

Course Information

Date Submitted: 5/2/2013

Current Prefix and Number: IBS - Integrated Biomedical Sciences , IBS 602 - BIOMOLECULES AND MOLECULAR BIOLOGY

Other Course:

Proposed Prefix and Number: IBS 602

What type of change is being proposed?

Major Change

Should this course be a UK Core Course? No

1. General Information

a. Submitted by the College of: College of Medicine

b. Department/Division: Integrated Biomedical Sciences

c. Is there a change in 'ownership' of the course? No

If YES, what college/department will offer the course instead: Select...

e. Contact Person

Name: Brett T. Spear

Email: bspear@uky.edu

Phone: 257-5167

Responsible Faculty ID (if different from Contact)

Name:

Email:

Phone:

f. Requested Effective Date

Semester Following Approval: No OR Effective Semester: Fall 2013

2. Designation and Description of Proposed Course

a. Current Distance Learning (DL) Status: N/A

b. Full Title: BIOMOLECULES AND MOLECULAR BIOLOGY

Proposed Title: Molecular Biology and Genetics

c. Current Transcript Title: BIOMOLECULES AND MOLECULAR BIOLOGY

Proposed Transcript Title:

d. Current Cross-listing: Same as BCH 608

Proposed – ADD Cross-listing :

Proposed – REMOVE Cross-listing: BCH 608

e. Current Meeting Patterns

LECTURE: 44

Proposed Meeting Patterns

LECTURE: 41

OTHER: 3

f. Current Grading System: Graduate School Grade Scale

Proposed Grading System: PropGradingSys

g. Current number of credit hours: 3

Proposed number of credit hours: 3

h. Currently, is this course repeatable for additional credit? No

Proposed to be repeatable for additional credit? No

If Yes: Maximum number of credit hours:

If Yes: Will this course allow multiple registrations during the same semester? No

2i. Current Course Description for Bulletin: An introductory graduate-level biochemistry course focused on the cellular mechanisms that underlie the regulated expression of genes, including transcription and translation, as well as basic mechanisms of DNA replication/repair and recombination. Genetic engineering and other experimental approaches critical to molecular biology research will be reviewed.

Proposed Course Description for Bulletin: In introductory graduate-level course focused on molecular biology and genetics (concepts and techniques) necessary for advanced graduate courses. The course will emphasize basic genetic principles and the molecular mechanisms that underlie the regulated expression of genes, including transcription, mRNA processing and translation, as well as mechanisms of DNA replication/repair and recombination. Genetic engineering and other experimental approaches that are critical to molecular biology research will be covered.

2j. Current Prerequisites, if any: Prereq: CHE 105, 107, 230 and 232; BIO 150 and 152; or equivalents.

Proposed Prerequisites, if any: Prereq: CHE 105, 107, 230 and 232; BIO 150 and 152; or equivalents.

2k. Current Supplementary Teaching Component:

Proposed Supplementary Teaching Component: No Change

3. Currently, is this course taught off campus? No

Proposed to be taught off campus? No

If YES, enter the off campus address:

4. Are significant changes in content/student learning outcomes of the course being proposed? Yes

If YES, explain and offer brief rationale: The curriculum for Integrated Biomedical Sciences (IBS) is currently being revised, which involves a number of different changes that includes the reduction of didactic coursework and an increase in teaching in small group format. The contents of IBS 602 (Biomolecules and Molecular Biology) and IBS 605 (Experimental Genetics) are being merged into a single 3-credit hour course (New course: IBS 602, Molecular Biology and Genetics). This will result in certain topics from both original courses being eliminated or reduced in content. However, the important concepts of both courses will remain. Furthermore, this merger will result in a reduction in the redundancy between IBS 602 and IBS 605. Method of grading or type of exams will not change.

5a. Are there other depts. and/or pgms that could be affected by the proposed change? Yes

If YES, identify the depts. and/or pgms: College of Medicine: Graduate Center for Toxicology; Master of Science in Medical Sciences. College of Pharmacy: Program in Pharmaceutical Sciences. These programs require IBS602 for their students. The DGS of Toxicology and M.S. in Medical Sciences are aware of these changes and the revised IBS602 will continue to be taken by their students. The Pharm. Sciences students can also take the revised IBS 602 class. However, it should be noted that the Department of Molecular and Cellular Biochemistry will continue to teach BCH608. If Pharm. Sciences students (as well as students in other departments who take the current IBS 602/BCH 608) feel that the revised IBS 602 is not appropriate, they can continue to take BCH 608.

5b. Will modifying this course result in a new requirement of ANY program? No

If YES, list the program(s) here:

6. Check box if changed to 400G or 500: No

Distance Learning Form

Instructor Name:

Instructor Email:

Internet/Web-based: No

Interactive Video: No

Hybrid: No

1. How does this course provide for timely and appropriate interaction between students and faculty and among students? Does the course syllabus conform to University Senate Syllabus Guidelines, specifically the Distance Learning Considerations?

2. How do you ensure that the experience for a DL student is comparable to that of a classroom-based student's experience? Aspects to explore: textbooks, course goals, assessment of student learning outcomes, etc.

3. How is the integrity of student work ensured? Please speak to aspects such as password-protected course portals, proctors for exams at interactive video sites; academic offense policy; etc.

4. Will offering this course via DL result in at least 25% or at least 50% (based on total credit hours required for completion) of a degree program being offered via any form of DL, as defined above?

If yes, which percentage, and which program(s)?

5. How are students taking the course via DL assured of equivalent access to student services, similar to that of a student taking the class in a traditional classroom setting?

6. How do course requirements ensure that students make appropriate use of learning resources?

7. Please explain specifically how access is provided to laboratories, facilities, and equipment appropriate to the course or program.

8. How are students informed of procedures for resolving technical complaints? Does the syllabus list the entities available to offer technical help with the delivery and/or receipt of the course, such as the Information Technology Customer Service Center (<http://www.uky.edu/UKIT/>)?

9. Will the course be delivered via services available through the Distance Learning Program (DLP) and the Academic Technology Group (ATL)? **NO**

If no, explain how student enrolled in DL courses are able to use the technology employed, as well as how students will be provided with assistance in using said technology.

10. Does the syllabus contain all the required components? **NO**

11. I, the instructor of record, have read and understood all of the university-level statements regarding DL.

Instructor Name:

SIGNATURE|MRWH224|Melissa R Wilkeson|College approval for ZCOURSE_CHANGE IBS 602|20130225

SIGNATURE|JDLIND2|Jim D Lindsay|HCCC approval for ZCOURSE_CHANGE IBS 602|20130308

SIGNATURE|ZNNIKO0|Roshan N Nikou|Graduate Council approval for ZCOURSE_CHANGE IBS 602|20130326

SIGNATURE|WF-BATCH|Batch User|Reminder for minor course work item|20130417

IBS 602
Molecular Biology and Genetics
SYLLABUS
Fall 2013

| Faculty | Department | Office | Phone | E-mail |
|------------------------|----------------------------|---------------|-------------------|-------------------------|
| Course Director | | | | |
| I. Mellon | Toxicology | 220 MDR3 | 257-6253 | mellon@uky.edu |
| Course Faculty | | | | |
| R. J. Craven | Molec. Pharmacology | 213 Combs | 323-3832 | rolf.craven@uky.edu |
| J. D'Orazio | Pediatrics/Toxicology | 204 Combs | 323-6238 | jdorazio@uky.edu |
| T. Gao | Biochemistry | | 323-3454 | tianyan.gao@uky.edu |
| T. McClintock | Physiology | MS585 Willard | 323-1083 | mclint@uky.edu |
| D. K. Orren | Toxicology | 356 HSRB | 323-3612 | dkorre2@uky.edu |
| C. Paumi | Toxicology | 312 Combs | 323-6086 | christian.paumi@uky.edu |
| K. J. Pearson | Nutritional Sciences | 591 CTW | 323-4933 (X81371) | kevin.pearson@uky.edu |
| R. D. Perry | Micro, Immuno, & Mol. Gen. | MN362 Willard | 323-6341 | rperry@uky.edu |
| C. A. Peterson | College of Health Sciences | 105B CTW | 323-1100 (X80476) | cpete4@email.uky.edu |
| D. W. Rodgers | Biochemistry | 269 BBSRB | 257-5205 | david.rodgers@uky.edu |
| B. T. Spear | Micro, Immuno, & Mol. Gen. | Combs 210 | 257-5167 | bspear@uky.edu |
| S. Stamm | Biochemistry | 159 BBSRB | 257-4790 | stefan.stamm@uky.edu |
| R. Xu | Pharmacology | 361 BBSRB | 323-7889 | ren.xu2010@uky.edu |

A. COURSE DESCRIPTION

IBS602 is a 3 credit hour Fall semester course designed to provide first year graduate students with the foundation of knowledge in molecular biology and genetics (concepts and techniques) necessary for advanced graduate courses and research in any of the seven basic science departments of the UK College of Medicine. The course will be focused primarily on basic genetic principles and the molecular mechanisms that underlie the regulated expression of genes, including transcription, mRNA processing and translation, as well as basic mechanisms of DNA replication/repair and recombination. In addition, genetic engineering and other experimental approaches that are critical to molecular biology research will be reviewed. Course material will be presented in several formats but will consist primarily of didactic lectures by expert faculty.

Lectures will be given Monday, Wednesday, Friday from 11:00- 11:50 PM in room MN 463

Bioinformatics sessions will be held in small group format: details for these three sessions will be posted on the Blackboard course site (see below, section I).

B. COURSE OBJECTIVES

The primary objective of this course will be to provide graduate students with a working knowledge of basic principles and the latest advances in selected areas of molecular biology and genetics.

C. CLASS ATTENDANCE

Class attendance is expected. You should contact the course director and specific lecturer if you know that you are going to miss a class due to illness or conflict. You will still be responsible for materials covered in classes that you do not attend. See Section F regarding absences from exams.

D. TEXT

Molecular Biology of the Gene, 6th Edition, Watson et al., Pearson, 2008. Recommended.

Additional readings from the scientific literature will also be provided, or will be readily accessible from on-line scientific journals (e.g. *J. Biol. Chem.*, *Proc. Natl. Acad. Sci.*, etc.) and/or posted on Blackboard.

E. PREREQUISITES

CHE 105 and 107, General College Chemistry I and II; CHE 230 and 232, Organic Chemistry I and II
BIO 150 and 152, Principles of Biology I and II or equivalents. *Students who have questions about prerequisites or whether they can enroll in IBS602 should talk with the course director.*

F. GRADING

Students will be evaluated based on: 1) performance on four written examinations and 2) participation in Bioinformatics sessions.

Each **exam** will last approximately two hours and each will account for **23.5% of the final grade**.

Locations for exams will be announced in class and posted on the Blackboard course website (see below). Exam times during the semester are 6:00 – 8:00 PM. Please refer to the Room listing for the correct classrooms for each lecture and exam.

Another component of the final grade will be performance on the bioinformatics session (**6% of Final Grade**). Attendance at these sessions is required and all students will be expected to participate actively in discussions. Unless the course director is notified ahead of time, failure to attend and/or participate in the bioinformatics sessions will result in a zero grade for this event.

The grading standards to be employed for the course are as follows:

| | |
|-----------|------------------|
| A: | 90-100% |
| B: | 80-89% |
| C: | 70-79% |
| D: | 60-69% |
| E: | below 60% |

Students who perform in these ranges will be guaranteed to receive the indicated grades, at a minimum. However, some adjustments (curving) of this scale are possible, depending on the performance of the class as a whole.

Examinations can be submitted for a reevaluation if it is deemed that a mistake has been made in the original grading. Resubmissions must be accompanied by a written explanation of the perceived mistake. Upon resubmission, the entire examination will be subject to reevaluation and all questions therein will be regraded. Examinations for regrading must be submitted within one week (7 days) and **initially to the course director only**.

Graduate students will not receive a grade of “D” but instead will receive a failing mark (“E”) for an average under 70% or below two standard deviations from the class average, if the scores are curved. All examinations must be taken at the scheduled time except when legitimate medical or personal circumstances make it impossible to do so. The course director must be notified of the circumstances of your absence prior to the examination. In these cases, either an oral or written make-up examination will be given. An “I” grade will not be assigned to students who simply miss an examination, but may be arranged due to illness or other emergencies that may arise.

G. UNDERGRADUATE ENROLLMENT

Undergraduate students may enroll in the course with the permission of the Course Director.

H. OFFICE HOURS

Course directors and instructors will be available for consultation. Students are encouraged to consult with participating faculty as needed. Students are strongly encouraged to email faculty to set up an appointment as specific office hours are not always established.

I. BLACKBOARD AND COURSE INFORMATION (IMPORTANT!)

Blackboard, a software program designed for facilitating course administration, will be used this semester in IBS602. You must be able to access the Blackboard course site in order to view such items of importance as *posted lecture notes, assignments for the bioinformatics sessions*) and *other announcements*. You can reach and register with Blackboard from the IBS site (<http://www.mc.uky.edu/ibs/current/blackboard.asp>).

Questions can be addressed by the Blackboard help desk 257-1300 and website <http://wiki.uky.edu/Blackboard/Wiki%20Pages/Home.aspx>.

J. ACADEMIC INTEGRITY

The University policy neither condones nor allows cheating, plagiarism, falsification or misuse of data. No exception to this policy will be tolerated. The course director reserves the right to assign a zero for the assignment in question as a minimum action. Further breaches may lead to referring the student for suspension from the University. The student is responsible to become familiar with the rules of academic dishonesty as outlined in the Code of Student Rights and Responsibilities (<http://www.uky.edu//Ombud>). Ignorance of these guidelines is not a defensible position against these rules.

Part II of *Student Rights and Responsibilities* (<http://www.uky.edu/StudentAffairs/Code/part2.html>) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it is a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work that a student submits as their own, whoever that other person may be.

Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, the student, and the student alone must do it. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how these were employed. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas that are so generally and freely circulated as to be a part of the public domain (Section 6.3.1). Programs and resources including, but not limited to, sources such as <http://www.plagiarism.org/> will be employed to insure academic integrity.

K. ACCOMODATIONS

A student with a documented disability that requires academic accommodations should contact the Course Director as soon as possible during scheduled office hours or via email. In order to receive accommodations in this course, a Letter of Accommodation must be provided from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address: jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

L. INCLEMENT WEATHER

The University of Kentucky has a detailed policy for decisions to close in inclement weather. The snow policy is described in detail at http://www.uky.edu/PR/News/severe_weather.htm or you can call (859) 257-5684. In general, the University is not closed for severe weather, but the instructor may decide to cancel the class, in which case, s/he will post this information on Blackboard at <https://elearning.uky.edu/webapps/portal/frameset.jsp>

M. CLASS SCHEDULE

| # | Date | Topic | Lecturer |
|----|-----------|--|--------------|
| 1 | Aug 28 | Introduction: Nucleic Acid Structure and Mendelian Genetics | Mellon |
| 2 | 30 | DNA topology, denaturation and renaturation | Mellon |
| | 2 | <i>No Class – Labor Day</i> | |
| 3 | 4 | DNA replication I | Rogers |
| 4 | 6 | DNA replication II | Rogers |
| 5 | 9 | DNA repair and recombination I | Orren |
| 6 | 11 | DNA repair and recombination II | Orren |
| 7 | 13 | DNA repair and recombination III | Orren |
| 8 | 16 | <i>Meiosis</i> | Spear |
| 9 | 18 | Linkage, Gene Mapping, Pedigree Construction/Analysis | Spear |
| 10 | 20 | Advanced Mendelian Models – monogenic and complex traits, chromosomal abnormalities, epistasis | Spear |
| 11 | 23 | Discussion – Ethical issues in Genetics | Spear |
| | 24 | <i>Exam #1 (lectures 1-11) Location TBD</i> | |
| 12 | 25 | Bacterial Genetics I | Perry |
| 13 | 27 | Bacterial Genetics II | Perry |
| 14 | 30 | Bacterial Genetics III | Perry |
| 15 | Oct 2 | Bacterial Genetics IV | Perry |
| 16 | 4 | Molecular Biology Techniques I – bacterial | Mellon |
| 17 | 7 | Molecular Biology Techniques II – bacterial | Mellon |
| 18 | 9 | Molecular Biology Techniques III – eukaryotic | Mellon |
| 19 | 11 | Molecular Biology Techniques IV – eukaryotic | Mellon |
| 20 | 14 | <i>Evolution of mammalian genomes</i> | Spear |
| | 15 | <i>Exam #2 (lectures 12-20) Location TBD</i> | |
| 21 | 16 | Transcription I | Xu |
| 22 | 18 | Transcription II | Xu |
| 23 | 21 | Chromatin | Xu |
| 24 | 23 | RNA processing | Stamm |
| 25 | 25 | RNA processing regulation, transport and turnover | Stamm |
| 26 | 28 | Small RNA | Stamm |
| 27 | 30 | RNAi | Stamm |
| 28 | Nov 1 | Protein synthesis and its regulation I | Gao |
| 29 | 4 | Protein synthesis and its regulation II | Gao |
| 30 | 6 | Regulation of Cellular Protein Trafficking | Paumi |
| 31 | 8 | Techniques to study protein turnover/stability | Paumi |
| | 8 | <i>Exam #3 (lectures 21-31) Location TBD</i> | |
| 32 | 11 | Developmental Genetics | Spear |
| 33 | 13 | Mouse Genetics | Spear |
| 34 | 15 | Techniques in Mouse Genetics | Spear |
| 35 | 18 | Epigenetics and Genomic Imprinting | Pearson |
| 36 | 20 | Genetic and Biochemical Basis of Human Disease | Pearson |
| 37 | 22 | Next Generation Sequencing/Gene Chip/Microarray Analysis | McClintock |
| 38 | 25 | Cancer Genetics and Cancer Gene Expression I | D'Orazio |
| | 27-29 | No classes – Thanksgiving Break | |
| 39 | Dec 2 | Cancer Genetics and Cancer Gene Regulation II | D'Orazio |
| 40 | 4 | Gene therapy and Stem Cells I | C. Peterson |
| 41 | 6 | Gene therapy and Stem Cells II | C. Peterson |
| 42 | 9 | Bioinformatics I | Spear/Mellon |
| 43 | 11 | Bioinformatics II | Spear/Mellon |
| 44 | 13 | Bioinformatics III | Spear/Mellon |
| | | <i>Exam #4 (Final Exam; lectures 32-41) Location TBD</i> | |