Term Information

Effective Term	Spring 2016

General Information

Course Bulletin Listing/Subject Area	Molecular Genetics
Fiscal Unit/Academic Org	Molecular Genetics - D0340
College/Academic Group	Arts and Sciences
Level/Career	Undergraduate
Course Number/Catalog	4502
Course Title	Expanded General Genetics Laboratory
Transcript Abbreviation	ExpGenGeneticsLab
Course Description	MolGen 4502 Expanded General GeneticsLaboratory complements the MolGen 4500 lecture course. It provides an in-depth laboratory experiences in a wide range of molecular genetic laboratory techniques and approaches, and utilization of relevant genetic model systems.
Semester Credit Hours/Units	Fixed: 2

Offering Information

Length Of Course	14 Week, 7 Week, 4 Week (May Session)
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	No
Grading Basis	Letter Grade
Repeatable	No
Course Components	Laboratory
Grade Roster Component	Laboratory
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites	Prereq or concur: 4500 or 4500E, or permission of instructor.
Exclusions	Not open for students with credit in MolGen 4501; MolGen 5601 (601), MolGen 5602 (602)

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code	26.0804
Subsidy Level	Baccalaureate Course
Intended Rank	Sophomore, Junior, Senior

Requirement/Elective Designation

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- -Utilize core molecular and general genetic laboratory techniques/approaches.
  -Appreciate the relevance and use of model systems in the context of genetic research
  -Have a basic understanding of relevant bioinformatics approaches

Content Topic List

- Isolation and manipulation of nucleic acids
  PCR in DNA amplification and manipulation
  DNA sequencing/analysis
  Generation of recombinant molecules
  Bacterial Transformation
  Protein expression
  Gene expression
  Model systems
  Populationgenetics

Attachments

- MOLECULAR GENETICS 4502 Course Description V2.docx: Course description
  (Other Supporting Documentation. Owner: Vaessin,Harald Emil Friedrich)
- MG4502 Syllabus (Draft).doc: Syllabus
  (Syllabus. Owner: Vaessin,Harald Emil Friedrich)
- MolGen4502%20Course%20Request-2.pdf: Department Chair Letter
  (Cover Letter. Owner: Vaessin,Harald Emil Friedrich)

Comments

- This course can serve as an elective in basically all life science majors, but is NOT an elective in the Molecular Genetics major or minor. It is not clear how we can provide updated curriculum maps for all of these other majors (none of which we control). *(by Vaessin,Harald Emil Friedrich on 04/21/2015 09:14 AM)*
- Please attach updated curriculum map if course can count in major. *(by Vankeerbergen,Bernadette Chantal on 04/21/2015 08:01 AM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Vaessin,Harald Emil Friedrich	04/17/2015 03:03 PM	Submitted for Approval
Approved	Vaessin,Harald Emil Friedrich	04/17/2015 03:04 PM	Unit Approval
Approved	Fink,Steven Scott	04/20/2015 09:15 AM	College Approval
Revision Requested	Vankeerbergen,Bernadette Chantal	04/21/2015 08:02 AM	ASCCAO Approval
Submitted	Vaessin,Harald Emil Friedrich	04/21/2015 09:25 AM	Submitted for Approval
Approved	Vaessin,Harald Emil Friedrich	04/21/2015 09:26 AM	Unit Approval
Approved	Fink,Steven Scott	04/22/2015 09:31 AM	College Approval
Pending Approval	Nolen,Dawn Vankeerbergen,Bernadette Chantal Hanlin,Deborah Kay Jenkins,Mary Ellen Bigler Hogle,Danielle Nicole	04/22/2015 09:31 AM	ASCCAO Approval

THE OHIO STATE UNIVERSITY

Department of Molecular Genetics

965 Biological Sciences Building
484 W. 12th Ave.
Columbus, OH 43210

614-292-5106 Phone
614-292-4466 Fax

Seeger.9@osu.edu

April 17, 2015

Curriculum Review Committee:

In spring of 2014 we offered a new laboratory course, MolGen 4501 General Genetics Laboratory, as a companion to our major genetics service course, MolGen 4500. MolGen 4501 has been a success with near full enrollment of multiple sections in both autumn and spring semesters of this academic year.

From our initial offerings we realize that a one-credit hour lab is rather limiting in terms of the knowledge and experiences that can be shared with our students. To address this issue, we are proposing a new two-credit hour version of this lab course, MolGen 4502 Enhanced General Genetics Laboratory. We feel this course will better address the needs of students desiring a more extensive exposure to techniques in genetics and molecular biology. By continuing to offer the one-credit version we will not impact students who feel that the existing course meets their educational and career needs. The department has the laboratory space, personnel, and fiscal resources to offer both versions of this valuable course for life science majors. We hope you will approve this new course request.

Sincerely,

Mark A. Seeger, PhD
Chair, Department of Molecular Genetics
The Ohio State University

Syllabus

Formatted: Font: Helvetica, 12 pt, Bold

Molecular Genetics 4502, Expanded General Genetics Laboratory
Spring 2014

Rm xxx, JenningsAronoff Hall
Laboratory time: TBD (33 hours ea. on 2 days/week)

Instructors	**Contact Information**
TBN	XXXXX

TAs	**Contact Information**
TBN	XXXXXX

Course Description

This expanded laboratory course will provide students with a laboratory experience in the application of current molecular genetic techniques to study nucleic acids, transmission and molecular genetics, gene expression, bioinformatics and biotechnology. The theoretical and practical mastery of these techniques and approaches provide the core learning objectives of this course. At the end of this course students will be able to use current molecular genetic laboratory techniques, utilize bioinformatics tools to analyze genetic experimental data, and understand the use of model systems to address genetic research problems. The material covered in this course complements and enhances the understanding of the material covered in MolGen 4500.

Carmen

Formatted: Indent: First line: 0.5"

The Laboratory Manual as well as any additional supplemental reading material can be downloaded as PDF files from the Carmen course web site, or from the iBook store. Each student enrolled in MolGen 4502 will have access to the website for the course, and you are exprected to check there regularly for handouts, Ppower Ppoint files, and announcements about the course. You are responsible for obtaining the Laboratory Manual before the start of the Week 2

laboratory session. Handouts will **not** be available in the laboratory. Therefore, print your copy, or use your laptop to access the Laboratory Manual.

Course Structure

The course will meet two days per week for 3 hours to complete the scheduled **experiments** for each session. Before the start of each session a short introduction will be presented that outlines the experimental work to be accomplished during each session, as well as to provide some theoretical background. As we have only a limited amount of time to complete the scheduled experiments, it is essential that students are not late for sessions.

Additional presentations/discussions will take place during experimental "down-time" (e.g. incubation periods etc.), in order to provide additional background and to address questions.

Individual experiments will extend over several sessions. Labbooks must be have to be kept by each students to record and document the work accomplished. The Labbooks will be graded at the end of the term. At the conclusion of each experiment set, a typed report will has to be submitted. Deadlines for the submission of these Lab Reports will be posted. The deadlines for reports are absolute.

Office for Student Life Disability Services:

If you need an accommodation based on the impact of a disability, you should contact the instructor to arrange an appointment as soon as possible. At the appointment we can discuss the course format, anticipate your needs and explore potential accommodations. We rely on the Office of Student Life For Disability Services (SLODS) for assistance in verifying the need for accommodations and developing accommodation strategies. If you have not previously contacted the SLODS, we strongly encourage you to do so as soon as possible. Any student currently registered with the SLODS and taking exams at SLODS will need to provide the MG4500 instructor with the SLODS proctor sheets during the first week of class for completion.

Academic Misconduct:

All instructional faculty and staff are required by The Ohio State

University to forward all cases of suspected academic misconduct to the Committee on Academic Misconduct. Any form of academic misconduct, no matter how seemingly small, will not be tolerated in this course. Students are expected to abide by the Code of Student Conduct and the university's honor code as outlined in the University Student Handbook or suffer the consequences.

Grades:

Grades will be calculated as following:

Reports:	40%
Labbook:	20%
Final Exam:	40%
Total	100%

93 – 100: A
90 -< 93: A-
85 -< 90: B+
80 -< 85: B
75 -< 80: B-
70 -< 75: C+
65 -< 70: C
60 -< 65: C-
55 -< 60: D
-< 55: E

Schedule of Topics (subject to change)

Week 1: Introduction, review of laboratory rules and organizational issues.

Week 1 and 2: Observation of Mitosis during Development:
Mitosis in imaginal discs; Polyploidy in the salivary glands

Weeks 1 to 5: Recombination mapping and genetic characterization of mutations using *Drosophila melanogaster*

Weeks 3 to 6: DNA Barcode – Determination of the species based on DNA Barcoding

Weeks 7: Subcloning and characterization of ~~an~~ amplified PCR fragments into plasmid vector.

Week 8 and 9: Expression and identification of recombinant proteins in E. coli

Week 10 to 12: Use of inducible RNAi for the identification and characterization of genes with critical roles during development.

Week 13 and 14: in situ analysis of gene expression

MOLECULAR GENETICS 4502: Expanded General Genetics Laboratory

Course Description

This two credit hour laboratory course has been developed based on student feedback from current students in MolGen 4500 (General Genetics) and in the 1 credit hour MolGen 4501 (General Genetics Laboratory) course. A survey of nearly ~450 students enrolled in MG4500 showed that ~300 of those students had an interest in an offering of some type of lab course. Of those students interested in a laboratory course over 80% preferred the proposed 2 credit hour class when compared to the 1 credit offering. A survey of current student in MG4501 resulted in two-thirds of the students expressing their preference for an expanded 2 credit hour version of the General Genetics Laboratory course, whereas one-third of the current MolGen 4501 students stated that they preferred the existing 1 credit hour version. In response to the student feedback a new two credit hour laboratory course is proposed that will provide MolGen 4500 students with an expanded, optional laboratory experience in the application of current molecular genetic techniques and approaches to study nucleic acids, transmission and molecular genetics, gene expression, bioinformatics and biotechnology. The extended laboratory time available will permit a more in depth laboratory experience. At the end of this course students will be able to use current, broadly employed molecular genetic laboratory techniques and bioinformatics tools to analyze genetic experimental data, and understand the use of model systems to address genetic research problems. The material covered in this course complements and enhances the understanding of the material covered in MolGen 4500. Molecular Genetics 4502 is an optional laboratory course for students enrolled in Molecular Genetics 4500. Concurrent or recent enrollment in MolGen 4500 is a requirement for enrollment in MolGen 4502. However, students enrolled in MolGen 4500 are NOT required to enroll in MolGen 4502. While the material covered in MolGen 4502 complements and enhances the material/topics covered in MolGen 4500, enrollment is MolGen 4502 is not necessary to be successful in MolGen 4500. Enrollment in MolGen4502 will NOT be open to students who have already successfully completed MolGen4501.

Learning Objectives:

Upon completion of the course, students can

- utilize core molecular genetic laboratory techniques and approaches;
- appreciate the relevance and use of model systems in the context of modern molecular genetic research;
- have a basic understanding of relevant bioinformatics approaches.

Furthermore, the expanded techniques learned in this course will serve as a foundation for students seeking employment in laboratory research positions that utilize these methods.

Assessment:

To determine how well students will be able to reach the Learning Objectives for the course we will utilize embedded questions, grading rubric subcategories for lab book and lab report analysis, as well as direct student feedback. The instructors will utilize this information and data to make adjustments in the course delivery and structure.

Laboratory Space

MolGen 4502 will be taught in our Jennings laboratories (either room 014 or 024 Jennings) in parallel sessions of not more than 24 students per session. The laboratory space is under scheduling control of the Department of Molecular Genetics