

Status: PENDING

**PROGRAM REQUEST**  
Molecular Genetics

Last Updated: Andereck, Claude David  
05/10/2011

<b>Fiscal Unit/Academic Org</b>	Molecular Genetics - D0340
<b>Administering College/Academic Group</b>	Biological Sciences
<b>Co-administering College/Academic Group</b>	
<b>Semester Conversion Designation</b>	Re-envisioned with significant changes to program goals and/or curricular requirements (e.g., degree/major name changes, changes in program goals, changes in core requirements, structural changes to tracks/options/courses)
<b>Current Program/Plan Name</b>	Molecular Genetics
<b>Proposed Program/Plan Name</b>	Molecular Genetics
<b>Program/Plan Code Abbreviation</b>	MOLGEN-PH
<b>Current Degree Title</b>	Doctor of Philosophy

**Credit Hour Explanation**

Program credit hour requirements		A) Number of credit hours in current program (Quarter credit hours)	B) Calculated result for 2/3rds of current (Semester credit hours)	C) Number of credit hours required for proposed program (Semester credit hours)	D) Change in credit hours
Total minimum credit hours required for completion of program		120	80.0	80	0.0
Required credit hours offered by the unit	Minimum	114	76.0	73	3.0
	Maximum	120	80.0	79	1.0
Required credit hours offered outside of the unit	Minimum	0	0.0	1	1.0
	Maximum	6	4.0	7	3.0
Required prerequisite credit hours not included above	Minimum	0	0.0	0	0.0
	Maximum	0	0.0	0	0.0

**Program Learning Goals**

Note: these are required for all undergraduate degree programs and majors now, and will be required for all graduate and professional degree programs in 2012. Nonetheless, all programs are encouraged to complete these now.

**Program Learning Goals**

**Assessment**

Assessment plan includes student learning goals, how those goals are evaluated, and how the information collected is used to improve student learning. An assessment plan is required for undergraduate majors and degrees. Graduate and professional degree programs are encouraged to complete this now, but will not be required to do so until 2012.

**Is this a degree program (undergraduate, graduate, or professional) or major proposal? Yes**

**Does the degree program or major have an assessment plan on file with the university Office of Academic Affairs? No**

**Program Specializations/Sub-Plans**

If you do not specify a program specialization/sub-plan it will be assumed you are submitting this program for all program specializations/sub-plans.

**Pre-Major**

**Does this Program have a Pre-Major? No**

**Attachments**

- MG PhD Program.pdf  
*(Program Proposal. Owner: Shannon,Laurel Jean)*
- MolGen PhD cover letter.doc: NMS Division of Arts and Sciences cover letter  
*(Letter from the College to OAA. Owner: Andereck,Claude David)*

**Comments**

**Workflow Information**

Status	User(s)	Date/Time	Step
Submitted	Shannon,Laurel Jean	03/14/2011 05:52 PM	Submitted for Approval
Revision Requested	Vaessin,Harald Emil Friedrich	03/15/2011 12:26 PM	Unit Approval
Submitted	Shannon,Laurel Jean	03/15/2011 01:06 PM	Submitted for Approval
Approved	Vaessin,Harald Emil Friedrich	03/15/2011 03:21 PM	Unit Approval
Revision Requested	Andereck,Claude David	03/29/2011 01:29 PM	College Approval
Submitted	Vaessin,Harald Emil Friedrich	03/29/2011 05:21 PM	Submitted for Approval
Approved	Vaessin,Harald Emil Friedrich	03/29/2011 05:29 PM	Unit Approval
Revision Requested	Andereck,Claude David	04/25/2011 01:48 PM	College Approval
Submitted	Shannon,Laurel Jean	04/30/2011 04:25 PM	Submitted for Approval
Approved	Vaessin,Harald Emil Friedrich	04/30/2011 09:34 PM	Unit Approval
Revision Requested	Andereck,Claude David	05/03/2011 01:17 PM	College Approval
Submitted	Vaessin,Harald Emil Friedrich	05/03/2011 03:58 PM	Submitted for Approval
Approved	Vaessin,Harald Emil Friedrich	05/03/2011 03:58 PM	Unit Approval
Revision Requested	Andereck,Claude David	05/10/2011 11:21 AM	College Approval
Submitted	Vaessin,Harald Emil Friedrich	05/10/2011 11:48 AM	Submitted for Approval
Approved	Vaessin,Harald Emil Friedrich	05/10/2011 11:52 AM	Unit Approval
Approved	Andereck,Claude David	05/10/2011 02:19 PM	College Approval
Pending Approval	Slotnick,Elliot E Myers,Dena Elizabeth	05/10/2011 02:19 PM	GradSchool Approval



Division of Natural and Mathematical Sciences

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186 University Hall  
230 North Oval Mall  
Columbus, OH 43210

Phone (614) 292-8908  
Fax (614) 247-7498

May 10, 2011

Dena Myers  
Graduate School  
250 University Hall  
230 North Oval Mall  
Campus

Dear Dena:

It is a pleasure to forward to you the proposal for the doctoral program in Molecular Genetics under semesters. The Department has recently merged with Plant Cellular and Molecular Biology, and the faculty agreed to retain one doctoral program with several tracks. Some changes to the core courses have occurred, and the number of credit hours within the core and in electives has also been adjusted. In the absence of sequences the transition for a student beginning under quarters should be straightforward.

Beyond my own review of the documents, the proposal has been discussed by colleagues from other NMS units at a meeting on March 29, 2011. Feedback from these discussions has been incorporated in the proposal.

If you have any questions, I would be happy to address them.

Sincerely,

A handwritten signature in black ink, appearing to read "David Andereck".

David Andereck  
Professor of Physics  
Associate Dean of Natural and Mathematical Sciences, College of Arts and Sciences



Department of Molecular Genetics

984 Biological Sciences Building  
484 W 12<sup>th</sup> Ave  
Columbus, OH 43210  
Phone: (614) 292-8084  
Fax: (614) 292-4466  
www.osumolgen.org

To: Office of Academic Affairs

From: Anita Hopper, Chair, Department of Molecular Genetics

A handwritten signature in blue ink that reads "Anita K. Hopper".

Mark Seeger, Associate Chair, Department of Molecular Genetics

A handwritten signature in black ink that reads "Mark A. Seeger".

Date: March 13, 2011

Re: Semester Program Proposal for Molecular Genetics PhD Program

The Department of Molecular Genetics has the following programs that will be converted from quarters to semesters:

- 1) Undergraduate Molecular Genetics Major (BS)
- 2) Undergraduate Molecular Genetics Major with a Specialization in Plant Cellular and Molecular Biology (BS)
- 3) Undergraduate Molecular Genetics Minor
- 4) Undergraduate Plant Cellular and Molecular Biology Minor
- 5) Molecular Genetics MS
- 6) Molecular Genetics PhD

The subject of this proposal is the Molecular Genetics PhD.

The Molecular Genetics Curriculum Committee and other subsets of Molecular Genetics and Plant Cellular and Molecular Biology (PCMB) faculty have been working on semester conversion for the past year. This process has included a critical reexamination of the Molecular Genetics PhD Program, focusing on the core course sequence and tracks that reflect the specialization of the student within the field of molecular genetics. With the recent merger of the Departments of Molecular Genetics and PCMB, the PCMB PhD Program will not be available to new students starting Autumn 2011.

The contents of this proposal have been discussed at multiple faculty meetings during Spring Quarter 2010, Autumn Quarter 2010 and Winter 2011. Molecular Genetics and PCMB graduate students have representation at departmental faculty meetings and thus numerous opportunities

for input regarding the changes outlined in this proposal. The contents of the proposal were approved by unanimous vote (20-0) of the Molecular Genetics and PCMB faculty at the January 2011 faculty meeting. Transition plans are provided as a component of this proposal. Given the individualized nature of graduate student advising and the size of the graduate program (~ 50 PhD students), no additional resources are required during the transition to semesters.

**Rationale for Changes to the Molecular Genetics PhD Program**

The recently merged Departments of Molecular Genetics and Plant Cellular & Molecular Biology (PCMB) have decided to retain a single active PhD Program moving forward; this will be the Molecular Genetics PhD Program with some minor modifications. Modifications to the Molecular Genetics PhD Program include the creation of research tracks that reflect areas of strength within the newly merged department. These include: cell biology, developmental biology, plant cell and molecular biology, and RNA biology. Core course requirements are decreased slightly and elective course requirements within the individualized tracks modestly increased. These proposed modifications are described in greater detail in the following paragraph.

The unifying theme of the Molecular Genetics PhD Program is in the use of genetic model systems to address fundamental questions in biology. Our core course sequence emphasizes the use of model organisms to address questions in molecular, cellular, and developmental biology. With the merger of MG and PCMB and increased strengths in plant genetic model systems, we have made minor changes to the content of each of our core courses to ensure that they include a plant component or module. More noticeable changes to our core sequence with semester conversion include the merging of Mol Gen 701 DNA Transactions with Biochem 702 Gene Regulation into a new four-semester credit hour course (Mol Gen 701 DNA Transactions and Gene Regulation) that will be cross-listed with Biochemistry. Concomitant with this change, we are dropping MG 880.06 Transcriptional Regulation and MG 880.07 Post-Transcriptional Control from our required core course sequence. MG 880.06 was an MG specific alternative to Biochem 702 that covered similar topics but was limited to less than 20 students and utilized a seminar format for instruction. Both MG880.06 and 880.07 will now be available as elective options for students wanting enhanced exposure to these topic areas. These changes reduce the number of credit hours in our core course sequence from eighteen-quarter credit hours to eleven-semester credit hours. Previously students were required to complete two electives. With semester conversion we have increased this requirement to three elective classes. Electives will be chosen from a list approved for each track with input from the dissertation advisor. These lists are intentionally flexible so that the individual needs and interests of each PhD student can be met. Additional changes include the elimination of MG801 Research Opportunities in Molecular Genetics. This course introduced students to research opportunities in faculty member lab; this information is now provided as part new graduate student orientation before the start of Autumn term.

**Transition Policy**

No student will be negatively impacted or have their degree progress impeded by the quarter to semester conversion process. Our graduate curriculum does not include any multi-course sequences. Furthermore, graduate students complete their core course curriculum during their first year. No significant changes are anticipated in terms of course offerings with the start of semesters. Finally, advising of graduate students is already handled on an individual basis. No additional resources or personnel are required to advise students during the transition process.

## **Molecular Genetics PhD Program - Semesters**

The graduate program coursework is based upon a common set of core classes and clusters of electives appropriate for the individual track that a student may pursue (e.g. cell biology, developmental biology, plant cell and molecular biology, RNA biology). A set of prescribed core courses are taken during the first year. At least three electives are required of all students and will be completed by the end of the second year. Students will identify their dissertation research advisor following laboratory rotations and no later than the end of Spring Semester of the first year. The candidacy exam will be completed in either Spring or Summer Semester of the second year. Following successful completion of the candidacy exam, students will enroll for one credit hour of MG 7800 Molecular Genetics Seminar and two credit hours of MG 8999 Dissertation Research each Autumn and Spring Semester and three credit hours of MG 8999 Dissertation Research during Summer Semesters. While it is possible to complete the PhD by the end of the 4<sup>th</sup> year, most students will not complete their degree until the 5<sup>th</sup> year.

### **FIRST YEAR**

#### Autumn Semester:

1. MG 6700 Systems of Genetic Analysis (3 semester credit hours). Modules focused on fungal, invertebrate, vertebrate and plant model systems.
2. MG 6701 DNA Transactions and Gene Regulation (4 semester credit hours).
3. Successor to OSBP 760 First Year Student Orientation (1 semester credit hour)
4. MG 7780 Laboratory Rotations (6 semester credit hours)
5. MG 7800 Molecular Genetics Seminar (1 semester credit hours)

#### Spring Semester:

1. MG 6705 Advances in Cell Biology (2 semester credit hours)
2. MG 6715 Developmental Genetics (2 semester credit hours)
3. Elective 1 (2 to 5 semester credit hours)
4. MG 7780 Laboratory Rotations (6 semester credit hours)
5. MG 7800 Molecular Genetics Seminar (1 semester credit hour)

#### Summer Semester:

1. MG 8999 Dissertation Research (4 semester credit hours)

### **SECOND YEAR**

#### Autumn Semester:

1. Elective 2 (2 to 5 semester credit hours)
2. MG 7800 Molecular Genetics Seminar (1 semester credit hour)
3. MG 8999 Dissertation Research (6 to 9 semester credit hours)

Spring Semester:

1. Elective 3 (2 to 5 semester credit hours)
2. MG 7800 Molecular Genetics Seminar (1 semester credit hour)
3. MG 8999 Dissertation Research (6 to 9 semester credit hours)

Summer Semester:

1. MG 8999 Dissertation Research (3 to 4 semester credit hours)

**Electives**

Cell Biology

- MG 6623 Genetics and Genomics (2)
- MG 6725 Circadian Biology (2) (not offered every year)
- MG 6796 Current Topics in Signal Transduction (2)
- MG 7802 Advanced Topics in Cell Biology (2)
- MG 7806 Transcriptional Regulation (2)
- MG 7807 Post-Transcriptional Control (3)

Other electives may be substituted with permission of advisor.

Developmental Biology

- MG 6623 Genetics and Genomics (2)
- MG 6725 Circadian Biology (2) (not offered every year)
- MG 6796 Current Topics in Signal Transduction (2)
- MG 7801 Advanced Topics in Developmental Genetics (2)
- MG 7806 Transcriptional Regulation (2)
- MG 7807 Post-Transcriptional Control (3)
- Successor to Neuroscience 790 Developmental Neurobiology (2) (not offered every year)

Other electives may be substituted with permission of advisor.

Plant Cell and Molecular Biology

- MG 5643 Plant Anatomy (3)
- MG 6625 Plant Metabolic Engineering (2) (not offered every year)
- MG 6623 Genetics and Genomics (2)
- MG 6630 Plant Physiology (3)
- MG 6725 Circadian Biology (2) (not offered every year)
- MG 6735 Plant Biochemistry (3)
- MG 6741 Reproductive Biology of Flowering Plants (2)

Other electives may be substituted with permission of advisor.

RNA Biology

- MG 6623 Genetics and Genomics (2)



MG 6770 Molecular Biology of Animal and Plant Viruses (4)  
MG 7806 Transcriptional Regulation (2)  
MG 7807 Post-Transcriptional Control (3)  
Successor to Biochem 761 Advanced Biochemistry: Proteins (2)  
Successor to Biochem 766 Advanced Biochemistry: Nucleic Acids (2)

Other electives may be substituted with permission of advisor.

## Quarter-Based Requirements for the Molecular Genetics PhD

### First Year Students:

#### Autumn Quarter:

- Molecular Genetics 700 - Systems of Genetic Analysis [3 hrs]
- Molecular Genetics 701 - Molecular Genetics: DNA Transactions [3hrs]
- Molecular Genetics 800- Seminar Program [1hr]
- Molecular Genetics 801- Research Topics (Faculty Research Opportunities) [1 hr]
- Molecular Genetics 804 - Lab Rotation [3 hrs]

#### Winter Quarter:

- Molecular Genetics 705 - Advances in Cell Biology [3 hrs]
- Molecular Genetics 880.06 -Gene Expression: Transcriptional Control [3 hrs]
- Molecular Genetics 800- Seminar Program [1 hr]
- Molecular Genetics 804 - Lab Rotations [3 hrs]

#### Spring Quarter:

- Molecular Genetics 715 - Eukaryotic Developmental Genetics [3 hrs]
- Molecular Genetics 880.07 -Gene Expression: Post-Transcriptional Control [3 hrs]
- Molecular Genetics 800- Seminar Program [1 hr]
- Molecular Genetics 804 (Lab Rotations) [3 hrs]

#### Summer Quarter:

- Molecular Genetics 999 [5 hrs, 14 hrs for Fellowship]
- Molecular Genetics 795 (Lab Group Meeting) [2 hr]

### Second Year Students:

#### Autumn Quarter:

- Elective Course [3 hrs]
- Molecular Genetics 800- Seminar Program [1hr]
- Molecular Genetics 999 [3-4 hrs]
- Molecular Genetics 795 (Lab Group Meeting) [2 hr]

#### Winter Quarter:

- Elective Course [3 hrs]
- Molecular Genetics 800- Seminar Program [1hr]
- Molecular Genetics 999 [3-4 hrs]
- Molecular Genetics 795 (Lab Group Meeting) [2 hr]

#### Spring Quarter:

- Molecular Genetics 800- Seminar Program [1hr]
- Molecular Genetics 999 [6-7hrs]
- Molecular Genetics 795 (Lab Group Meeting) [2 hr]

#### Summer Quarter:

- Molecular Genetics 999 [5-8 hrs]
- Molecular Genetics 795 (Lab Group Meeting) [2 hr]

## Course Listing and Curriculum Map for the Molecular Genetics PhD

### Core Requirements within Department

Semester Course Number	Course Title	Semester Credit Hours	Quarter Equivalent Course Number	Quarter Credit Hours	Notes
Mol Gen 6700	Systems of Genetic Analysis	3	Mol Gen 700	3	Enhanced content
Mol Gen 6701	DNA Transactions and Gene Regulation	4	Mol Gen 701 and Biochem 702	3 + 3	Merged content
Mol Gen 6705	Advances in Cell Biology	2	Mol Gen 705	3	7 week course; same content
Mol Gen 6715	Developmental Genetics	2	Mol Gen 715	3	7 week course; same content
Mol Gen 7780	Molecular Genetics Laboratory Rotations	4-6 (4 semester credit hours used for a Summer offering)	Molecular Genetics Laboratory Rotations	3	Credit hours increased to accurately reflect the time and effort dedicated to laboratory rotations. Repeatable to a maximum of 16 semester credit hours.
Mol Gen 7800	Molecular Genetics	1	Mol Gen 800	1-3	Same content. Repeatable. This course is graded S/U.

	Seminar			
Mol Gen 8999	Dissertation Research	1-12	Mol Gen 999	1-18 No change. Repeatable. This course is graded S/U.

**Core Courses from Outside the Department**

Semester Course Number	Course Title	Semester Credit Hours	Quarter Equivalent Course Number	Quarter Credit Hours	Notes
Successor to OSPB 760	First Year Student Orientation	1	OSBP 760	1	This course covers ethics, responsible conduct of research and other related issues in graduate education.

**Elective Courses Within the Department**

Semester Course Number	Course Title	Semester Credit Hours	Quarter Equivalent Course Number	Quarter Credit Hours	Notes
Mol Gen 5643	Plant Anatomy	3	PCMB 643	5	Same content
Mol Gen 6623	Genetics and Genomics	2	PCMB 623	4	Slight reduction in content
Mol Gen 6625	Plant Metabolic Engineering	2	PCMB 625	3	Same content
Mol Gen 6630	Plant Physiology	3	PCMB 630 and 631	3 + 3	Merging of 630 and 631 with reduction in content

Mol Gen 6725	Circadian Biology	2	PCMB 725	3	Same content
Mol Gen 6733	Human Genetics	2	Mol Gen 733	3	Same content
Mol Gen 6735	Plant Biochemistry	3	PCMB 735 and 736	3 + 3	Merging of 735 and 736 with reduction in content
Mol Gen 6741	Reproductive Biology of Flowering Plants	2	PCMB 741	3	Same content
Mol Gen 6770	Molecular Biology of Animal and Plant Viruses	4	Mol Gen 770	3	Enhanced content; this class will have merged content from Mol Gen 770, MVIMG/VBS 754 and MVIMG/VBS 841
Mol Gen 6795	Special Topics in Molecular Genetics	1-3	Mol Gen 795 or PCMB 795	1-3	Repeatable; not more than 3 semester credit hours can count towards the degree
Mol Gen 6796	Current Topics in Signal Transduction	2	PCMB 796	3	Same content
Mol Gen 7801	Advanced Topics in Developmental Genetics	2	Mol Gen 880.01	1-3	Same content
Mol Gen 7802	Advanced Topics in Cell Biology	2	Mol Gen 880.02	1-3	Same content
Mol Gen 7806	Transcriptional Regulation	2	Mol Gen 880.06	1-3	Same content
Mol Gen 7807	Post-Transcriptional	3	Mol Gen 880.07	3	Expanded content.

	Control				
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**Elective Courses From Outside the Department**

Semester Course Number	Course Title	Semester Credit Hours	Quarter Equivalent Course Number	Quarter Credit Hours	Notes
Successor to Biochem 761	Advanced Biochemistry: Proteins	2	Biochem 761	3	Direct conversion
Successor to Biochem 766	Advanced Biochemistry: Nucleic Acids	2	Biochem 766	3	Direct conversion
Successor to Neuroscience 790	Developmental Neurobiology	2	Neuroscience 790	3	Direct conversion

**Molecular Genetics PhD Program  
Sample Semester Program**

<b>Year 1</b>					
<b>Autumn:</b>		<b>Spring:</b>		<b>Summer:</b>	
MG 6700	3	MG 6705	2	MG 8999	4
MG 6701	4	MG 6715	2		
MG 7780	6	MG 7780	6		
MG 7800	1	MG 7800	1		
OSBP 760		Elective #1	2-5		
Successor	1				
<b>Sem Total</b>	<b>15</b>	<b>Sem Total</b>	<b>13-16</b>	<b>Sem Total</b>	<b>4</b>
<b>Year 2</b>					
<b>Autumn:</b>		<b>Spring:</b>		<b>Summer:</b>	
Elective #2	2-5	Elective #3	2-5	MG 8999	3-4
MG 7800	1	MG 7800	1		
MG 8999	8-11	MG 8999	8-11		
<b>Sem Total</b>	<b>14</b>	<b>Sem Total</b>	<b>14</b>	<b>Sem Total</b>	<b>3-4</b>
<b>Year 3</b>					
<b>Autumn:</b>		<b>Spring:</b>		<b>Summer:</b>	
MG 7800	1	MG 7800	1	MG 8999	3
MG 8999	2	MG 8999	2		
<b>Sem Total</b>	<b>3</b>	<b>Sem Total</b>	<b>3</b>	<b>Sem Total</b>	<b>3</b>
<b>Year 4</b>					
<b>Autumn:</b>		<b>Spring:</b>		<b>Summer:</b>	
MG 7800	1	MG 7800	1	MG 8999	3
MG 8999	2	MG 8999	2		
<b>Sem Total</b>	<b>3</b>	<b>Sem Total</b>	<b>3</b>	<b>Sem Total</b>	<b>3</b>
<b>GRAND TOTAL:</b>		<b>81 Semester Credit Hours</b>			