UC 12289 13S

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: Donna Pattison Telephone: x3-2642 Email: dpattison@uh.edu
3. Course Information on New/Revised course:
   - Instructional Area / Course Number / Long Course Title:
     BCHS / 4311 / Biochemistry Laboratory II

     RECEIVED APR - 4 2013
   - Instructional Area / Course Number / Short Course Title (30 characters max.)
     BCHS / 4311 / BIOCHEMISTRY LABORATORY II
   - SCH: 3.00 Level: SR CIP Code: 2602020002 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): BCHS
   - 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
   BCHS / 4311 / Biochemistry II Laboratory
   - Course ID: 12742 Effective Date (currently active row): _____
9. Proposed Catalog Description: (If there are no prerequisites, type in "none".)
   Cr: 3. (1-6). Prerequisites: BCHS 3201. Description (30 words max.): Contemporary experimental techniques in biochemistry and molecular biology. Cloning, expression and purification of recombinant proteins, applications of the polymerase chain reaction, and generation of genomic libraries.
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: Donna Pattison Telephone: 713-743-2642
Email: dpattison@uh.edu
Dean's Signature: _____ Date: 9/23/2012

Course Number and Title: BCHS4311 Biochemistry Laboratory II
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):

Students will gain first-hand experience using some of the most common and useful tools employed by biochemists and molecular biologists today. By the end of the course students will understand and be able to set up a polymerase chain reaction, clone a gene into a vector, transform a cloning vector into a cell line, and purify expressed protein. Students will be able to explain when and why scientists would use these particular methods in the laboratory. Students will be able to apply the scientific method from start to finish. Students will develop their own problem to explore in the context of a biomaterials project. Students will work as a team to select one problem from all the problems proposed, establish a hypothesis, design experimental methods, conduct the experiment, analyze the data, and communicate their findings to their peers in both oral and written form.

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
☐ Mathematics
☐ Language, Philosophy, & Culture
☐ Creative Arts
☒ Life & Physical Sciences
☐ American History
☐ Government/Political Science
☐ Social & Behavioral Science
X Component Area Option

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:

In this laboratory course, students contribute to an ongoing research project. Students design their own experiments to test the characteristics of Drosophila ultrabithorax protein. In vitro, ultrabithorax forms stable biomaterials. Students either develop experiments to optimize materials formation (the development of ropes, films, or sheets) or they design novel ways to work with the materials such as developing novel structures. The experience provides students with a chance to formulate their own questions and hypotheses based on the current literature on the topic, develop a protocol to test their hypothesis, try their experiments, evaluate the results, redesign protocols based on the initial experimental trials, and finally to report the data in a written journal-style manuscript and to share the results with the class in an informal seminar-type talk.

Communication Skills:

Once the project is complete, students each write a journal-style article to report their work. Although this is a group project, each student is expected to write their own paper (figures, tables, and pictures may be shared). The first draft of the paper is peer edited by members of their own group. This helps ensure all the important elements of the experiment are included. Next, the papers are peer-edited by a classmate that is not a group member to ensure that the writing is clear to someone not intimately involved in the project. Papers are submitted to Turnitin to check for plagiarism. Papers will be submitted through Blackboard for the University assessment of the core in the future. A rubric is used to grade the work (see attached). At the end of the semester, a seminar-style event is held for all lab sections of the course where each team presents their work. Question and answer sessions are held at the end of each presentation. Students are allowed to invite friends and faculty to the event. PowerPoint slides are prepared as a group and each member is expected to participate in the delivery to the class in their oral presentation. A rubric is used to score the presentations (see attached).

Empirical & Quantitative Skills:

Students are expected to demonstrate empirical and quantitative reasoning in the design of their experiment and the analysis of their results. The manuscript on the project will be used to assess these skills.

Teamwork:

Students are expected to contribute both their time and their intellectual thought processes to the development of the research proposal. Every student is required to contribute 3 ideas or problems to test in the research project and they will be scored individually for the completion of the assignment and the quality and originality of their ideas. At the end of the project, students will evaluate their teammates using a rubric to assess the contributions of each individual on their team. A portion of the project grade will be determined by the student evaluations. See attached rubric.

Social Responsibility:
Not required for Life and Physical Sciences

Personal Responsibility:
Not required for Life and Physical Sciences

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

BIOCHEMISTRY LABORATORY II
BCHS 4311
Spring 2012

Lab Coordinator: Dr. Donna Pattison
Office: Room 108C, Science Teaching Laboratory Building
Phone Number: 713-743-2642
e-mail: dpattison@uh.edu

Teaching Assistant:_____
TA e-mail:_____

Text: Laboratory DNA Science; Bloom, Freyer, and Micklos (1996) [ISBN: 0-8053-3040-2]

A calculator may be helpful. Lab Coats and Goggles are REQUIRED. You will also need a tear-out lab notebook with duplicate pages.

Goggles, lab coats and notebooks are available for purchase at Research Stores on the second floor of the Science Building.

Course Overview and Objectives: Students will gain first-hand experience using some of the most common and useful tools employed by biochemists and molecular biologists today. By the end of the course students will understand and be able to set up a polymerase chain reaction, clone a gene into a vector, transform a cloning vector into a cell line, and purify expressed protein. Students will be able to explain when and why scientists would use these particular methods in the laboratory. Students will be able to apply the scientific method from start to finish. Students will develop their own problem to explore in the context of a biomaterials project. Students will work as a team to select one problem from all the problems proposed, establish a hypothesis, design experimental methods, conduct the experiment, analyze the data, and communicate their findings to their peers in both oral and written form.

Week	Lab
January 16-17	No labs. Martin Luther King, Jr. Holiday
January 18-19	Lab Orientation and Safety Micropipetting, Sterile Techniques and Bacterial Culture Techniques (Labs 1 and 2)
January 23-24	Research Databases and Referencing Tools: **Labs will meet in the Training Room 10F in the library basement**

January 25-January 26	Assay for an Antibiotic Resistance Gene (separate handout)
January 30-31	Use of Bioinformatics to Investigate β-Lactamase
February 1-2	Effects of DNA Methylation on Restriction (Lab 4)
February 6-7	Southern Hybridization of λ DNA (Lab 13A); **Quiz 1**
February 8-9	Southern Hybridization of λ DNA (Lab 13B and C)
February 13-14	Southern Hybridization of λ DNA (Lab 13D)
February 15-16	Construction of a Genomic Library of λ DNA (Lab 14A/B) **Quiz 2**
February 20-21	Construction of a Genomic Library of λ DNA (Lab 15B)
February 22-23	Construction of a Genomic Library of λ DNA (Lab 16A)
February 27-28	Construction of a Genomic Library of λ DNA (Lab 16B); Editing Workshop for Southern Hybridization Paper **(Complete Southern Blot paper drafts due)**
February 29-March 1	Construction of a Genomic Library of λ DNA (Lab 16C); **Southern Blot Paper Due**
March 5-6	Human DNA Fingerprinting (Lab 23); **Quiz 3**
March 7-8	Cloning by PCR (Lab 18A)
March 12-15	Spring Break
March 19-20	Cloning by PCR (continued; Lab 18B and C)
March 21-22	Cloning by PCR (continued; Lab 19A and B)
March 26-27	Cloning by PCR (continued; Lab 20B); **Quiz 4**
March 28-29	Purify UBX protein
April 2-3	Purify UBX protein
April 4-5	Bradford Assays/SDS-PAGE gels to check quantity and quality of protein preps; **CV and Cover Letter due**
April 9-10	Student Designed Materials Experiments: Creating ropes

	and sheets
April 11-12	Student Designed Materials Experiments: Creating ropes and sheets
April 16-17	Field Trip to Rice University; labs will not meet on April 23rd or 24th
April 18-19	Ubx Paper editing workshop; **Complete Ubx draft due**
April 23-24	Sharing data and results from UBX experiments
April 25-26	**Ubx Research Paper Due** **Quiz 5** (in LECTURE on April 30th)

Please note the above schedule is TENTATIVE. The schedule is subject to change based on the availability of materials from our suppliers and the need to allow some flexibility in the time needed to complete the lab exercises.

Attendance and Grading
Attendance is **MANDATORY**.

Guesting: If you miss a lab for an excused reason, inform your TA as soon as possible. Make arrangements another TA (see schedule posted on classroom door) to guest in their lab. You may guest up to two times in a semester. Please contact your regular TA and the TA with whom you will be guesting for permission. No more than 5 students will be permitted to guest in a single section. You do NOT need to ask Dr. Pattison for permission. You are also required to fill out the guesting form (located on the TA bench at the front of the room) when you arrive for the section in which you are guesting. There are no labs on Friday. You will take the quiz for the lab section you are visiting.

Absences: As the main point of a laboratory course is to gain hands-on experience in lab techniques, if you fail to attend more than two labs, you will automatically fail the course unless you provide evidence of extenuating circumstances that are excused under university policies. It is **YOUR** responsibility to deal with attendance issues **PROMPTLY**. If there are extenuating circumstances and you have already guested twice, you must speak with both your TA AND Dr. Pattison.

Late work: Failure to hand in 2 or more lab reports will result in an F even if you attended the lab. Lab reports are due at the start of class. Reports will be subjected to a ten percent loss in points for failure to turn the report in at the start of class and for each day beyond the due date. Lab reports that are more than 7 days late will receive a zero.

Arriving Late: You are expected to arrive in class on time. You will not receive additional time to complete a quiz if you are late. Points will be deducted from your participation grade for tardiness. **If you are more than 15 minutes late, you are considered absent and will not be allowed to participate in the lab.** You will need to guest in another lab to obtain credit for that lab.

Incomplete Grade Policy: 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 the 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 (124F, Science Building). Further information on "I" grades can be found at http://www.uh.edu/academics/catalog/general/acade2.html#grades.

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. Pattison, to discuss appropriate arrangements.

Grades

Lab reports (Tear-out)	270 points (see below)
Southern Blotting Paper	100 points
Ubx Project	260 points
Library Training	10 points
Curriculum vitae/cover letter	20 points
Field Trip	30 points
Participation	50 points
Quizzes	250 points (5 quizzes / 50 points each)
	990 points total

UBX Project

- Initial experiment idea (10 points)
- Experimental Protocol (20 points)
- Tear-out write up on cloning and purification (50 points)
- Oral presentation (30 points)
- Final paper (on student designed experiment) (150 points)

Tear-Out Lab Reports:

Micropipetting, Sterile Techniques and Bacterial Culture Techniques (20 points)
Effects of DNA Methylation on Restriction (50 points)
Assay for an Antibiotic Resistance Gene (50 points)
Genomic Library (50 points)
Cloning by PCR (50 points)
DNA Fingerprinting (50 points)

Grade Assignments

Important Dates:
February 1: Last day to drop class without a grade
April 3th: Last day to drop class

92.0 – 100%	A	68.0 – 69.9%	D+
90.0 - 91.9%	A-	62.0 – 67.9%	D
88.0 - 89.9%	B+	60.0 – 61.9%	D-
82.0 – 87.9%	B	≤59.9%	F
80.0 – 81.9%	B-		
78.0 – 79.9%	C+		
72.0 – 77.9%	C		
70.0 – 71.9%	C-		

Biochemistry Lab II (BCHS4311)

Components	Comments	Points	
		Max	Earned
Initial Project Idea (3 ideas, creativity, originality)		10	
Protocol (completeness, logical process, appropriate controls)		20	
Tear-out Report		50	
Title ▪ identifies theme of study and nature of work ▪ avoids unnecessary words or phrasing ▪ cites author and e-mail addresses of authors so we can contact you in the future, date, and TA name below title		5	
Abstract ▪ summarizes briefly all aspects of study including objectives or purpose, hypothesis, methods, results, and conclusions. Clearly states WHY the work is interesting and should be done. ▪ avoids unnecessary details		10	
Introduction ▪ states purpose of study ▪ justifies why study needs to be done ▪ reviews previous results by others states hypothesis, predictions, and possible outcomes		20	
Materials and Methods ▪ provides details of materials and equipment (described in paragraphs, not as a list) ▪ describes experimental treatments and procedures for collecting the data ▪ provides sufficient detail to allow precise replication		20	
Results and Discussion ▪ uses graphs, tables and pictures as needed to report data ▪ provides title and correct labeling on graphs and tables ▪ uses text (words) to describe important aspects of data (refers to tables and graphs) ▪ presents data objectively ▪ Clearly labeled and well-written figure legends ▪ provides interpretation of experimental results with regard to your hypothesis ▪ addresses limitations and possible sources of errors ▪ indicates importance and possible applications of experimental findings ▪ proposes new questions that arise from your study ▪ summarizes major conclusion(s)		60	
Creativity and Effort ▪ Is the idea original? ▪ Was a real effort made to generate materials (6 hours of class time were cleared off the schedule to allow this work to be done…does your effort reflect 2 class periods worth of work for experimenting and presentation preparation? Did you do your share of the work?)		20	
Writing Proficiency and Format ▪ uses appropriate nomenclature throughout ▪ uses correct grammar, spelling, and punctuation ▪ organizes report according to specified format ▪ presents ideas clearly, concisely and logically		15	
Oral Presentation ▪ States goal ▪ Outlines methods ▪ Shared results and troubleshooting attempts ▪ Future directions for this project if you were to continue ▪ Students were prepared		30	
Overall Grade:		260	

UBX Project Participation Summary

Your name:

TA:

Group Letter:

Project Title:

Please fill in the names of your group members and check the box that most adequately reflects their level of participation in the group project.

Member Name	Fully Participated	Participated Most of the Time	Participated at an acceptable level considering scheduling issues	Participated in less than half of the project	Barely participated	Did not participate at all

Comments: