

CBM003 ADD/CHANGE FORM

Undergraduate Council
 New Course Course Change
 Core Category: WI-ID Effective Fall 2008

or

Graduate/Professional Studies Council
 New Course Course Change
 Effective Fall CORE CODE!

1. Department: Biology and Biochemistry College: NSM

2. Person Submitting Form: L. Rapp Telephone: x3-8398

RECEIVED SEP 25 2007

3. Course Information on New/Revised course:

• Instructional Area / Course Number / Long Course Title:

BIOL / 3311 / Genetics Laboratory

• Instructional Area / Course Number / Short Course Title (30 characters max.)

BIOL / 3311 / GENETICS LABORATORY

• SCH: 3.00 Level: JR CIP Code: 26.0801.0002 Lect Hrs: 1 Lab Hrs: 6

APPROVED OCT 17 2007

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:

 / /

• Content ID: Start Date (yyyy3):

6. Authorized Degree Program(s): BA, BS Biology

• 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

• Are special fees attached to this course? Yes No

• Can the course be repeated for credit? Yes No

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 / 3201 / Genetics Laboratory

• Start Date (yyyy3): 20033 Content I.D.: 292117

9. Proposed Catalog Description: (If there are no prerequisites, type in "none".)

Cr: 3. (1-6). Prerequisite: credit for or concurrent enrollment in BIOL 3301. 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: 25 Sept '07

Print/Type Name: IAN EVANS



RECEIVED SEP 25 2007

MEMORANDUM

Date: September 5, 2007

To: Dr. Ian Evans, Associate Dean
College of Natural Science and Mathematics

From: Larry Rapp, Associate Chair for Undergraduate Affairs
Department of Biology and Biochemistry

RE: Introduction of BIOL 3311 Genetics Laboratory as a "Writing in the Disciplines" course

We are requesting approval of a new course, BIOL 3311, Genetics Laboratory that will replace the existing BIOL 3201, Genetics Laboratory course in the B.A., B.S. Biology degrees. Proposed changes in the course include expanded content and scope, and the addition of a lecture component on technical writing and scientific method. Along with already intensive writing instruction and assignments of the existing course, these changes will qualify BIOL 3311 as a core curriculum "Writing in the Disciplines" course.

Current Course: BIOL 3201 is currently a two semester-hour required laboratory course for biology majors. Course participants study experimental aspects of basic Mendelian, molecular, and microbial genetics. Coursework includes a semester-long independent research project where the students map a *Drosophila melanogaster* gene. As part of the course requirements, each student writes a paper in the format of a scientific style manuscript based on the experimental findings of their independent study. The instruction for scientific style of writing currently includes a single lecture in the form of a writing workshop, reading and evaluation of a recent journal article, and feedback on a "trial" manuscript written by the students in the middle of the semester. Thus, the students write a scientific paper based on simulated results followed by evaluation and feedback of the initial paper. Toward the end of the semester students write a second "term" paper based on the results of their actual study.

Changes: A lecture component on technical writing and scientific method will be added to the current curriculum of BIOL 3201 Genetics Laboratory to create the three semester-hour BIOL 3311 course. This change will not only improve students' understanding of basic concepts of scientific practices and conventions in genetics; it will serve to fulfill the exemplary educational objectives for a "Writing in the Disciplines" course as set forth by the Texas Higher Education Coordinating board (see attached Core Curriculum Request Form).

The lecture component of the course will include:

1. Instruction on scientific writing conventions using a writing rubric that outlines the proper content and format of each section of a scientific paper (Abstract, Introduction, Methods and Materials, Results, Discussion).

2. Evaluation of two written assignments (2,500-3,000 words each), both returned to the students with written comments pertaining to the content, style and grammar used according to the writing rubric.
3. Instruction on scientific method and generation of scientific theory using results of the independent project performed by the students.
4. Instruction on how to perform searches in the current literature using PubMed and other search methods.
5. Instruction on reading and scientific analysis of journal articles from current literature to develop an understanding of writing conventions and practices used in biological sciences.

Attachments:

CBM003 Form to add BIOL 3311

CBM003 Form to delete BIOL 3201

Core Curriculum Request Form

Syllabus for lecture and laboratory components of BIOL 3311

Writing Rubric for Genetics Laboratory term paper

Cc: Dr. Stuart Dryer
Dr. Nusrat Malik

UNIVERSITY of HOUSTON
CORE CURRICULUM COURSE REQUEST

Originating Department/College: Biology and Biochemistry/NSM

Person making request: Laurence Rapp Telephone: x3-8398

Dean's signature: _____ Date: 9/5/07

I. General Information:

Course number and title: BIOL 3311 Genetics Laboratory

Complete catalog description (NOT required if attached to CBM 003 form):

see attached CBM 003 form

Category of Core for which course is being proposed (mark only one):

- Communication
- Communication: Writing Intensive Experiences in the Disciplines
- Mathematics
- Mathematics/Reasoning (IDO)
- Natural Sciences
- Humanities
- Visual/Performing Arts Critical
- Visual/Performing Arts Experiential
- Social/Behavioral Sciences
- U.S. History
- American Government

II. Objectives and Evaluation (respond on one or more separate sheets):

Call 3-0919 for a copy of "Guidelines for Requesting and Evaluating Core Courses" or visit the website at www.uh.edu/academics/corecurriculum

- A. How does the proposed course meet the appropriate Exemplary Educational Objectives (see **Guidelines**). Attach a syllabus and supporting materials for the objectives the syllabus does not make clear.

The proposed course (BIOL 3311 Genetics Laboratory) was developed by modifying and enhancing BIOL 3201 Genetics Laboratory to qualify it as a core curriculum "Writing in the Disciplines" course. As it is currently offered, BIOL 3201 already has an extensive writing component. Students complete a semester-long independent research project where they map the chromosomal location of a *Drosophila melanogaster* gene using linkage analysis, and they report their findings in a scientific style paper. The technical skills of the students for writing this paper are developed in two phases. During the first half of the semester, students perform computer-assisted simulations of the linkage analysis experiments. In addition to

providing the students with key concepts, this exercise generates theoretical data that serve as the basis for writing a "trial" paper (first phase). Prior to writing the paper, students participate in an in-class writing workshop on technical writing of scientific papers. During the workshop students are introduced to the rubric for their paper, which is explained to them in detail. The workshop and rubric were developed in collaboration with the UH Writing Center. The students submit their papers just before the mid-point of the semester, and the papers are returned to them with feedback based on the rubric. Students then apply this feedback to the writing of their term-project paper (second phase), which is based on the actual data they generate in the semester-long project they conduct in the laboratory. The term paper is graded according to the rubric and handed back to them with written feedback before the end of the semester, while there is still an opportunity to interact with the instructor. The mid-semester and term papers are each 2500-3000 words in length, so the writing assignments for the course total 5,000-6000 words.

In the proposed course, a one-hour lecture component (14 given per semester) dedicated to discipline-related writing instruction will be added (see attached syllabus for lecture component). Lecture content will run in parallel to writing assignments for the course. Lectures 1 – 4 will instruct the students on shared writing conventions and how they are applied to writing papers in the field of genetics. The remaining lectures will cover topics of scientific method, generation of scientific theory, accessing and analyzing scientific literature, and other forms of scientific expression such as review papers and oral presentations. The lecture will also provide a forum where students can discuss the feedback they are receiving on their papers.

The proposed course meets all of the exemplary educational objectives, as set forth by the Texas Higher Education Coordinating Board. Genetics is a cornerstone of the field of Biology, and scientific papers written by students in Genetics Laboratory provide them with discipline-specific context for their writing. A particular advantage of using Genetics Laboratory for this purpose is that students write their papers based on their own scientific experimentation. This provides them with the additional context of basing their writing on their own work, and of translating the results of their work into the accepted writing format in their discipline. The writing workshop, use of a writing rubric, and lecture presentations instruct students in the writing conventions and constructs used by scientists and biologists in particular, which the students are then able to demonstrate through the writing of their own papers. The feedback given to students on their mid-semester (simulation) paper provides students the opportunity to revise and edit their writing in the term paper so that it conforms to writing standards of the discipline. The course provides for the development of critical thinking and problem solving in students by the testing of hypotheses for their term project, drawing conclusions (most importantly by identifying the mutation of their flies) and by expressing their conclusions in writing in the discussion sections of their papers. Experimentation for their project (but not the paper writing) is done as a cooperative effort in teams of four students, so critical thinking is also stimulated and developed by interaction in these groups. The students develop the ability to research the background for the paper by being given training on searching and analyzing the scientific literature in

their discipline. By participating in all steps in the process of scientific discovery including the written expression of their findings and conclusions, students in Genetics Laboratory develop and learn the analytical and technical writing skills that serve a model for those used by scientists in their discipline.

B. Specify the processes and procedures for evaluating course effectiveness in regard to its goals.

The writing rubric for the course was developed in collaboration with the UH Writing Center to help improve the writing skills of students taking Genetics Laboratory. In fall 2006, the effectiveness of the rubric was evaluated by a study sponsored by the College of Natural Sciences and Mathematics and conducted in collaboration with the UH Writing Center. Papers written by students before and after the introduction of the writing workshop and rubric were evaluated and scored by independent writing experts. The findings of the study suggested that the students benefited by the writing rubric, however, specific areas were identified that were in need of further improvement. The effectiveness of the course with regards to its goals will be determined using similar assessments in future. These will include assessing the value of feedback received by students on their mid-semester papers on the writing skills they exhibit on their term paper. All papers submitted by students in the course are currently, and will continue to be collected using the turnitin.com service provided by the University. This enables papers to be grouped and sorted for assessment purposes. "Writing studios" will also be implemented in the course in which students identified as having poor writing skills from their mid-semester paper will meet in small groups attended by a facilitator (writing instructor) to discuss common difficulties in their writing and ways to improve. The effectiveness of the writing studios will be assessed by evaluating the improvement in writing proficiency of these students after participation in the studio. Course evaluations completed by students twice a semester (at the middle and the end) will also be examined to gauge students' perception of whether or not course interventions were beneficial in developing their technical writing skills.

C. Delineate how these evaluation results will be used to improve the course?

Using the writing rubric for the course as the standard for technical writing in the discipline, the assessments described above will point to specific areas of deficiency in students' writing. This will enable the course coordinator and others involved in developing the course to enhance and adjust course content according to the educational needs of the students. Lecture content, workshops, and studios will be modified to address writing practices that have not been sufficiently learned by the students. The findings of the assessments will be discussed with writing experts in the UH writing center. Consultations of this kind led to the interventions in the course including the rubric, workshop, and studios. Finally, consensus of students in their course evaluations and in informal discussion with them will provide direction for improving course content and teaching methods.

Biol 3311 - GENETICS LABORATORY Fall 2008 Lecture Syllabus

Lab Coordinator: Dr Nusrat Malik
Office: Room 124C, Old Science Building
Phone Number: 713-743-2641
e-mail: nmalik3@uh.edu

Text: Writing Papers in Biological Sciences. Victoria McMillian, Second Edition

Lecture Time/Location: TBA

Course Overview and Objectives:

Students will obtain an understanding of experimental aspects of Mendelian and molecular genetics, methods of research and writing convention in biology, and writing a scientific paper. By the end of the course, students will be able to follow protocols and procedures accurately and carefully with critical comprehension, maintain discrete biological cultures. The students will develop the ability to carry out complex laboratory procedures accurately and precisely, learn proper data recording and statistical analysis of the collected data. Apply critical thinking and scientific method to manipulate meaningful data sets to generate and test a hypothesis. Lastly, the students will be able to compile collected data in a manuscript using the standard manuscript format used in Biology.

Lecture Focus: In lecture we will discuss all aspects scientific style of writing including how to perform literature survey, collect background information on a research project, and compile the data of the research project into a scientific manuscript.

Attendance:

Attendance in the lab and lecture is mandatory and students must participate in the laboratory to receive credit for the lab. Students more than 15 minutes late to lecture or lab will not receive credit for attendance. They will also not receive extra time to complete their pop quiz.

Instruction on performing literature search and writing scientific style paper will be given in lecture rather than in lab. Therefore, it is in your best interest to attend lecture. Attending labs alone will not prepare you for the quizzes or the final exam. The grading policy can be found on the lab syllabus.

Students who miss *two* lab classes without proper documentation will not receive credit for BIOL 3201, *regardless of the nature of the absences*. Excused absences are only permitted in extreme circumstances such as family or medical emergency.

Students with 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. Malik, to discuss appropriate arrangements.

Biol 3311 - GENETICS LABORATORY
Fall 2008 Lecture Schedule

WEEK	TOPIC	ASSIGNMENTS
Aug27	Introduction – Scientific Method and Generation of Scientific Theory Writing a Research Paper - Overview	
Sep 3	Research Paper – M&M and Results	
Sep 10	Research Paper – Introduction	
Sep 17	Research Paper – Discussion and Abstract	
Sep 24	Writing Style – Language, Grammar Research Paper – Citing References and Revisions	
Oct 1	Scientific Method and Generation of Scientific Theory - I	Flygen Simulation Paper
Oct 8	Scientific Method and Generation of Scientific Theory - II	
Oct 15	Locating and Using Biological Literature	
Oct 22	Reading scientific literature	
Oct 29	Reading scientific literature	
Nov 5	Other Forms of Writing I – Review Paper	
Nov 12	Other Forms of Writing II – Oral Presentation	Term Project Paper
Nov 19	No class – Thanksgiving holiday	
Nov 26	Final Exam	

BIOL 3311
GENETICS LABORATORY
Fall 2008 Syllabus

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WEEK	PAGES	EXERCISE	TERM PROJECT	WORK DUE
Aug 27		Introduction Mendelian Genetics I: Drosophila Biology	Term Project distributed	
Sep 3		No Lab – Office Hour in Flylab – Rm. 121 (Independent work on term project)	Marker flies for DC1 distributed	Mendelian Genetics Worksheet
Sep 10		Introduction to Flygen Simulation Writing Workshop		
Sep 17		Aseptic Technique Mendelian Genetics II: Flygen Simulation	Marker flies for DC2 distributed	Flygene Simulation Worksheet
Sep 24		Biochemical Pathways I: Ames Test		Term Project time line
Oct 1		Biochemical Pathways II: Chromatography	Marker flies for MC1 distributed	Flygen Simulation Paper
Oct 8		Exam I – Mendelian Genetics, Practical and Written		
Oct 15		Molecular Genetics I: Genomic DNA Extraction, PCR		Term Project progress report
Oct 22		Molecular Genetics II: PCR product: clean, quantify, ligate	Flygene Simulation paper returned	
Oct 29		No Lab – Office Hour in Rm. 127 (Feedback on Flygene Simulation paper)		
Nov 5		Molecular Genetics III: Transformation		
Nov 12		Molecular Genetics IV: Clone Analysis; Sequence Analysis		Term Project paper
Nov 19		No Labs – Thanksgiving holiday		
Nov 26		Exam II – Biochemical Pathways, Molecular Genetics	Term Project paper returned	

Requirements:

Lab Manual (University Copy Center, 52 UC)

Lab Coat (UC bookstore or Research Stores in Science bldg. Rm 209)

TA Name: _____

TA Email: _____

Lab Supervisor: Dr. Nusrat Malik, Rm 124C, 713-743-2641, nmalik3@uh.edu

UH Policy: This syllabus is tentative and subject to change

3201: Genetics laboratory Cr. 2. (0-6). Prerequisite: credit for or enrollment in Biol 3301

Biology 3311 – Term Paper Guidelines Page 10 of 10

Each student will write two scientific papers, one based on data collected using Flygene simulation and the second based on the data collected by their term project group, to map unknown *Drosophila* gene to its chromosomal location. The papers must be type written, double-spaced and should include all components described below. Refer to the assigned paper and the notes from the writing workshop for the proper format of each section of the paper

Components
<p>Title</p> <ul style="list-style-type: none"> ▪ Identify theme of study (organism) and nature of work. ▪ Avoid unnecessary words or phrasing. ▪ Author, date, and TA name cited below title.
<p>Abstract</p> <ul style="list-style-type: none"> ▪ Summarize <u>briefly</u> all aspects of study including aims and objectives, methods, results, and conclusions. ▪ Avoid unnecessary details (Should not be more than one page).
<p>Introduction</p> <ul style="list-style-type: none"> ▪ State specific 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 Bibliography). ▪ Provide context for study (field overview). ▪ Indicate possible applications of research.
<p>Materials and Methods</p> <ul style="list-style-type: none"> ▪ Provide details of materials and equipment used. ▪ Present succinct and orderly description of data collection procedure. ▪ Describe statistical procedures used to analyze data. ▪ Provide sufficient detail to allow precise replication of the study.
<p>Results</p> <ul style="list-style-type: none"> ▪ Summarize data in tabular form with appropriate titles and labels. ▪ Use text (words) to describe important aspects of data (refer to each table and figure). ▪ Include chromosomal drawings (DC1 for chromosomes 1,2,3,4 before actual chromosome figured out, DC2 and the mapping cross 1 and 2) in the results section. ▪ Report statistical findings in text. ▪ Gene and its map location is appropriately identified using accurate calculation of map location. ▪ Present data objectively (without interpretation).
<p>Discussion</p> <ul style="list-style-type: none"> ▪ Provide interpretation of experimental results with regard to the aim of your study. ▪ Compare results of your study to those of other investigations. ▪ Address limitations and possible sources of errors of your study. ▪ Indicate importance and possible applications of experimental findings. ▪ Propose new questions that arise from your study. ▪ Summarize major conclusion(s).
<p>Bibliography</p> <ul style="list-style-type: none"> ▪ Cite at least three references with at least one from current literature (journal article) on your specific unknown gene. ▪ Use proper format (follow the format used in the assigned paper).
<p>Appendix</p> <ul style="list-style-type: none"> ▪ Include raw data or calculations in appendix.
<p>Writing Format</p> <ul style="list-style-type: none"> ▪ Use appropriate nomenclature. ▪ Use correct grammar, spelling, and punctuation. ▪ Organize report according to specified format.