will be assigned to a group, which will meet on the same day of the week at the same time. Group assignments will be adjusted each semester to accommodate for class schedule changes.

Students must attend and actively participate in all required workshops for successful completion of this course. Students should register only once for the course, and registration will continue automatically until a grade is assigned after completing all workshops.

This course is not open to students in professional degree programs (e.g., AuD, DDS, DNP, MD, MSN, PharmD). Professional students may consider taking the web-based CITI training course modules that are available.

*Final meeting dates and times wil be announced before the semester starts. See the course web site for full details: http://www.grad.uiowa.edu/principles-of-scholarly-integrity.

Recommendations: first-year graduate standing (Ph.D., M.S./M.A.) and involvement in conducting NSF/NIH-funded research.

Electives (8 sh chosen from the following courses)

BIOL:4333:001 Genes and Development **3 SH**
002:168:001 (The same course cannot be used to satisfy a requirement and the elective requirement)

Instructors: 2:00P - 3:15P TTh 106 BBE
Lecture Time & Location: 2:00P - 3:15P TTh 106 BBE
Description: Course Fee: $ 10.00

This course is designed for senior undergraduates majoring in the life sciences and graduate students. How multicellular animals develop has long been a central area of study in the biological sciences. Technological innovations in recent years have stimulated a virtual explosion of new information and conceptual breakthroughs, providing molecular mechanisms for fundamental developmental processes. The object of this course is to provide an intellectual foundation for understanding the current research literature in developmental biology through in-depth analysis of selected systems. As noted in the course title, a major emphasis is to explore the genetic regulation of developmental pathways and processes. However, organismal, cellular, and biochemical perspectives are discussed when appropriate. The course provides an in-depth examination of topics in pattern formation, cell fate specification, and differentiation. Readings are primarily from research articles and reviews, providing a particularly detailed study of selected processes, in development, drawing on examples primarily from *Drosophila* and vertebrate systems. Emphasis is on understanding development through molecular genetic technologies. Attendance is required. Grades are based on three take-home exams.

Recommended: 002:104.

BIOL:5117:0001 Seminar: Topics in Molecular Genetics **1, 2 SH**
002:191:001

Instructor: Anna Malkova (Primary Instructor), Josep Comeron (Team Teacher)
Lecture Arranged Time Arranged Location

002:234:001 Seminar: Writing in Natural Sciences **2 SH**
BIOL:6188:0001

Instructor: Maurine Neiman (Primary Instructor) , Bernd Fritzsch (Team Teacher)
Lecture Time & Location:
10:30A - 12:30P Th B20 BB
Description: The overarching goal of this course is to inform you about and give you practice in how to write for the natural sciences. Lectures are interspersed throughout the semester. Approximately 70% of the time in class is spent editing writing projects of your classmates. The nature of the writing project is dependent on the student and chosen in consultation with the instructors. Appropriate types of writing projects include thesis (M.S. and Ph.D.) project proposals, thesis chapters, review and data-driven articles, and competitive grant applications. Each student submits three drafts of their writing for editing by the class. Students are evaluated based on 1) the quality of the writing in the final draft, 2) the progress they have made on their project, 3) their writing skills over the semester, and 4) the quantity and quality of their critiquing.

Students that are repeating the course must focus on a writing project that is entirely different from the project that was their focus the first time that they took the course. Instructor approval of this project is required prior to enrollment

Registration Restrictions: **Restricted for all students**

MICR:6268:0001 **Biology and Pathogenesis of Viruses** 2 SH
061:268:001

Instructor Stanley Perlman (Primary Instructor)

Lecture Time & Location: 10:30A – 12:20P TH 1180 ML

Description: Molecular biology of animal DNA and RNA viruses, interaction of these viruses with eucaryotic cells; mechanisms of viral latency, persistence, cellular transformation, oncogenesis; virology literature.

MCB:6215:0001 **Transcription RNA** 1 SH
142:215:001

Instructor Instructor: Scott Moye-Rowley (Primary Instructor), David Price (Team Teacher)

Lecture Time & Location:
Begins: Jan 21, 2015
Ends: Feb 20, 2015
10:30A - 11:25A MWF 1-107 BSB

Description: Principles and techniques for investigating mechanisms of controlling eukaryotic gene expression; basic genome organization, chromatin structure, transcription, RNA processing, translation; cloning methods, use of electronic sequence databases, footprinting, chromatin immunoprecipitation, in vivo and in vitro transcription assays, DNA microarray analysis, information retrieval.

Prerequisites: BISC:5201 (156:201) Fundamentals of Gene Expression

MCB:6217:0001 **Epigenetics, Cancer & Mouse Models** 1 SH
142:217:001

Instructor: Adam Dupuy (Primary Instructor)

Lecture Time & Location:
Begins: Apr 06, 2015
Ends: May 08, 2015
10:30A - 11:20A MWF 1-107 BSB

Description: Epigenetic mechanisms of transcriptional control, mouse models for understanding the molecular basis for human disease; based on research publications.

Prerequisites: BISC:5201 (156:201) Fundamentals of Gene Expression

MCB:6225:0001 **Growth Factor Receptor Signaling** 1 SH
142:225:001

Instructor: John Koland (Primary Instructor)

Lecture Time & Location:
Begins: Jan 20, 2015
Ends: Feb 19, 2015
9:00A - 10:20A TTh 1-107 BSB

Description: Mechanisms of signaling by growth factors; cytokines and related molecules that regulate cell proliferation, development, differentiation, and survival; emphasis on molecular mechanisms of signaling, relevance of these signaling processes to various human diseases.

MCB:6226:0001 **Cell Cycle Control** 1 SH
142:226:001

Instructor: Prabhat Goswami (Primary Instructor), Dawn Quelle (Team Teacher), Aloysius Klingelhutz (Team Teacher)

Lecture Time & Location:
Begins: 02/24/2015 Ends: 04/02/2015
8:30A - 9:50A TTh 1-107 BSB

Description: Cell cycle regulation, DNA damage-dependent cell cycle regulation, redox-dependent cell cycle regulation, cellular senescence.

MCB:6227:0001 **Cell Fate Decisions** 1 SH
142:227:001

Instructor: Tina Tootle (Primary Instructor)

Lecture Time & Location:
Begins: Apr 07, 2015
Ends: May 07, 2015
9:00A - 10:20A TTh 1-107 BSB

Description: Cellular fate decisions, including signal integration, terminal differentiation in development, mechanisms of embryonic stem cell gene regulation/cellular reprogramming, cell death paradigms, and cell death in development and cancer.

BISC:5205:0001 **Practical Bioinformatics** 1 SH
156:205:001

Instructor: Todd Scheetz (Primary Instructor)

Lecture Time & Location:
Begins: Jan 0, 2015
Ends: Jan 16, 2015
2:00P - 5:00P MWF 207E HLHS

Description: Formal instruction on the use and application of bioinformatics for bench scientists; bioinformatics, resources, genome annotations, sequence analysis, comparative genomics, expression analysis, and systems biology.

BISC:5265:0001 **Biosciences Critical Thinking and Communication** 2 SH
156:265:001

Instructor: Michael Schultz (Primary Instructor), George Richerson (Team Teacher)

Lecture Time & Location:
12:30P - 2:20P M 1180 ML

Description: Entry-level graduate seminar that involves weekly discussions of selected papers and oral and written presentations tied to the student's research rotations.

RESTRICTIONS Restricted for all students

BISC:5265:0001 **Biosciences Critical Thinking and Communication** 2 SH
156:265:001

Instructor: Michael Schultz (Primary Instructor), George Richerson (Team Teacher)

Lecture Time & Location:
12:30P - 2:20P M 1180 ML

Description: Entry-level graduate seminar that involves weekly discussions of selected papers and oral and written presentations tied to the student's research rotations.

RESTRICTIONS Restricted for all students

Statistics

STAT:3510:0A14 **Biostatistics-Discussion** 3 SH
22C:101:A14

Instructor: TBD (Primary Instructor), TBD (Course Supervisor)

Lecture Time & Location:
5P - 5:50P Th 74 SH

Description: Statistical concepts and methods for the biological sciences; descriptive statistics, elementary probability, sampling distributions, confidence intervals, parametric and nonparametric methods, one-way ANOVA, correlation and regression, categorical data.

Mid-term Exam: 6:30P – 8:00 P TH Arranged Location

STAT:3510:0AAA (22S:101:AAAA) will be automatically added with this section.

Computational Genetics-Core Group

BIOC:3110:0EXW **Biochemistry** 3 SH
099:110:EXW

Instructor: Marc Wold (Primary Instructor), Ernesto Fuentes (Team Teacher), Pam Geyer (Team Teacher), Daniel Weeks (Team Teacher)

Lecture Time & Location:
5P - 5:50P Th 74 SH

Description: This section is offered through the Division of Continuing Education (DCE). Visit the Course Overview Page for more details. New or returning students unable to register directly on ISIS click here to proceed. Contact DCE at 319-335-2575 or dce-registration@uiowa.edu for assistance.

Midterm exams will be held in 100 PH from 5:30-6:20pm on:

Tuesday, February 10, 2015
Tuesday, March 3, 2015
Tuesday, March 31, 2015
Tuesday, April 21, 2015

Distance students may take exams at their respective locations with an approved proctor. See the course ICON site for more information

Textbooks and Materials The following textbook and material information is for planning purposes only and could be modified. Final textbook information will be available four weeks before the start of the semester. Please check then to finalize your textbook and material purchases.

- Biochemistry: A Short Course
John L. Tymoczko, Jeremy M. Berg & Lubert Stryer
W.H. Freeman
©2013
$220.1
ISBN: 9781429283601