

Term Information

Effective Term
[Previous Value](#)

Autumn 2018
[Summer 2012](#)

Course Change Information

What change is being proposed? (If more than one, what changes are being proposed?)

Change credit hours from 4 to 3.

What is the rationale for the proposed change(s)?

This course serves graduate students in the Molecular Genetics and MCDB PhD graduate programs as a first year course. It also serves as a potential senior elective for undergraduates in the Molecular Genetics major. The Graduate program in Molecular Genetics seeks to streamline our lecture based course offerings to allow first year graduate students to focus a little more on their lab-based responsibilities. After reducing coverage of some prokaryotic-specific topics we find that the course is suitable to be offered in 3 credit hours. A three credit hour course will additionally be easier to schedule in the approved class grid, increasing accessibility for both graduate and undergraduate students.

What are the programmatic implications of the proposed change(s)?

(e.g. program requirements to be added or removed, changes to be made in available resources, effect on other programs that use the course)?

We anticipate no major programmatic changes. Students in graduate programs can maintain fulltime status by registering for an additional credit of lab research, reflecting their increased commitment in that area. Our examination of recent graduates from the undergraduate Molecular Genetics major indicates that the student population that takes MOLGEN 5701 will not be negatively impacted if the course is a 3 credit hour elective instead of a 4 credit hour elective.

Is approval of the request contingent upon the approval of other course or curricular program request? No

Is this a request to withdraw the course? No

General Information

| | |
|--------------------------------------|--|
| Course Bulletin Listing/Subject Area | Molecular Genetics |
| Fiscal Unit/Academic Org | Molecular Genetics - D0340 |
| College/Academic Group | Arts and Sciences |
| Level/Career | Graduate, Undergraduate |
| Course Number/Catalog | 5701 |
| Course Title | DNA Transactions and Gene Regulation |
| Transcript Abbreviation | DNA & Gene Regul |
| Course Description | Understanding mechanisms of DNA replication, DNA repair and recombination, transcription, translation, regulation of gene expression, and the experimental approaches to these topics. |
| Semester Credit Hours/Units | Fixed: 3 |
| Previous Value | Fixed: 4 |

Offering Information

| | |
|--|------------------|
| Length Of Course | 14 Week, 12 Week |
| Flexibly Scheduled Course | Never |
| Does any section of this course have a distance education component? | No |
| Grading Basis | Letter Grade |
| Repeatable | No |
| Course Components | Lecture |

| | |
|----------------------------|----------|
| Grade Roster Component | Lecture |
| Credit Available by Exam | No |
| Admission Condition Course | No |
| Off Campus | Never |
| Campus of Offering | Columbus |

Prerequisites and Exclusions

| | |
|----------------------------|---|
| Prerequisites/Corequisites | Prereq: 4500 (500), 4606 (606), Biochem 4511 (511), or equiv, and Sr standing; or Grad standing; or permission of instructor. |
| Exclusions | Not open to students with credit for Biochem 5701 (701) or 702. |
| Electronically Enforced | No |

Cross-Listings

| | |
|----------------|--------------------------|
| Cross-Listings | Cross-listed in Biochem. |
|----------------|--------------------------|

Subject/CIP Code

| | |
|------------------|---------------------------|
| Subject/CIP Code | 26.0804 |
| Subsidy Level | Doctoral Course |
| Intended Rank | Senior, Masters, Doctoral |

Requirement/Elective Designation

Required for this unit's degrees, majors, and/or minors
The course is an elective (for this or other units) or is a service course for other units

Course Details

| | |
|--|---|
| Course goals or learning objectives/outcomes | <ul style="list-style-type: none">• 1. Students describe and apply fundamental concepts applicable to DNA regulation Students will learn how DNA is replicated and repaired and be expected to understand the proteins involved in regulating these processes• 2. Students explain how chromatin structure is critical to regulating activity on DNA. Students appreciate how a cell dynamically manipulates that structure to alter protein complex accessibility to the DNA and regulate genetic processes.• 3. Students understand regulation of RNA expression, including how cells control a gene's output, the molecular machinery used to transcribe RNA, as well as transcriptional initiation, elongation and termination.• 4. Students learn different mechanisms cells use to alter activity of a gene after transcription and discuss post-transcriptional control mechanisms including RNA processing and micro RNAs. |
|--|---|

[Previous Value](#)

Content Topic List

- DNA replication in E. coli and eukaryotes
- DNA polymerases and related enzymes
- Translesion polymerases
- DNA repair mechanisms
- Eubacterial RNA polymerase structure and function
- Sigma factors
- Regulation of transcription in eubacteria
- Lac operon
- Carbon-catabolite regulation
- Arabinose operon
- Bacteriophage lambda
- Attenuation
- Riboswitches
- Eukaryotic RNA polymerase
- Promoter structure and regulatory elements
- General transcription factors
- Transcription initiation and elongation
- Chromatin remodeling
- Post-transcriptional regulation
- RNA modifications
- Alternative splicing
- Translational regulatory mechanisms
- Post-translational regulatory mechanisms
- Targeted degradation
- Epigenetic regulation

Sought Concurrence

Yes

Previous Value

No

Attachments

- MOLGEN5701 Sample Syllabus.docx: Syllabus
(Syllabus. Owner: Vaessin, Harald Emil Friedrich)
- Departmental Letter.pdf: Departmental Letter
(Cover Letter. Owner: Vaessin, Harald Emil Friedrich)
- Concurrence_Form_5701.pdf: Concurrence Form-send out
(Other Supporting Documentation. Owner: Vaessin, Harald Emil Friedrich)
- Concurrence from MCDB.pdf: Concurrence MCDB
(Concurrence. Owner: Vaessin, Harald Emil Friedrich)
- MolGenCurriculumMap_2017_5701_3_credit.xlsx: updated Curricular Map
(Other Supporting Documentation. Owner: Vaessin, Harald Emil Friedrich)

Comments

COURSE CHANGE REQUEST
5701 - Status: PENDING

Last Updated: Haddad,Deborah Moore
11/16/2017

Workflow Information

| Status | User(s) | Date/Time | Step |
|------------------|---|---------------------|------------------------|
| Submitted | Vaessin,Harald Emil Friedrich | 11/16/2017 09:57 AM | Submitted for Approval |
| Approved | Vaessin,Harald Emil Friedrich | 11/16/2017 09:57 AM | Unit Approval |
| Approved | Haddad,Deborah Moore | 11/16/2017 10:03 AM | College Approval |
| Pending Approval | Nolen,Dawn Vankeerbergen,Bernadet te Chantal Oldroyd,Shelby Quinn Hanlin,Deborah Kay Jenkins,Mary Ellen Bigler | 11/16/2017 10:03 AM | ASCCAO Approval |



Susan E. Cole
209 Biological Sciences Building
484 W. 12th Ave.
Columbus, OH 43210

614-292-3276 Phone
614-292-4466 Fax

cole.354@osu.edu

November 10th, 2017

Dear Members of the ASCC,

The Department of Molecular Genetics is filing a course change request for MOLGEN 5701 “DNA Transactions and Gene Regulation”. This request will change the semester credit hours associated with the class from 4 to 3.

This course serves graduate students in Molecular Genetics and MCDB as a first-year course. It also serves as a potential senior elective for undergraduates in Molecular Genetics. The Graduate program in Molecular Genetics seeks to streamline our lecture based course offerings to allow first year graduate students to increase their focus on their lab-based responsibilities. After reducing coverage of some prokaryotic-specific topics we find that the course is suitable to be offered in 3 credit hours. A three credit hour course will additionally be easier to schedule in the approved class grid, increasing accessibility for both graduate and undergraduate students

We anticipate no major programmatic changes arising from this change. Students in graduate programs can maintain fulltime status by registering for an additional credit of lab research, reflecting their increased commitment in that area. Our examination of recent graduates from the undergraduate Molecular Genetics major indicates that the student population that takes MOLGEN 5701 will not be negatively impacted if the course is a 3 credit hour elective instead of a 4 credit hour elective.

Concurrence has been sought from the department of Chemistry and Biochemistry, where this course is cross listed as well as from the Interdisciplinary Graduate Program in Molecular, Cellular and Developmental Biology, where this course is a required first year course/

Sincerely,

Susan Cole, Ph.D.
Associate Chair of Molecular Genetics

MOLGEN 5701
DNA Transactions and Gene Regulation
Time TBA
Format: Lecture
3 credit hours
Location TBA

COURSE DIRECTORS AND CONTACT INFORMATION:

Name
Address
Phone
Email

Name
Address
Phone
Email

OFFICE HOURS:

Available by appointment. To set up a meeting, please email your instructor(s) using your name.#account.

COURSE MATERIALS:

- No textbook is required. Links to open source reading and A/V materials will be provided by the course directors on Carmen.
- Additional supplemental material will be available on closed (2hr) reserve in Biological Sciences/Pharmacy Library.

COURSE DESCRIPTION:

During this course, students will learn in detail the fundamental basis and molecular mechanisms that control DNA replication, DNA repair, RNA transcription, and post-transcriptional gene regulation. These processes are controlled through the actions of DNA binding proteins, chromatin architecture, epigenetics, and non-coding RNA molecules. Students will be expected to learn the details of these processes as well as the experimental methodology used to test these principles in the laboratory. Students will have to read and analyze research publications focusing on these molecular processes.

LEARNING OBJECTIVES:

- 1. Describe and apply fundamental concepts applicable to DNA regulation**
Students will learn how DNA is replicated and repaired and be expected to understand the proteins involved in regulating these processes
- 2. Explain how chromatin structure is critical to regulating activity on DNA**
The structure of chromatin and how that structure is epigenetically maintained will be described in detail. Students will learn how a cell dynamically manipulates that structure to alter protein complex accessibility to the DNA and regulate genetic processes.
- 3. Understand how genes are regulated to produce RNA transcripts**
Students will learn how the cells control the relative abundance of a gene's output and the molecular machinery used to transcribe RNA. The processes of transcriptional initiation, elongation and termination will be discussed in great detail.
- 4. Learn different mechanisms cells use to alter activity of a gene after transcription**
Post-transcriptional control mechanisms including RNA processing and micro RNAs will be discussed.

GENERAL COURSE SCHEDULE: (based on Au 2017 calendar = 41 class meetings)

| Lecture | Topic | Lecturer |
|---------|--|----------|
| 1 | DNA Replication- General Concepts | TBA |
| 2 | E. coli DNA polymerase I and associated activities | TBA |
| 3 | Pol I and other Pol I-like enzymes | TBA |
| 4 | E. coli DNA polymerase III- clamps and clamp loaders | TBA |
| 5 | Pol III and the E. coli replisome | TBA |
| 6 | Replication fork activities/Okazaki fragment maturation in E. coli | TBA |
| 7 | Eukaryotic DNA polymerases | TBA |
| 8 | Eukaryotic replisome | TBA |
| 9 | Okazaki fragment maturation in eukaryotes | TBA |
| 10 | DNA damage tolerance & Translesion polymerases | TBA |
| 11 | Regulation of polymerase activities at the replication fork | TBA |
| 12 | Reverse transcriptase and Telomerase | TBA |
| 13 | Histones and chromatin structure | TBA |
| 14 | Higher order chromatin structure | TBA |
| 15 | Histone code/regulation of chromatin structure & accessibility | TBA |
| 16 | DNA methylation and epigenetic inheritance | TBA |
| 17 | Overview of DNA repair- Base excision repair (BER) | TBA |
| 18 | Nucleotide excision repair (NER) | TBA |
| 19 | Mismatch repair (MMR) and double strand break repair | TBA |
| 20 | The fundamental unit of genome: the gene | TBA |
| 21 | Core Promoter: TATA Box and building the transcriptional complex | TBA |

| | | |
|-----------|---|-----|
| 22 | Promoter Elements and TATA-less genes | TBA |
| 23 | RNA Pol II | TBA |
| 24 | Other RNA polymerases | TBA |
| 25 | Enhancer Elements | TBA |
| 26 | Transcription Factors | TBA |
| 27 | Transcription Factors II | TBA |
| 28 | Mediator Complex and DNA looping | TBA |
| 29 | Chromatin, Epigenetics and DNA accessibility | TBA |
| 30 | Co-regulator molecules – guardians of accessibility | TBA |
| 31 | Pioneering factors and master regulators | TBA |
| 32 | Insulators and gene organization | TBA |
| 33 | Transcriptional Repression | TBA |
| 34 | mRNA production: Elongation and termination | TBA |
| 35 | Splicing | TBA |
| 36 | Splicing II | TBA |
| 37 | Post-transcriptional regulation of RNA | TBA |
| 38 | Non-coding RNAs: miRNA | TBA |
| 39 | Other non-coding RNAs | TBA |
| 40 | Editing the Genome: From Zinc fingers to Crispr/Cas | TBA |
| 41 | Semester Review | TBA |

GRADING POLICY:

The course is graded on an A-E basis. The grade will be based upon a student's performance on one midterm (50%) and final (50%) exam. The mid-term examination will be held outside of regular class time tentatively scheduled for DATE TBA. As this exam is held outside of normal class hours, appropriate accommodations will be made for students with time conflicts. Any student with such a conflict must bring it to the attention of the instructor as soon as possible. The final exam will be held at the date and time assigned by the registrar. Make up examinations are only given in cases of documented emergency or illness.

GRADING SCALE:

Final grades will be based on your final percentage [(points accumulated/ total points for the course) x 100)]. Generally, the final grades assigned will reflect the grade scheme below, however, the instructor reserves the right to adjust the lower limits for each grade category downwards if justified by overall class performance (i.e., a 90 % is guaranteed to receive an A-, but in some cases an A- may be assigned for a performance below 90%

| | | | |
|----|----------|----|----------|
| A | 93-100% | C+ | 77-79.9% |
| A- | 90-92.9% | C | 73-76.9% |
| B+ | 87-89.9% | C- | 70-72.9% |
| B | 83-86.9% | D | 65-69.9% |
| B- | 80-82.9% | E | <65% |

COURSE ATTENDANCE POLICY:

In order to be successful in this course, attendance is expected for all lectures and mandatory for all in-class exams and projects.

STATEMENT ON ACADEMIC MISCONDUCT:

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/csc/>.

STATEMENT ON DISABILITY SERVICES:

Students with disabilities (including mental health, chronic or temporary medical conditions) that have been certified by the Office of Student Life Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office of Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 614- 292-3307, slds@osu.edu; <http://slds.osu.edu>.

Ohio State Department Course Review Concurrence Form

The purpose of this form is to provide a simple system of obtaining departmental reactions to proposed new courses, group studies, study tours, workshop requests, and course changes. A letter may be substituted for this form.

Academic units initiating a request which requires such a reaction should complete Section A of this form and send a copy of the form, course request, and syllabus to each of the academic units that might have related interests in the course. Initiating units should allow at least two weeks for responses.

Academic units receiving this form should respond to Section B and return the form to the initiating unit. Overlap of course content and other problems should be resolved by the academic units before forwarding this form and all other accompanying documentation to the Office of Academic Affairs.

A. Information from academic unit *initiating* the request:

Initiating Academic Unit: Molecular Geneticss Date: 11/06/2017

Registrar's Listing: MOLGEN 5701

Course Number: Level: U ☒ P ☐ G ☒ Credit Hours: 4

Course Title: "DNA Transactions and Gene Regulation"

Type of Request: ☐ New Course ☐ Group Studies ☐ Workshop ☐ Study Tour ☒ Course Change

Academic Unit with related interests asked to review the request (use a separate form for each unit while requesting concurrences from multiple units):

Date responses are needed:

B. Information from academic units *reviewing* the request:

- ☐ The academic unit ***supports*** the proposal
☐ The academic unit ***does not support*** the proposal.
Please explain:

☐ The academic unit suggests:

Signature of Department Chair

Signature of Graduate Studies Chair (if applicable)

Re: Concurrence request from Molecular Genetics re MOLGEN/BIOCHEM 5701

Brown, Anthony

Sent: Wednesday, November 08, 2017 5:13 PM

To: Cole, Susan

Cc: Pasquale, Lauren R.; Seeger, Mark; Chandler, Dawn S. [Dawn.Chandler@nationwidechildrens.org]; Vaessin, Harald

OK. Thanks.

Anthony Brown, PhD
Professor, Department of Neuroscience
Co-Director, MCDB Graduate Program
Director, Neuroscience Center Core
The Ohio State University
Rightmire Hall
1060 Carmack Road
Columbus, OH 43210

E-mail: brown.2302@osu.edu

Office: (614) 292 1205

Lab: (614) 292 1367

Lab web site: www.neurofilament.osu.edu



On Nov 8, 2017, at 2:39 PM, Cole, Susan <cole.354@osu.edu> wrote:

Thanks Tony,

I'm pretty sure the email is sufficient. Harald will let me know if I'm wrong...

Susan

Susan Cole, Ph.D.
Associate Professor
Department of Molecular Genetics
282 Biological Sciences Building
484 West 12th Ave.
Ohio State University
Columbus, OH 43210

Phone: (614) 292-3276

Fax: (614) 292-4466

cole.354@osu.edu

From: "Brown, Anthony" <brown.2302@osu.edu>

Date: Wednesday, November 8, 2017 at 2:25 PM

To: "Cole, Susan" <cole.354@osu.edu>

Cc: "Pasquale, Lauren R." <pasquale.19@osu.edu>, "Seeger, Mark" <seeger.9@osu.edu>, "Chandler, Dawn S." <Dawn.Chandler@nationwidechildrens.org>

Subject: Re: Concurrence request from Molecular Genetics re MOLGEN/BIOCHEM 5701

MCDB concurs, Susan. Do you need us to complete the form also?

Tony

Anthony Brown, PhD
Professor, Department of Neuroscience
Co-Director, MCDB Graduate Program
The Ohio State University
Rightmire Hall
1060 Carmack Road
Columbus, OH 43210

E-mail: brown.2302@osu.edu

Office: (614) 292 1205

Lab: (614) 292 1367

Lab web site: www.neurofilament.osu.edu

<image001.jpg>

On Nov 8, 2017, at 9:58 AM, Cole, Susan <cole.354@osu.edu> wrote:

Dear Tony,

The Department of Molecular Genetics is requesting concurrence from the Graduate program in Molecular, Cellular and Developmental biology regarding a course change request for MOLGEN 5701 "DNA Transactions and Gene Regulation". We propose to change the credit hours for this course from 4 to 3 starting in Autumn 2018 and beyond. Your input is requested as the course serves as a first year course for graduate students in MCDB.

As outlined in the attached request letter and paperwork, this change is being made to

reflect the streamlined coverage of prokaryotic-specific topics. This change will allow graduate students in affected programs to devote additional time to lab-based commitments in the fall of their first year, and scheduling as a three credit hour course will increase accessibility for both graduate students and senior undergraduates.

I have attached the letter being sent to the curriculum committee regarding these changes, as well as a proposed syllabus for the course. You can respond to this concurrence request either via return email or by filling out the attached concurrence forms and returning them to me. Please feel free to contact me with any questions or concerns

Thank you for your consideration,

Susan

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<Departmental Letter for Molgen 5701 credit hour change.docx><MOLGEN5701 General 3CH Syllabus 110617.docx><Concurrence_Form_5701.pdf>