

## Term Information

Effective Term Spring 2017  
*Previous Value* Summer 2012

## Course Change Information

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

We propose to change the title of the course to "Advanced Human Genetics". An additional prerequisite of "grade of C- or better in MOLGEN4500 or MOLGEN4606" will also be added to better reflect appropriate background knowledge for the course. The course description will be updated to read: "The principles of human genetics, mapping of disease genes, defects causing human disease, the cloning of disease genes, exon and genome sequencing for disease gene identification, complex traits, gene therapies, transgenes, and specific pathological disorders, development of treatments for genetic disorders."

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

MOLGEN5733 serves an advanced group of students including graduate students, residents at Nationwide Children's, and undergraduates with senior standing. Thus, there is a significant population of undergraduates with interest in the course material who are not able to take this elective. We are developing a new elective in Human Genetics at the 4000 level that will be accessible for these less mature students, and propose to change the title of MOLGEN 5733 to reflect the differences between the newly developed course and the existing course.

### 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 do not expect any changes to existing programs. MOLGEN5733 will continue to be available for the programs that require, and will continue to be available as a senior elective in the Molecular Genetics major.

### 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	5733
Course Title	Advanced Human Genetics
<i>Previous Value</i>	<i>Human Genetics</i>
Transcript Abbreviation	AdvHuman Genetics
<i>Previous Value</i>	<i>Human Genetics</i>
Course Description	The principles of human genetics, mapping of disease genes, defects causing human disease, the cloning of disease genes, exon and genome sequencing for disease gene identification, complex traits, gene therapies, transgenes, and specific pathological disorders, development of treatments for genetic disorders.
<i>Previous Value</i>	<i>The principles of human genetics covering mapping of disease genes, defects causing human disease, the cloning of disease genes, gene therapy, transgenes, and specific pathological disorders.</i>
Semester Credit Hours/Units	Fixed: 2

## Offering Information

**COURSE CHANGE REQUEST**  
5733 - Status: PENDING

Last Updated: Vankeerbergen, Bernadette  
Chantal  
11/24/2015

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Length Of Course	14 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	4500 (500), 4606 (606) or equivalent with a grade of C- or better and senior standing; or graduate standing; or permission of instructor.
<i>Previous Value</i>	<i>Prereq: 4500 (500), 4606 (606), or equiv, and Sr standing; or Grad standing; or permission of instructor.</i>
Exclusions	Not open to students with credit for 733, MolBioC 5733 (733), or Pathol 5733 (733).

## Cross-Listings

Cross-Listings	Cross-listed in MolBioC and Pathol.
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## Subject/CIP Code

Subject/CIP Code	26.0806
Subsidy Level	Doctoral Course
Intended Rank	Senior, Masters, Doctoral

## Requirement/Elective Designation

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**

- Students will understand the basics of Mendelian Genetics and pedigree analysis
- Students will be able to understand and interpret genetic linkages in human populations
- Students will understand the techniques and analyses relevant to identification and cloning of human disease genes
- Students will understand the use of exome and genomic sequencing to identify disease genes
- Students will understand the principle behind mapping of complex disease loci in particular the basics of association analysis
- Students will understand the techniques and implications of gene therapy
- Students will understand the development of therapies based on the Genetics of the disorder the two examples given will be Spinal muscular Atrophy and Cystic Fibrosis
- Students will understand how pathological mutations cause diseases in specific contexts including haemoglobinopathies, Duchenne muscular dystrophy, triplet repeat disorders, and cystic fibrosis.
- Students will understand the basic principles of risk calculation using Bayesian analysis

**Previous Value**

**Content Topic List**

- Mendelian genetics, pedigree analysis, and human inheritance
- Gene and gene linkages in human populations
- Mapping the human genome
- Cloning human disease genes
- Gene therapy
- Pathological mutations, including haemoglobiniopathies, Duchenne muscular dystrophy, triplet repeat disorders, and cystic fibrosis

**Attachments**

- Departmental Letter.pdf: Departmental Letter  
*(Other Supporting Documentation. Owner: Vaessin, Harald Emil Friedrich)*
- 5733\_syllabus\_for\_course\_changeV2-2.docx: Syllabus  
*(Syllabus. Owner: Vaessin, Harald Emil Friedrich)*
- Concurrence Forms re Dept. of Pathology.pdf: Concurrence  
*(Concurrence. Owner: Vankeerbergen, Bernadette Chantal)*

**Comments**

**Workflow Information**

Status	User(s)	Date/Time	Step
Submitted	Vaessin, Harald Emil Friedrich	11/23/2015 09:53 AM	Submitted for Approval
Approved	Vaessin, Harald Emil Friedrich	11/23/2015 09:54 AM	Unit Approval
Approved	Fink, Steven Scott	11/23/2015 11:00 AM	College Approval
Pending Approval	Nolen, Dawn Vankeerbergen, Bernadette Chantal Hanlin, Deborah Kay Jenkins, Mary Ellen Bigler Hogle, Danielle Nicole	11/23/2015 11:00 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 20th, 2015

To Whom It May Concern:

The Department of Molecular Genetics is requesting the creation of a new course, to be titled "MOLGEN-4703, Human Genetics". This course will cover principles of human genetics, including mapping and identification of disease genes, animal models, genetic testing and gene therapy, with a focus on reading the primary scientific literature. This request is being submitted concurrently with a request to change the name of the existing Human Genetics course (MOLGEN 5733, crosslisted as MOLBIOC 5733 and PATHOL 5733) to "Advanced Human Genetics."

The rationale for these changes is that the current Human Genetics elective offering (MOLGEN5733) is limited to senior undergraduates, and also serves graduate and postdoctoral students. It is thus not appropriate or accessible for many of our majors, or majors in other biological sciences. Many of the students in the biological sciences plan a career in healthcare, and thus have an interest in or need for coursework in Human Genetics. This new offering of Human Genetics will be an appropriate and attractive elective for advanced undergraduates across the biological sciences. This course request is being completed in tandem with a request to re-title the existing Human Genetics course (MOLGEN5733) as "Advanced Human Genetics" to more accurately describe its place in the curriculum and its appropriate audience.

Sincerely,

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

**ADVANCED HUMAN GENETICS**  
**MOLECULAR AND CELLULAR BIOCHEMISTRY**  
**MOLECULAR GENETICS**  
**PATHOLOGY**  
**5733**

**Spring semester, Lecture course, 2 credits**

10:20 –11:15 M W

HLRI 165

**Instructors:**

Arthur Burghes

Dept. Molecular & Cellular Biochemistry

363 Hamilton Hall

688-4759

[burghes.1@osu.edu](mailto:burghes.1@osu.edu)

Thomas Prior

Dept. of Pathology

121 Hamilton Hall

292-5484

[thomas.prior@osumc.edu](mailto:thomas.prior@osumc.edu)

**Description:** This course will provide in depth coverage of human genetics and the principles of genome analysis, building on previous coursework in genetics. The course is aimed at graduate students in the life sciences, medical students and residents, and senior undergraduates in biology, genetics, biochemistry or anthropology. A broad range of topics will be considered. We assume that all students have had a course in general genetics, at least equivalent to the material in Molecular Genetics 4500 or in Molecular genetics 4606. This would include principles of Mendelian (transmission) genetics, and molecular genetics topics such as structure of DNA, transcription, translation and basic gene cloning.

**Course goals:** Upon completion of this course:

- Students will understand the basics of Mendelian Genetics and pedigree analysis
- Students will be able to understand and interpret genetic linkages in human populations
- Students will understand the techniques and analyses relevant to identification and cloning of human disease genes
- Students will understand the use of exome and genomic sequencing to identify disease genes
- Students will understand the principle behind mapping of complex disease loci in particular the basics of association analysis
- Students will understand the techniques and implications of gene therapy
- Students will understand the development of therapies based on the Genetics of the disorder the two examples given will be Spinal muscular Atrophy and Cystic Fibrosis
- Students will understand how pathological mutations cause diseases in specific contexts including haemoglobinopathies, Duchenne muscular dystrophy, triplet repeat disorders, and cystic fibrosis.
- Students will understand the basic principles of risk calculation using Bayesian analysis

**Grading:** Grades will be based on one midterm exam (which may include both an inclass and a take-home portion) and a final examination; each examination will be worth 45% of the grade. In addition, a short paper will be required. This paper will focus on the description of the recent analysis of a specific genetic disease or a method of genetic analysis (with the topics chosen from a list to be provided during the first two weeks), worth 10% of the grade.

**Midterm exams:** Exams have traditionally been given in the late afternoon (either 5:00 or 6:00) on a Thursday afternoon. Tentative dates are February 13 and March 27. If anyone has a conflict please let us know early in the quarter.

**REQUIRED TEXTBOOK:**

T. Strachan, A. Read - Human Molecular Genetics 4ed (2010) Garland Science. ISBN-13: 978-0815341499 ISBN-10: 0815341490

**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/>.”

**Student Accommodations**

“Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; <http://www.ods.ohio-state.edu/>.”

**Lecture schedule (Subject to change):**

1/11 – Methods (TP)  
1/113 – Molecular Math (HW, Bayes (TP)  
1/18 – MLK no class  
1/20- Mutation Introduction (TP)  
1/25 – Review of cloning (AB)  
1/27 – Analyzing variations in the human genome and genetic markers (AB)  
2/01 - Allele frequency , linkage mapping and recombination (AB)  
2/03 – Physical mapping of the human genome (AB)  
2/08 – From Linkage to gene (AB)  
2/10- From Linkage to gene (AB)  
2/15 - Extra and review

**Exam 1**

2/17- Sequencing exon and complete genome (AB)  
2/22 - Animal models of genetic disease (AB)  
2/24- Development of therapy Gene therapy (AB)  
2/29- From gene to therapy Spinal muscular Atrophy (AB)  
3/2- From gene to therapy Cystic Fibrosis (AB)  
3/7 Hemoglobinopathies 1 (TP)  
3/9- [**Introduction to molecular oncology and cancer genetics - J. Lang, James Cancer Center**] \*  
3/14- Spring break  
3/16- Spring break  
3/21 – Hemoglobinopathies 2 (TP)  
3/23- Complex traits (AB)  
3/28— Complex traits (AB)  
3/30- Extra and review

**Exam 2**

4/04 – Biochemical (TP)  
4/06- Biochemical genetics I (TP)  
4/11- Mitochondrial (TP)  
4/13 – Duchenne muscular (TP)  
4/18- Cystic and methods (TP)  
4/20- Triplets I (TP)  
4/25 – Triplets II (TP)  
4/27 – Case Studies (TP)

\* - Tentative dates for special lecture; dates and titles subject to change

**Term papers due 4/20**

**FINAL EXAM: as per main exam schedule**

**The Ohio State University  
College of the Arts and Sciences Concurrence Form**

The purpose of this form is to provide a simple system of obtaining departmental reactions to course requests. **An e-mail may be substituted for this form.**

An academic unit initiating a request 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. Units should be allowed two weeks to respond to requests for concurrence.

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 this form and all other accompanying documentation may be forwarded to the Office of Academic Affairs.

**A. Proposal to review**

*Molecular Genetics 5733 (MOLBIOC5733 PATHOL 5733 <sup>Advanced</sup> Human Genetics)*  
 \_\_\_\_\_  
 Initiating Academic Unit      Course Number      Course Title

*Change* \_\_\_\_\_ *11-23-15*  
 Type of Proposal (New, Change, Withdrawal, or other)      Date request sent

*Pathology & Biological Chemistry and Pharmacology*  
 \_\_\_\_\_  
 Academic Unit Asked to Review      Date response needed

**B. Response from the Academic Unit reviewing**

Response: include a reaction to the proposal, including a statement of support or non-support (continued on the back of this form or a separate sheet, if necessary).

**Signatures**

*[Signature]*      *Chair Pathol*      *11/23/15*  
 \_\_\_\_\_  
 1. Name      Position      Unit      Date

\_\_\_\_\_  
 2. Name      Position      Unit      Date

\_\_\_\_\_  
 3. Name      Position      Unit      Date



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**A. Proposal to review**

*Molecular Genetics 4703 Human Genetics*  
 \_\_\_\_\_  
 Initiating Academic Unit    Course Number    Course Title

*New* \_\_\_\_\_ *11-23-15*  
 Type of Proposal (New, Change, Withdrawal, or other)    Date request sent

*Pathology and Biological Chemistry and Pharmacology*  
 \_\_\_\_\_  
 Academic Unit Asked to Review    Date response needed

**B. Response from the Academic Unit reviewing**

Response: include a reaction to the proposal, including a statement of support or non-support (continued on the back of this form or a separate sheet, if necessary).

**Signatures**

*W. A. ... Chair Pathol*    *11/23/15*  
 1. Name    Position    Unit    Date

2. Name    Position    Unit    Date

3. Name    Position    Unit    Date