UC 12295 135

CBM003 ADD/CHANGE FORM

APPROVED APR 24 2013

☒ Undergraduate Council	or	☐ Graduate/Professional Studies Council
☐ New Course ☒ Course Change		☐ New Course ☐ Course Change
Core Category: WID Effective Fall 2014		Effective Fall 2013

1. Department: Biology & Biochemistry College: NSM
2. Faculty Contact Person: Tom Vida Telephone: x3-2641 Email: tavida@uh.edu
3. Course Information on New/Revised course:
   - Instructional Area / Course Number / Long Course Title: BIOL / 3311 / Genetics Laboratory

     RECEIVED APR - 4 2013
   - Instructional Area / Course Number / Short Course Title (30 characters max.) BIOL / 3311 / GENETICS LABORATORY
   - SCH: 3.00 Level: JR CIP Code: 26080100 Lect Hrs: 1 Lab Hrs: 6
4. Justification for adding/changing course: **To meet core curriculum requirements**
5. Was the proposed/revised course previously offered as a special topics course? ☐ Yes ☒ No
   If Yes, please complete:
   - Instructional Area / Course Number / Long Course Title: ____ / ____ / _____
   - Course ID: _____ Effective Date (currently active row): _____
6. Authorized Degree Program(s): BIOL
   - Does this course affect major/minor requirements in the College/Department? ☒ Yes ☒ No
   - Does this course affect major/minor requirements in other Colleges/Departments? ☐ Yes ☒ No
   - Can the course be repeated for credit? ☐ Yes ☒ No (if yes, include in course description)
7. Grade Option: Letter (A, B, C ...) Instruction Type: lecture laboratory (Note: Lect/Lab info. must match item 3, above.)
8. If this form involves a change to an existing course, please obtain the following information from the course inventory: Instructional Area / Course Number / Long Course Title
   BIOL / 3311 / Genetics Laboratory
   - Course ID: _____ Effective Date (currently active row): _____
9. Proposed Catalog Description: (If there are no prerequisites, type in "none".)
   Cr: 3. (1-6). Prerequisite(s): credit for or concurrent enrollment in BIOL3301. Description (30 words max.): Experimental aspects of Mendelian and molecular genetics. A semester-long independent research project emphasizes scientific method and writing conventions.
10. Dean's Signature: _____ Date: _____

    Print/Type Name: Dan Wells

REQUEST FOR COURSES IN THE CORE CURRICULUM

Originating Department or College: Biology and Biochemistry

Person Making Request: Thomas Vida Telephone: 713-743-2641

Email: tavida@central.uh.edu

Dean's Signature: _____ Date: Click here to enter text.

Course Number and Title: BIOL3311 Genetics Laboratory

Please attach in separate documents:

☒ Completed CBM003 Add/Change Form with Catalog Description

☒ Syllabus

List the student learning outcomes for the course (Statements of what students will know and be able to do as a result of taking this course. See appended hints for constructing these statements):

Laboratory Techniques

Students will be able to:

1. Maintain healthy cultures of *Drosophila melanogaster*.
2. Follow protocols and procedures with careful and critical comprehension.
3. Carry out complex laboratory procedures accurately and precisely.
4. Cooperate/collaborate in dividing tasks among team members and collectively maintaining a high degree of quality for the work.
5. Record data properly and perform correct statistical analysis of the collected data with consideration of sample size and error.

Written Assignments

Students will be able to:

1. Follow all writing assignment guidelines accurately.
2. Write in a clear and concise style using proper grammar with scientific formats and conventions.
3. Use computer software to produce high quality figures and data tables.
4. Become proficient at reading peer-reviewed, primary scientific research papers and use these as references with proper citation and formatting.

Scientific Knowledge

Students will:

1. Learn key events in the history of classical and molecular genetics.
2. Learn the basic biology of *Drosophila melanogaster*. This includes important events in the developmental, morphological, biochemical, and signaling pathways relevant to the assigned mutant allele for the semester project.
3. Understand all aspects of Mendelian inheritance including how meiosis and sexual reproduction give rise to genetic variation.
4. Understand genetic linkage analysis and how recombination frequencies are used to map chromosomal loci.
5. Know how environmental factors can influence phenotypic variability.
6. Understand, in detail, the molecular structure of nucleic acids and how this contributes to replication mechanisms *in vivo* and *in vitro*.
7. Know how DNA is sequenced and how DNA/protein sequences are used in bioinformatics.
8. Understand how mutations such as nucleotide base insertions, substitutions, and transposable elements give rise to changes in genotype and phenotype.
9. Learn how to use BLAST and search, interpret, and use DNA and protein sequence databases.

Component Area for which the course is being proposed (check one):

*Note: If you check the Component Area Option, you would need to also check a Foundational Component Area.

☐ Communication ☐ American History

☐ Mathematics ☐ Government/Political Science

☐ Language, Philosophy, & Culture ☐ Social & Behavioral Science

☐ Creative Arts ☒ Component Area Option

☒ Life & Physical Sciences

Competency areas addressed by the course (refer to appended chart for competencies that are required and optional in each component area):

☒ Critical Thinking ☒ Teamwork

☒ Communication Skills ☐ Social Responsibility

☒ Empirical & Quantitative Skills ☐ Personal Responsibility

Because we will be assessing student learning outcomes across multiple core courses, assessments assigned in your course must include assessments of the core competencies. For each competency checked above, indicated the specific course assignment(s) which, when completed by students, will provide evidence of the competency. Provide detailed information, such as copies of the paper or project assignment, copies of individual test items, etc. A single assignment may be used to provide data for multiple competencies.

Critical Thinking:
Students work on a semester-long research project to determine the identity of an unknown mutant gene in the Drosophila melanogaster (fruit flies). Students perform a series of 3 to 4 genetic crosses. Students must analyse and interpret the results of each cross before deciding what the next cross performed should be. Students search DNA and protein sequence databases in the course of their molecular genetic analysis of their mutant. This exercise demands that students critically evaluate statistical parameters in determining the relevance of sequence matches. The project is performed in teams of 4-5 students working independently in the laboratory. The results of this project are reported in a manuscript-style paper at the end of the semester.

Communication Skills:
Students report the results of their semester-long research project (see above) in a manuscript-style paper using the conventions of scientific writing.

Empirical & Quantitative Skills:
As part of the semester-long research project (see above), students perform statistical analyses on the results of their genetic crosses. This includes chi-square distribution of progeny. The statistical analyses is reported in their manuscript-style paper.

Teamwork:

Students work in teams of 4-5 members to complete the semester-long research project (see above). Students must coordinate efforts and communicate results. Students evaluate the performance of their team members at the end of the project.

Social Responsibility:
Click here to enter text.

Personal Responsibility:
Click here to enter text.

Will the syllabus vary across multiple section of the course? ☐ Yes ☒ No
If yes, list the assignments that will be constant across sections:
Click here to enter text.

Inclusion in the core is contingent upon the course being offered and taught at least once every other academic year. Courses will be reviewed for renewal every 5 years.

The department understands that instructors will be expected to provide student work and to participate in university-wide assessments of student work. This could include, but may not be limited to, designing instruments such as rubrics, and scoring work by students in this or other courses. In addition, instructors of core courses may be asked to include brief assessment activities in their course.

Dept. Signature: _____

The following courses have been reviewed and approved by the NSM Curriculum Committee to meet the new core requirements. Given the length of the individual submissions I have elected to submit these requests by electronic means only.

Natural Sciences: Core Courses

BIOL 1309 – Human Genetics and Society

BIOL 1310 – General Biology

BIOL 1320 – General Biology

BIOL 1361 - Introduction to Biological Science I

BIOL 1362 - Introduction to Biological Science II

CHEM 1301 – Foundations of Chemistry

CHEM 1331 – Fundamentals of Chemistry I

CHEM 1332 – Fundamentals of Chemistry II

GEOL 1302 - Introduction to Global Climate Change

GEOL 1330 - Physical Geology

GEOL 1340 - Introduction to Earth Systems

GEOL 1350 - Introduction to Meteorology

GEOL 1360 - Introduction to Oceanography

GEOL 1376 - Historical Geology

PHYS 1301 - Introductory General Physics I

PHYS 1302 - Introductory General Physics II

PHYS 1321 - University Physics I

PHYS 1322 - University Physics II

Mathematics: Core Courses

MATH 1310 – College Algebra

MATH 1311 – Elementary Mathematical Modeling

Math/Reasoning: Core Courses

COSC 1306 – Computer Science and Programming

MATH 1330 - Precalculus

MATH 1431 - Calculus I

MATH 1432 – Calculus II

MATH 2311 – Introduction to Probability and Statistics

Writing in the Disciplines: Core Courses

BCHS Biochemistry Lab II

BIOL 3311 – Genetics Lab

PHYS 3313 – Advanced Lab I

Ian Evans

Associate Dean

4/4/13

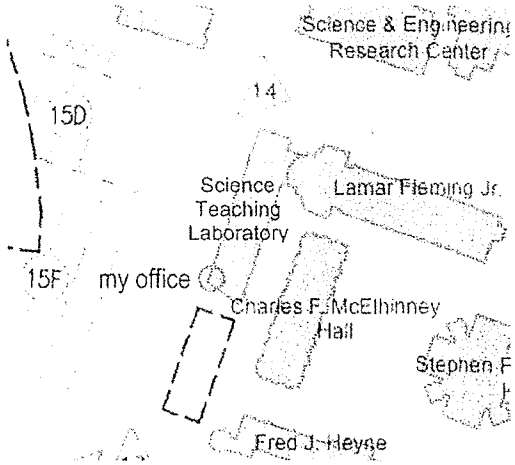
BIOL 3311 Syllabus, Course Goals, Grading Policy, and Calendar

BIOL3311: Genetics laboratory Cr. 3. (1-6). Prerequisite: credit for or enrollment in BIOL 3301

Course Faculty Coordinator: Thomas Vida, Ph.D.

Office:	Science Teaching Laboratory Building, Suite 253, room 224
Phone:	713-743-2641
Email:	tavida@central.uh.edu
Office Hours:	by appointment

The best way to contact me is via email.



Teaching Assistant Instructor (fill in the information):

Name:_____

Email:_____

COURSE OBJECTIVES

Students will be evaluated on the following areas. ***Achieving these is where you earn your grade!***

Laboratory Techniques

1. Maintain healthy cultures of *Drosophila melanogaster*.
2. Follow protocols and procedures with careful and critical comprehension.
3. Carry out complex laboratory procedures accurately and precisely.
4. Cooperate/collaborate in dividing tasks among team members and collectively maintaining a high degree of quality for the work.
5. Record data properly and perform correct statistical analysis of the collected data with consideration of sample size and error.

Written Assignments

1. Follow all writing assignment guidelines accurately.
2. Write in a clear and concise style using proper grammar with scientific formats and conventions.
3. Use computer software to produce high quality figures and data tables.
4. Become proficient at reading peer-reviewed, primary scientific research papers and use these as references with proper citation and formatting.

Scientific Knowledge

1. Learn key events in the history of classical and molecular genetics.
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3. Understand all aspects of Mendelian inheritance including how meiosis and sexual reproduction give rise to genetic variation.
4. Understand genetic linkage analysis and how recombination frequencies are used to map chromosomal loci.
5. Know how environmental factors can influence phenotypic variability.
6. Understand, in detail, the molecular structure of nucleic acids and how this contributes to replication mechanisms *in vivo* and *in vitro*.
7. Know how DNA is sequenced and how DNA/protein sequences are used in bioinformatics.
8. Understand how mutations such as nucleotide base insertions, substitutions, and transposable elements give rise to changes in genotype and phenotype.
9. Learn how to use BLAST and search, interpret, and use DNA and protein sequence databases.

COURSE POLICIES

Attendance: This is a FACE-TO-FACE course, NOT online, correspondence, or via a proxy. ***ATTENDANCE IS MANDATORY.*** Further, students must also ***participate*** in the laboratory to receive full credit (being physically present may not be enough to satisfy the attendance requirement. ***Attendance is also mandatory in the once per week 60 min lecture session.*** You must be in the lab and lecture rooms on time. Students who are more than 15 minutes late to class will ***not*** receive credit for attendance. **Students who miss *two* lab classes without proper documentation will be in jeopardy of receiving credit for BIOL 3311, *regardless of the reason for the absences.*** Excused absences are only permitted in extreme circumstances such as a documented family or medical emergency. *PLEASE NOTE: YOU MAY RECEIVE A **0.5% DEDUCTION** IN YOUR FINAL OVERALL COURSE SCORE FOR EVERY ABSENCE IN LECTURE OR LAB SESSION.*

Late Work: Submission deadlines for written work are ***final.*** Papers will ***not*** be accepted 48 hours past the deadline and a 10% deduction for each late day will be assessed on the final grade of the report before 48 hours. ***All written work must be submitted electronically to the Turnitin link on your lab section Blackboard site. If your TA lab instructor requires a hard copy too, you must furnish this within 24 hours of the Turnitin submission and it must be identical to the electronic version.***

****

PLEASE NOTE: STUDENTS WHO FAILURE TO SUBMIT A COMPLETE SEMESTER PROJECT MANUSCRIPT AT THE END OF THE COURSE WILL AUTOMATICALLY RECEIVE AN F FOR THEIR COURSE GRADE! REGARDLESS OF PREVIOUS QUIZ, EXAM, OR OTHER GRADES.

****

There are no make-up labs after the week is concluded. If a student knows they will miss a lab, they may attend another lab the same week. This policy is called "*guesting*." Each student is allowed to be a guest ***only once per semester without grade deduction***. To guest, you ***must*** notify the Teaching Assistant instructor (of the lab in which you wish to guest) via email to obtain permission. Further, you must also notify your regular Teaching Assistant lab instructor via email and give the time, date, and instructor's name for the lab that you were a guest.

Plagiarism: Plagiarism is using someone else's ideas without proper acknowledgement. This includes getting help from a friend or colleague and online material. When using someone else's ideas, ***always*** cite the source. This becomes especially important when writing reports and papers. Help from someone in writing the paper, should always be acknowledged. ***Plagiarism is considered a serious breach of academic integrity***. All papers must be submitted via a Turnitin link on Blackboard. Turnitin compares your writing to a HUGE database including the entire Internet, submitted papers from any institution that uses Turnitin, and all published work, scientific or otherwise. The Turnitin algorithm will definitely detect significant plagiarism. *THE **MINIMAL** PENALTY FOR ANY SIGNIFICANT PLAGIARISM WILL BE ONE FULL LETTER GRADE LOWER THAN WHAT YOUR FINAL SCORE COMES OUT TO BE.* For example, if your final point total is 935.5 points, an A$^-$, then you will receive a B$^-$ with a plagiarism penalty. The penalty could be greater depending on the degree of plagiarism. The bottom line is to be original, ***BUT*** if in doubt pre-evaluate your writing using WriteCheck (https://www.writecheck.com/static/home.html) before you submit any papers.

Academic Integrity - Cheating or any other suspected violations of academic integrity will ***not be tolerated*** and reported to the Department of Biology & Biochemistry, Associate for Undergraduate Affairs and if substantiated may result in no credit given for the laboratory. Please refer to the University of Houston Student Handbook for a description of academic honesty policies.

Policy on grades of I (Incomplete) A temporary grade of "I" can be assigned by the instructor when a student is currently (a) passing a course or (b) still has a reasonable chance of passing in the judgment of the instructor, but for non-academic reasons beyond their control have not completed a relatively small part of all course requirements. After the student and instructor agree that the student shall receive an "I" grade, an "**Incomplete Grade Agreement**" form ***must*** be completed and filed with the Office of Undergraduate Affairs. It is the student's responsibility to see to it that this form is filled out and delivered. Further information on "I" grades can be found in the student handbook:

http://www.uh.edu/dos/publications/handbook.php

http://www.uh.edu/academics/catalog/policies/academ-reg/grades/index.php.

Student with Disabilities or Special Needs: The Americans with Disabilities Act of 1990 requires that universities make reasonable accommodations to persons with disabilities as defined in the act. Students who feel they need assistance as defined by the guidelines set forth in the act should contact the lab coordinator, Dr. Vida, to discuss appropriate arrangements. Please call 713-743-5400 for more assistance.

Laboratory Section Identification

This fall we will have 12 lab sections. Each section has a 6-digit number. You will need to know your section number for correct identification when turning in writing assignments. Further, to simplify everyday identification of your section, we will use the day of the week and consecutive number for that day (see table below).

#	Section #	Day	Time
1	16886	M1	11:30-2:30
2	16887	M2	2:30-5:30
3	16888	Tu1	8:30-11:30
4	16889	Tu2	11:30-2:30
5	16890	Tu3	2:30-5:30
6	16891	W1	11:30-2:30
7	16892	W2	2:30-5:30
8	16893	W3	5:30-8:30
9	16894	Th1	8:30-11:30
10	16895	Th2	11:30-2:30
11	37379	Th3	2:30-5:30
12	37380	Th4	5:30-8:30

However, when you submit writing assignments, they will need your section number AND day of the week in the title for the submission. For example, for writing assignment 1, you should use "16889 M1 WA1" in the title and so forth depending on your section number.

GRADING POLICY

BIOL 3311 is a ***three credit-hour*** course for which you will receive a letter grade. The final grade for the course is based on a total of 1000 points derived from your performance on 6 quizzes, 2 exams, 6 writing assignments, 1 research manuscript, completing the semester project, peer-reviewed group participation, and lab notebook quality. The distribution of points and grading scale is listed below and at the right.

Please note: bonus points most likely will be available to earn on exams, quizzes, or activities in the lab sessions. Further, ***your overall grade at the end of the semester is FINAL. DO NOT try and negotiate, plead, or beg for a higher score. Further, if your prior acceptance into a graduate or professional school is contingent on passing this course, then it is up to you (not me) to indeed earn a passing grade.***

Category	Points	%
Exam 1	150	15
Exam 2	150	15
Quiz (average of six)	75	7.5
Writing assignments	150	15
Semester project completion	100	10
Lab notebook	75	7.5
Group evaluation	100	10
Semester project manuscript	200	20
Total	**1000**	**100**

Final %	Letter Grade
93.0-100	A
90.0-92.9	A^-
88.5-89.9	B^+
82.0-88.4	B
80.0-81.9	B^-
78.5-79.9	C^+
72.0-78.4	C
70.0-71.9	C^-
68.5-69.9	D^+
62.0-68.4	D
60.0-61.9	D^-
<59.0	F

Schedule BIOL3311 – FALL 2012 (please see the last page of this manual).

BIOL 3311: Genetics Laboratory Fall 2012 Overall Schedule (tentative)

WEEK #	WEEK OF:	LABORATORY CONTENT	LECTURE CONTENT	QUIZ, EXAM, or ASSIGNMENTS	SEMESTER PROJECT (see note below)
1	8/27	introduction; *Drosophila* biology; form groups; assign fly mutant; basic techniques	introduction; *Drosophila* biology; overview of semester project		unknown mutant assigned; collect mutant virgin females
2	9/3	Genetic Crosses; assign gene for writing assignment II	semester project; writing a research paper: references	*QUIZ 1; writing assignment 1: mutant phenotype description*	collect mutant virgin females; set-up 1st genetic cross (DC1)
3	9/10	Chi Square Analysis; Linkage analysis	semester project; writing a research paper: intro & discussion	*writing assignment 2: D. melanogaster gene chart using FlyBase; Fly lab schedule log*	monitor DC1; score first progeny
4	9/17	Rough draft editing of writing assignment 3	semester project; writing a research paper: intro & discussion	*QUIZ 2*	monitor DC1; score progeny; set-up 2nd genetic cross (DC2)
5	9/24	Computer simulated genetic crosses and linkage analysis	semester project; writing a research paper: results	*writing assignment 3: D. melanogaster gene; Fly lab schedule log*	complete scoring of DC1 progeny; set-up DC2
6	10/1	Linkage analysis II	semester project; writing a research paper: references	*QUIZ 3*	monitor DC2; score progeny
7	10/8	review for exam 1	semester project; review for exam 1	*writing assignment 4: results and statistical analysis of computer simulation; Fly lab schedule log*	complete scoring of DC2; score first progeny
8	10/15	*Exam 1*	semester project	*Exam 1*	complete scoring of DC1 progeny; set-up 3rd genetic cross (MC1)
9	10/22	genomic DNA extraction from wild-type and mutant fly; set-up PCRs	semester project; molecular genetics	*QUIZ 4; Fly lab schedule log*	monitor/set-up third genetic cross (MC1); analyze DC1 and 2 data

10	10/29	agarose gel analysis of PCR product; purify PCR product for DNA sequencing	semester project; molecular genetics	*writing assignment 5: results of DC1 and DC2*	collect and score MC1 progeny; set-up 4th genetic cross (MC2)
11	11/5	DNA sequence and BLAST analysis	semester project; molecular genetics; transposons	*QUIZ 5; Fly lab schedule log*	complete MC1;set-up/monitor 4th genetic cross (MC2)
12	11/12	DNA sequence and BLAST analysis		*writing assignment 6: abstract for semester project*	score MC2 progeny
13	11/19	*No scheduled classes, "Thanksgiving Holiday"*	*No scheduled classes, "Thanksgiving Holiday"*	*No scheduled classes, "Thanksgiving Holiday"*	***keep working!***
14	11/26				score MC2 progeny
15	12/3	review for exam 2	semester project; review for exam 2	*QUIZ 6; Fly lab schedule log*	score MC2 progeny
16	12/10	*No scheduled classes*	*No scheduled classes*	*writing assignement 7: semester project paper DUE 12/10 for all sections*	
17	12/17	*Exam 2*		*Exam 2*	

Please note: the semester project schedule is just a guideline; you need to perform 4 genetic crosses and they require about 2 weeks to complete; you can begin the next cross as soon as you know the result of the preceding cross (read more in the lab manual for details)

Please note: I reserve the right to make reasonable changes to this syllabus and policy statement at any time.

Writing Assignment 7: Research Manuscript on the semester project (BIOL 3311 Fall 2012)

General Formatting Considerations

- as all assignments:
- use one of three fonts, Arial, Palatino, or Times New Roman; 12 point; doubled spaced throughout; use 0.7 inches for all margins; ***for alignment of text use JUSTIFICATION and NOT left-aligned*** as this is much "cleaner"
- use appropriate genetic and taxonomic nomenclature; you will get points deducted for every instance of writing Drosophila melanogaster / Drosophila Melanogaster or D. melanogaster / D. Melanogaster instead of the proper *Drosophila melanogaster* or *D. melanogaster* (standard binomial taxonomy names are ALWAYS italicized with genus in Uppercase (first letter) and species in lowercase (all letters)
- ***AVOID*** jargon; for example, realize that "DC1" etc. is definitely jargon; we use it to speak about the project in a quick manner, if you use "DC1" etc. ***you must first describe what it is in words***, then use an abbreviation
- use correct grammar, spelling, and punctuation

Components

Title (on separate cover page)

- in your title, identify the theme, study, or nature of the work
- ***avoid*** unnecessary words or phrasing in the title
- you must put your name (at least one student did not do this on the simulation paper), institution, semester, instructor name, section and group number with unknown mutant code cited below title; follow the cover page template on Blackboard lecture section
- subsequent pages need to be numbered in ***upper right***

Abstract (do NOT put on the title page)

- summarize all aspects of the work including:

  context of the work

  aims and objectives

  very brief methods

  brief results

  conclusions;

- *the abstract must stand alone in content and meaning such that it represents the entire paper,* a reader should be able to use the abstract and determine what your paper is about
- avoid unnecessary details (*MUST BE NO MORE THAN 200 WORDS*); *you must put word total of the abstract at the end in parentheses (i.e. abstract = 184 words)*

Introduction: provide an overall conceptual framework of the work

- *have a broad overview in the first paragraph* (subsequent paragraphs should become more specific) *you may use writing assignment 2 here with revisions as needed*
- *describe the biological process that your gene most likely plays a role*; you may use information and references from writing assignment 2 also here if appropriate
- state the aim(s) of the study and justify why this particular study needed to be done
- *review previous literature as part of justification for study* (provide in-text reference and make proper citations in the Literature Cited section per the journal "Genetics;" which is in essence the APA style).
- it is difficult to place a length requirement on the introduction as these vary considerably in published research papers, content is more important than overall length

Materials and Methods: *overall, provide sufficient detail to allow "precise" replication of the study*

obvious items to include are:

  - *culturing and manipulating flies*
  - *setting up genetic crosses*
  - *scoring phenotypes*
  - *statistical analyses*
  - *PCR amplification, agarose gel electrophoresis, BLAST sequence analysis*

- the materials and equipment are ***not*** to be listed separately, rather identify them in context as they are described for the method; please note that you do ***not*** necessarily have to include the precise model number / manufacturer of the equipment or materials; all of the items used in the project are relatively easy to obtain and many types could be used from a variety of manufacturers;
- the molecular methods need a description of how genomic DNA was extracted, the PCR thermocycling conditions, the primer sequences, how the agarose gel was performed and visualized
- briefly describe how you performed the BLAST analysis

Results

- overall: present data objectively (with very little interpretation); you may state a few thoughts to present a steam of logic
- ***overall use text (words) to describe all of the results***; ***DO NOT*** just put in Tables or Figures and leave it to the reader to decipher what you did; remember this in ***NOT*** a lab report; when you describe data refer to the Figure or Table
- describe the phenotype of your mutant compared to wild-type (***use writing assignment 1 with revisions and elaboration***)

Classical Genetics

- the predicted chromosomal outcomes (1, 2, 3, or 4) ***with words*** for the first two genetic crosses (DC1 and DC2); also describe the statistical analysis with words ***you may put the bulk of writing assignment 4 in this section including data for figures and graphs with revisions as needed; further, if you performed extra crosses because of unexpected DC1 results, put them in the results too***
- ***the mapping crosses require description with text and mapping cross 2 requires:***
  - ***chromosomal drawings***
  - ***Chi-square tables and analyses***
- identify the gene and its map location using accurate calculation of map location

Molecular Genetics

- describe the results of the PCR analysis including the agarose gel analysis
- describe the results of BLAST analysis of your DNA sequence; ***identify the allele of your mutant gene***
- describe the results of BLAST analysis of your gene's protein sequence when examined for matches in the human or other species database, this should include any conserved sequence domains
- all Figures and Tables need a title and brief legend; the legend can be written as text; ***all figures and Tables are to put at the end of the paper as in assignment 4***

Discussion: the overall goal is to provide interpretation of experimental results with regard to the aim of your study AND put it in context of what is known from other studies

- explain why your possible genes hypothesized in writing assignment were wrong, if one was correct then briefly elaborate on why it was correct
- compare results of your study to those of other investigations

- explain how mutations in your gene give rise to the mutant phenotype; do this at the molecular level (this will require several paper citations)
- address limitations and possible sources of errors of your study
- include an assessment of how mapping sex-linked vs autosomal genes differs
- indicate importance and possible applications of experimental findings; compare your gene to other organisms
- discuss your gene product (protein) *D. melanogaster* relative to at least one non *Drosophila* homologous protein that matches well from a BLAST analysis
- propose new questions that arise from your study
- summarize major conclusion(s)

Literature Cited

- cite at least eight (8) *peer-reviewed references*; they must include

2 general reviews on *D. melanogaster (use writing assignment 2)*

1 thorough review on the biological process where your gene functions (hopefully you have one from writing assignment 2)

1 that addresses the specific allele of your mutation

1 that deals with a protein homolog for your gene product

1 that helps explain your data (previous mapping experiments; dominant/recessive issues; phenotypic incompatibilities, etc.)

2 research studies from the last 5 years on your specific unknown gene

the BIOL3311 lab manual does NOT count as a reference

- Use proper format; (specified in the journal "*Genetics*")

correct format for a two author research paper:

Bridges, C. B., and E. G. Anderson, 1925 Crossing over in the X chromosomes of triploid females of *Drosophila melanogaster*. Genetics **10:** 418-441. (Note spaces between authors' initials and after the boldface colon.)

- ***do NOT include Internet http addresses for ANY reference***

The point breakdown for your paper is as follows:

Component	**Points**
Title:	5
Abstract:	20
Introduction:	25
Materials and Methods	25
Results	50

Discussion	50
References	15
General Formatting and grammar	10
	200

Each component part will have detailed point values based on the above format and guidelines. Deductions for proper grammar and nomenclature could take place for each section if appropriate. One last comment on plagiarism is in order here. We have dealt with plagiarism in past assignments for the course in increasing degree of severity. At this point, you should all know what plagiarism is and how science papers, in general, use different criteria compared to writing in other fields. ***Significant plagiarism in this final paper will have harsh deductions to your score and could include 0 points and possible disciplinary action from the university.*** Be original, BUT if in doubt pre-evaluate your writing using WriteCheck (https://www.writecheck.com/static/home.html) before you submit your paper.

Grading Rubric: BIOL3311 / Semester Project Paper / Fall 2012

Title Page

title identifies the theme, study, or nature of the work	
name, institution, semester, instructor name, section, and group number with unknown mutant code cited below title	
Total Points	*0*

Abstract

puts work in context (of biological science)	
states aims or objectives	
brief methods and results	
draws brief conclusions	
abstract could stand alone away from whole paper	
word total of the abstract at the end in parentheses	
Total Points	*20*

Introduction

the first paragraph is a broad overview	
subsequent paragraphs become more specific	
states the aim(s) of the study or justifies the study	
reviews previous literature as part of the justification for study	
in-text reference and proper citations	
Total Points	*25*

Materials and Methods

describes how flies were cultured and manipulated	
explains how genetic crosses were conducted	
explains how phenotypes were scored	
discusses how statistical analyses were performed	
describes PCR conditions	
describes agarose gel electrophoresis	
describes the BLAST analyses	
provides sufficient detail about equipment and materials to allow precise replication of the study	
the materials and equipment are not listed separately	
Total Points	*25*

Results

describes the mutant phenotype compared to wild-type	
describes the predicted chromosomal outcomes with drawings and the statistical analysis for the first genetic cross (DC1) with text	
describes the nature of the second mapping cross (MC2) and shows possible chromosomal recombination with drawings	
presents a Chi-square table(s) and analysis for MC2	
correctly identifies the gene and its map location using accurate calculation of map location	
describes the results of the PCR analysis including the agarose gel analysis	
describes the results of BLAST analysis of DNA sequence; identifies the allele of unknown mutant gene	
describes the results of BLAST analysis of gene's protein sequence when examined for matches in the human or other species database, including any conserved sequence domains	
refers to the appropriate Figure or Table with text and presents data objectively with very little interpretation	
all Figures and Tables have a brief legend	
Total Points	***50***

Discussion

explains why your possible genes hypothesized in writing assignment 1 were wrong, if one was correct then briefly elaborate on why it was correct	
addresses limitations and possible sources of errors in experimental results	
includes an assessment of how mapping sex-linked vs autosomal genes differs	
compares results to those of other investigations	
explains how mutations in the gene give rise to the mutant phenotype at the molecular level	
indicates importance of experimental findings with possible applications and compares the *D. melanogaster* gene to similar genes in other organisms	
discusses *D. melanogaster* gene product (protein) relative to at least one non *Drosophila* homologous protein that matches well from a BLAST analysis	
proposes new questions for future research	
summarizes major conclusion(s)	
provides adequate interpretation of ***all*** experimental results	
Total Points	***50***

Literature Cited: needs at least eight (8) ***peer-reviewed references***

2 general reviews *on D. melanogaster*	*2*
1 thorough review on the biological process where the gene functions	*1*
1 that addresses the specific allele of unknown gene	*1*
1 that deals with a protein homolog for your gene product	*1*
1 that helps explain the data (previous mapping experiments; dominant/recessive issues; phenotypic incompatibilities, etc.)	*2*
2 research studies from the last 5 years on the specific unknown gene; this may not be possible for certain unknown genes, in this case you may include studies about similar or relate genes	*3*
uses proper reference format; does not include Internet http addresses in any reference	*5*
Total Points	***15***

Overall General Formatting

proper font, spacing, margins, justification	2	
appropriate genetic and taxonomic nomenclature	2	
appropriate grammar; sentence structure; avoids jargon	6	
Total Points	*10*	
Overall Total Points	*200*	

Working in groups (read this carefully)

As in many lab courses, you will be collaborating in groups of four to five for your semester project. HOWEVER, your group in this lab is quite different because you need to work **together as a team *independently***. The groups will be randomly organized on the very first lab section. Where you initially sit in the lab usually governs this process (hint: sit near people who look smart and work hard). If you wish to have certain people in your group before the first lab section, then this is permitted. Make sure you inform your TA Instructor. The nature of the *Drosophila melanogaster* life cycle is such that it will be necessary for you and your partners to come to fly lab several times a day to accomplish some of the required tasks. Thus, your group will need to coordinate these activities among yourselves.

Each student is expected to take this group responsibility seriously and to contribute equally to the group's work. Your success will depend in part on the cooperation and contributions of your partners. Further, your overall grade in this course has a component of peer assessment where your group members evaluate you. ***This is worth 120 points (12% of your final grade).*** If you wish to earn much of these points, you need to have open, frank, and honest group discussions throughout the semester about your progress. The following are guidelines for determining how to award these points.

Three categories are graded; ***1) time; 2) effort, and 3) involvement.***

Time (20 points maximum) concerns putting in the required hours (3 hours minimum per week) for checking on flies, setting up crosses, and scoring phenotypes. It should be easy to come up with a score.

Effort (40 points maximum) goes beyond just logging in hours and is a measure of ***quality***. Questions you could ask yourself when grading others on ***effort*** might be:

> Was the work done to high standards?
> Were flies cultured and cared for in ways that helped the project?
> Did this group member go beyond the required 3 hours and do whatever was needed to make the project succeed?

Involvement (60 points maximum) is somewhat more complicated to define compared to time and effort. It also may be the most difficult to award full credit for your fellow group members. Involvement concerns three areas: ***1) intellectual comprehension and understanding; 2) communication with group members; and 3) group interactions and dynamics***. Questions you should ask yourself are:

> for #1: ***intellectual comprehension and understanding (30 points maximum)***
> Did this group member understand what was being done and why it was done throughout the semester project?
> Were they able to troubleshoot any unexpected problems?
> Were they helpful in tabulating data and performing the statistical analyses?
> When I spoke with this group member was the "light" on?
>
> for #2: ***communication with group members (15 points maximum)***
> Did this group member write helpful notes in the lab notebook?
> Did they respond to email or text messages that concerned the group project?

Did they verbally express themselves to the group as a whole concerning the progress of the project?
for #3: *group interactions and dynamics (15 points maximum)*
Was this group member a "team player"?
Did this group member treat other group members with respect?
Was this group member easy to work with? Was this member difficult to work with?
If I had to do this project all over again, would I want this person in my group?

Do not allow petty personal issues or personality flaws to influence your scores. You need to be objective and cast aside any animosity, ill feelings, or irrationally based opinions of your fellow group members. Be fair and stick with the facts rather than your feelings.

Many of you may think that other student's evaluations should not contribute to your overall course grade. This is naïve, especially when considering how grade normalization (curving) often functions to determine your overall course grades and scores on standardized exams. The fall 2012 BIOL 3311 students thought that the group evaluation should contribute more to the overall grade when they were surveyed. Now it is worth 20% more and is structured differently, than in the past.

Real science is seldom performed in individual isolation. Indeed, integration of many disciplines is required to discover the deeper issues in any contemporary scientific field. The best science tends to bring this approach and so should your group. The best groups work together as a unit. They get the work done on time, share tasks, have flexible schedules, and they communicate well. Groups need not have a single leader because this can lead to difficulties with potential overbearing behavior. However, often a leader or two will emerge during the semester and this can be beneficial, especially if other group members follow the lead(s). On the other hand, lazy, uninterested, and unmotivated group members also emerge during the semester. Obviously, this is a terrible situation because a group of five now becomes a group of four or even three, which is why the group evaluation is so important to your overall grade.

Should your group encounter difficulties with one or more members; try to address them and work them through as soon as possible; problems seldom fix themselves without effort. If you would like assistance from your TA instructor or Dr. Vida in resolving disagreements, feel free to ask. We want everyone to have a good experience in the lab.