Fiscal Unit/Academic Org	Molecular Genetics - D0340
Administering College/Academic Group	Biological Sciences
Co-adminstering College/Academic Group	
Semester Conversion Designation	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)
Current Program/Plan Name	Molecular Genetics
Proposed Program/Plan Name	Molecular Genetics
Program/Plan Code Abbreviation	MOLGEN-BS
Current Degree Title	Bachelor of Science

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		40	26.7	30	3.3
Required credit hours offered by the unit	Minimum	19	12.7	17	4.3
	Maximum	35	23.3	26	2.7
Required credit hours offered outside of the unit	Minimum	5	3.3	4	0.7
	Maximum	21	14.0	13	1.0
Required prerequisite credit hours not included above	Minimum	67	44.7	50	5.3
	Maximum	69	46.0	52	6.0

Explain any change in credit hours if the difference is more than 4 semester credit hours between the values listed in columns B and C for any row in the above table

We have made slight changes to our required core sequence.

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

- 1. Undergraduate Molecular Genetics majors acquire a basic mastery of fundamental concepts of biology, chemistry, mathematics, physics, and the scientific method.
- 2. Undergraduate majors acquire a basic mastery of molecular genetics, including transmission genetics, central dogma, regulation of gene expression, quantitative and population genetics, genomics, recombinant DNA, and cell and developmental biology.
- 3. Undergraduate Molecular Genetics majors develop analytical and problem solving skills in areas of genetics and molecular biology.
- 4. Undergraduate Molecular Genetics majors acquire a basic mastery of experimental techniques and approaches in genetics and molecular biology.
- 5. Undergraduate Molecular Genetics majors acquire a basic mastery of data analysis and statistical approaches used in genetics.
- 6. Undergraduate Molecular Genetics majors effectively communicate their understanding of genetics and molecular biology both orally and in writing.
- 7. Undergraduates majors participate in academic research and/or outreach activities that are consistent with their interests and postgraduate plans.
- 8. Undergraduate majors acquire expertise relevant to their chosen area of specialization.

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? Yes

Summarize how the program's current quarter-based assessment practices will be modified, if necessary, to fit the semester calendar.
We do not anticipate any required changes to our assessment practices as we transition to semesters.

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.

Program Specialization/Sub-Plan Name Plant Cell & Mol Biology (New)

Program Specialization/Sub-Plan Goals

- The Plant Cell & Mol Biology Specialization shares the first eight learning goals with the standard Moleculcar Genetics Major.
- 9. Undergraduate majors with a PCMB specialization acquire mastery of concepts and approaches fundamental and/or unique to plant biology.

Pre-Major

Does this Program have a Pre-Major? No

Attachments

- Molecular Genetics Undergraduate Major Semester Program Proposal.pdf: All requested documents.

(Program Proposal. Owner: Shannon,Laurel Jean)

Comments

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Shannon,Laurel Jean	11/29/2010 01:29 PM	Submitted for Approval
Approved	Vaessin,Harald Emil Friedrich	11/29/2010 04:50 PM	Unit Approval
Pending Approval	Andereck,Claude David	11/29/2010 04:50 PM	College Approval

THE OHIO STATE UNIVERSITY

Department of Molecular Genetics

984 Biological Sciences Building
484 W 12th 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

Mark Seeger, Associate Chair, Department of Molecular Genetics

Date: November 26, 2010

Re: Semester Program Proposal for Undergraduate Molecular Genetics Major

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 undergraduate majors and minors; the other programs (MS and PhD) will be addressed in a separate proposal.

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 Major and Minor, focusing on the core course sequence. In addition, we have created a new Plant Cellular and Molecular Biology Specialization within the Molecular Genetics Major that will meet the needs of undergraduates desiring a plant biology focus to their major. With the imminent merger of the Departments of Molecular Genetics and PCMB, the PCMB Undergraduate Major will become unavailable to new students starting Autumn 2012.

The contents of this proposal have been discussed at multiple faculty meetings during Spring Quarter 2010 and extending into Autumn Quarter 2010. Proposed changes to the major were presented to Molecular Genetics undergraduates at the first Autumn Meeting of the Molecular

Genetics Undergraduate Student Organization where strong support for the changes outlined in this proposal was voiced. Since Molecular Genetics and PCMB graduate students have representation at departmental faculty meeting, they've had a clear opportunity to contribute to this proposal. The contents of the proposal were approved by unanimous vote of the Molecular Genetics and PCMB faculty at the November 2010 faculty meeting. Transition plans are provided as a component of this proposal. The department has a plan in place and adequate resources to meet the increased advising that is anticipated throughout the semester conversion process.

Rationale for Changes to the Undergraduate Molecular Genetics Major Program

There are three changes to the Molecular Genetics Undergraduate Major as we transition to semesters. All of these changes impact our core sequence of classes required for all majors. First, we are merging MG 605 Molecular Genetics I (4 quarter hours) and MG 606 Molecular Genetics II (4 quarter hours) into a single class, MG 5606 Molecular Genetics (4 semester hours). Traditionally, most students have taken their first MG classes starting Winter Quarter of their junior year. In semesters students will take their first MG class their sophomore year. This will allow students to complete the core sequence their junior year and free up their senior year for upper level electives within the major. This change is a significant improvement to our major and strongly endorsed by our undergraduates. To keep MG 5606 as a four-semester hour course we are moving some content to MG 5607 Cell Biology (3 semester hours) and MG 5608 Genes and Development (3 semester hours). The quarter system counterparts, MG 607 and MG 608, were both three quarter hour classes. The second change is the addition of MG 5640 Evolutionary Genetics (3 semester hours) as a required core course for Molecular Genetics Majors. We feel the increased exposure to population and quantitative genetics is important for our majors. The relatively limited exposure to topics in population and quantitative genetics that our students previously had in MG 605 will be moved to MG 5640 and significantly expanded. The third change is the creation of two Embedded Honors Courses, M 5607E and MG 5608E. Both of these classes will include an additional one-hour, faculty-directed recitation section that will delve deeper into lecture topics through the use of additional primary literature research articles. A high proportion of our majors are in the Honor's Program, and these high achieving students will welcome the addition of a second honors option. Currently we offer a stand-alone honors version of MG 607.

Rationale for Creation of the Plant Cellular and Molecular Biology (PCMB) Specialization within the Molecular Genetics Major

The imminent merger of the Molecular Genetics Department with the Department of Plant Cell and Molecular Biology was driven in part by the small number of PCMB Undergraduate Majors. To continue to offer a plant intensive option for students seeking such an educational experience, we have created a Plant Cellular and Molecular Biology Specialization within the Molecular Genetics Major. Traditional Molecular Genetics Majors and those seeking the PCMB Specialization will share foundational coursework in genetics, molecular, cell and developmental biology. All of these common core courses will utilize examples from plants as well as other genetic model systems, including fungal, invertebrate and vertebrate organisms. Courses unique to the PCMB specialization will include two core courses: MG 3300 General Plant Biology and MG 3436 Introductory Plant Physiology. MG 5640 Evolutionary Genetics will not be a required core course for the PCMB Specialization, but will be an optional elective. All other electives will be from courses with a plant specific focus. The PCMB Specialization will be remarkably similar to the previous PCMB Undergraduate Major with the difference that foundational topics in genetics, molecular, cell and developmental biology will be taught from a broader perspective and will not have a unique focus on plants. These changes ensure that we have the faculty to teach the important courses that require a plant specific focus.

Transition Policy

Students who begin their degree under quarters will not be penalized as we move to semesters. Our major is not dependent upon specific sequences of courses. With the exception of the merging of MG 605 and MG 606 into MG 5606, most courses will continue to exist with similar content. Essentially all students take MG 605 (offered in Winter Quarter) and MG 606 (offered in Spring Quarter) in consecutive quarters, so the students who have completed only one of these courses will be quite limited in number (past experience suggests this will be less than 5 students). These students will be advised on an individual basis to determine the best course of action with specific consideration to their performance in the course and at the same time minimizing any delay in their progress to degree completion. For students who fail to complete MG 606 an individual study plan will be developed tailored to the specific needs of the student. This will include utilization of MG 5193 Individual Studies to substitute for MG 606.

We will provide quarterly updates to all of our undergraduate majors via email in the year preceding the semester conversion. These emails will communicate the importance of ensuring that major prerequisite course sequences in chemistry, math, and physics be completed to ensure a smooth transition to semesters. All remaining PCMB Undergraduate Majors will be advised on an individual basis as to the sequence of courses that should be taken to complete their undergraduate major. As noted earlier, the number of these PCMB Undergraduate Majors is not large. We do not foresee any significant difficulties in the transition process that are unique to our undergraduate major or minor programs.

Course Listing and Curriculum Map for the Molecular Genetics BS Major

Required prerequisites for the major

(do not count towards hours in the major)

Requirements	Semester Course Number	Course Title	Semester Credits		Quarter Equivalent Course Number	Quarter Credits	Notes	Program Goals
Biology	Bio 1113	Intro Biology	4		Bio 113	5		1, 2, 3, 4, 5
	Bio 1114	Intro Biology	4		Bio 114	5		1, 2, 3, 4, 5
Chemistry	Successors to Chem 121, 122, 123	General Chemistry I & II	10		Chem 121, 122, 123	15		1, 3
	Successors to Chem 251, 252, 253	Organic Chemistry I & II	8 (or as determined by the Dept of Chemistry)		Chem 251, 252	8		1, 3
	Successors to Chem 245, 246	Organic Chemistry Lab I & II	4 (or as determined by the Dept of Chemistry)		Chem 245, 246	4	Chem 254 and 255 also accepted	1, 3, 5
Math	Math 1150	Pre-Calculus	5		Math 150	5		1, 3, 5

	Math 1156 -----OR----- Math 1151	Calculus for Biological Sciences -----OR----- Calculus	5 -----OR----- 5		Math 151, 152	10		1, 3, 5
Physics	Physics 1200, 1201 -----OR----- 1250, 1251	General Physics -----OR----- Physics	10 -----OR----- 10		Physics 111, 112, 113	15		1, 3, 5

Core major requirements in the department

Semester Course Number	Course Title	Semester Credits		Quarter Equivalent Course Number	Quarter Credits	Notes	Program Goals
Mol Gen 5606	Molecular Genetics	4		Mol Gen 605, 606	8	Merged content of MG605 and 606; some content moved to MG 5608 (eukaryotic gene regulation); population and quantitative genetics removed and met by addition of MG 5640 to the core	1*, 2*, 3*, 4*, 5*

Mol Gen 5607 -----OR------ Mol Gen 5607E	Cell Biology ------OR------ Honors Cell Biology	3 ----OR----- 4		Mol Gen 607 and PCMB 648	3 4	Merged content of Mol Gen 607 and PCMB 648 with elimination of redundant subject matter ----------OR---------- Embedded Honor's version includes an extra 55-min recitation with instructor	1*, 2*, 3*, 4*, 5*
Mol Gen 5608 -----OR------ Mol Gen 5608E	Genes and Development -----OR------ Honors Genes and Development	3 ----OR----- 4		Mol Gen 608	3	Enhanced content and addition of material previously taught in MG 605, 606 ----------OR---------- Embedded Honor's version includes an extra 55-min recitation with instructor	1*, 2*, 3*, 4*, 5*
Mol Gen 5640	Genetic Basis of Evolution	3		Mol Gen 640	5	This course was previously not part of the core	1*, 2*, 3*, 4*, 5*
Mol Gen 5601 -----OR------ Mol Gen 5602	Molecular Genetics Lab -------OR-------- Cell and Developmental Biology Lab	3-4 -----OR---- 3-4		Mol Gen 601 ----------OR---------- Mol Gen 602	5 ---OR--- 5	Enhanced content for both Mol Gen 5601 or 5602; 3 semester hour version limited to May-mester offerings	2*, 3*, 4*, 5*, 6*, 7* ----OR---- 2*, 3*, 4*, 5*, 6*, 7*

Core major requirements outside the department

Semester Course Number	Course Title	Semester Credits		Quarter Equivalent Course Number	Quarter Credits	Notes	Program Goals
Biochem 4511 ----OR----- Biochem 5613 AND Biochem 5613	Biochemistry -------OR-------- Biochemistry and Molecular Biology	4 ----OR---- 3 AND 3		Biochem 511 ----------OR---------- Biochem 613 AND Biochem 614	5 ---OR--- 4 AND 4		1*, 2*, 3*, 4*, 5*

Elective Course in Molecular Genetics that count towards the major

Semester Course Number	Course Title	Sem Credits		Quarter Equivalent Course Number	Quarter Credits	Notes	Program Goals
Mol Gen 2220H	Intro to Molecular Life Sciences: Research Opportunities	1		Mol Gen 220H	1	Expanded content.	1, 2

	and Career Options						
Mol Gen 4503	Molecular Genetics Writing Project	1		Mol Gen 503	2	Same content	6**, 7**, 8**
Mol Gen 4591S	DNA Fingerprinting Workshops in Columbus Public Schools	1		Mol Gen 591	2	Same content	6**, 7**
Mol Gen 5193	Individual Studies	1-3		Mol Gen 693 and PCMB 693	1-10	Repeatable; not more than 3 semester hours can count towards a major	6**, 7**, 8**
Mol Gen 5194	Group Studies	1-3		PCMB 694	1-5	Repeatable; not more than 3 semester hours can count towards a major	2**, 8**
Mol Gen 5632	Insect Molecular Genetics	2		Mol Gen 632	3	Same content	2**,8*
Mol Gen 5643	Plant Anatomy	3		PCMB 643	5	Same content	2**, 8**
Mol Gen 5650	Analysis and Interpretation of Biological Data	3		Mol Gen 650	5	Same content	3**, 5**
Mol Gen 5797	Study at a Foreign Institution	1-15		PCMB 698.02	1-15	Not more than 3 semester hours of either 5797 or 5798 can counts towards the major	6*, 7*, 8*
Mol Gen 5798	Study Tour: Domestic	1-15		PCMB 698.01	1-15	Not more than 3 semester hours of either 5797 or 5798 can counts towards the major	6*, 7*, 8*

Mol Gen 5998	Undergraduate Research in Molecular Genetics	1-5		Mol Gen 699	1-18	Repeatable; not more than 4 credit hours can count towards the major	3**, 4**, 5**, 6**, 7**, 8**
Mol Gen 6623	Genetics and Genomics	3		PCMB 623	4	Enhanced content	2**,3**, 4**, 8**

Mol Gen 6625	Plant Metabolic Engineering	2		PCMB 625	3	Same content	2**, 3*, 4**, 8**
Mol Gen 6631	Plant Physiology	3		PCMB 630 and 631	3 + 3	Merging of 630 and 631 with reduction in content	2**, 3**, 4**, 8**
Mol Gen 6700	Systems of Genetic Analysis	3		Mol Gen 700	3	Enhanced content	2**, 3**, 4**, 8**
Mol Gen 6701	DNA Transactions and Gene Regulation	4		Mol Gen 701 and Biochem 702	3 + 3	Merged content	2**, 3**, 4**, 8**
Mol Gen 6705	Advances in Cell Biology	2		Mol Gen 705	3	7 week course; same content	2**, 3**, 4**, 8**
Mol Gen 6715	Developmental Genetics	2		Mol Gen 715	3	7 week course; same content	2**, 3**, 4**, 8**
Mol Gen 6725	Circadian Biology	2		PCMB 725	3	Same content	2**, 3**, 4**, 8**
Mol Gen 6733	Human Genetics	2		Mol Gen 733	3	Same content	2**, 3**, 4**, 8**
Mol Gen 6735	Plant Biochemistry	3		PCMB 735 and 736	3 + 3	Merging of 735 and 736 with reduction in content	2**, 3**, 4**, 8**
Mol Gen 6741	Reproductive Biology of Flowering Plants	2		PCMB 741	3	Same content	2**, 3**, 4**, 8**

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	2**, 3**, 4**, 8**
Mol Gen 6795	Special Topics in Molecular Genetics	1-3		Mol Gen 795 or PCMB 795	1-3	Repeatable; not more than 3 semester hours can count towards the major	2**, 3**, 4**, 8**
Mol Gen 6796	Current Topics in Signal Transduction	2		PCMB 796	3	Same content	2**, 3**, 4**, 8**

1. Undergraduate Molecular Genetics majors acquire a basic mastery of fundamental concepts of biology, chemistry, mathematics, physics, and the scientific method.

2. Undergraduate Molecular Genetics majors acquire a basic mastery of fundamental areas of molecular genetics, including transmission genetics, the central dogma of molecular biology, regulation of gene expression, quantitative and population genetics, genomics, recombinant DNA and biotechnology, and cell and developmental biology.

3. Undergraduate Molecular Genetics majors develop analytical and problem solving skills in areas of genetics and molecular biology.

4. Undergraduate Molecular Genetics majors acquire a basic mastery of experimental techniques and approaches in genetics and molecular biology.

5. Undergraduate Molecular Genetics majors acquire a basic mastery of data analysis and statistical approaches used in genetics.

6. Undergraduate Molecular Genetics majors effectively communicate their understanding of genetics and molecular biology both orally and in writing.

7. Undergraduates majors participate in academic research and/or outreach activities that are consistent with their interests and postgraduate plans.

8. Undergraduate majors acquire expertise relevant to their chosen area of specialization.

Program learning goals with no asterisk = beginner's level; * = intermediate level; ** = advanced level

Course Listing and Curriculum Map for the Molecular Genetics BS Major

With Specialization in PCMB

Required prerequisites for the major

(do not count towards hours in the major)

Requirements	Semester Course Number	Course Title	Semester Credits		Quarter Equivalent Course Number	Quarter Credits	Notes	Program Goals
Biology	Bio 1113	Intro Biology	4		Bio 113	5		1, 2, 3, 4, 5
	Bio 1114	Intro Biology	4		Bio 114	5		1, 2, 3, 4, 5
Chemistry	Successors to Chem 121, 122, 123	General Chemistry I & II	10		Chem 121, 122, 123	15		1, 3
	Successors to Chem 251, 252, 253	Organic Chemistry I & II	8 (or as determined by the Dept of Chemistry)		Chem 251, 252	8		1, 3
	Successors to Chem 245, 246	Organic Chemistry Lab I & II	4 (or as determined by the Dept of Chemistry)		Chem 245, 246	4	Chem 254 and 255 also accepted	1, 3, 5
Math	Math 1150	Pre-Calculus	5		Math 150	5		1, 3, 5

	Math 1156 -----OR----- Math 1151	Calculus for Biological Sciences -----OR----- Calculus	5 -----OR----- 5		Math 151, 152	10		1, 3, 5
Physics	Physics 1200, 1201 -----OR----- 1250, 1251	General Physics -----OR----- Physics	10 -----OR----- 10		Physics 111, 112, 113	15		1, 3, 5

Core major requirements in the department

Semester Course Number	Course Title	Semester Credits		Quarter Equivalent Course Number	Quarter Credits	Notes	Program Goals
Mol Gen 5606	Molecular Genetics	4		Mol Gen 605, 606	8	Merged content of MG605 and 606; some content moved to MG 5608 (eukaryotic gene regulation); population and quantitative genetics removed and met by addition of MG 5640 to the core	1*, 2*, 3*, 4*, 5*

Mol Gen 5607 -----OR------ Mol Gen 5607E	Cell Biology ------OR------ Honors Cell Biology	3 ----OR----- 4		Mol Gen 607 and PCMB 648	3 4	Merged content of Mol Gen 607 and PCMB 648 with elimination of redundant subject matter ----------OR---------- Embedded Honor's version includes an extra 55-min recitation with instructor	1*, 2*, 3*, 4*, 5*
Mol Gen 5608 -----OR------ Mol Gen 5608E	Genes and Development -----OR------ Honors Genes and Development	3 ----OR----- 4		Mol Gen 608	3	Enhanced content and addition of material previously taught in MG 605, 606 ----------OR---------- Embedded Honor's version includes an extra 55-min recitation with instructor	1*, 2*, 3*, 4*, 5*
Mol Gen 3300	General Plant Biology	3		PCMB 300	5	Same content	1*, 2*, 9*
Mol Gen 3436	Introductory Plant Physiology	3		PCMB 436	5	Same content	1*, 2*, 9*

Core major requirements outside the department

Semester Course Number	Course Title	Semester Credits		Quarter Equivalent Course Number	Quarter Credits	Notes	Program Goals
Biochem 4511 ----OR----- Biochem 5613 AND Biochem 5613	Biochemistry -------OR-------- Biochemistry and Molecular Biology	4 ----OR---- 3 AND 3		Biochem 511 ----------OR---------- Biochem 613 AND Biochem 614	5 ---OR--- 4 AND 4		1*, 2*, 3*, 4*, 5*

Elective Course in Molecular Genetics that count towards the major

Semester Course Number	Course Title	Sem Credits		Quarter Equivalent Course Number	Quarter Credits	Notes	Program Goals
Mol Gen 5601 -----OR------ Mol Gen 5602	Molecular Genetics Lab -------OR-------- Cell and Developmental	3-4 -----OR-- -- 3-4		Mol Gen 601 ----------OR---------- Mol Gen 602	5 ---OR--- 5	Enhanced content for both Mol Gen 5601 or 5602; 3 semester hour version limited to May-mester offerings; lab must have a	2*, 3*, 4*, 5*, 6*, 7*, 9* ----OR---- 2*, 3*, 4*,

	Biology Lab					plant module to count towards the PCMB specialization	5*, 6*, 7*, 9*
Mol Gen 4503	Molecular Genetics Writing Project	1		Mol Gen 503	2	Must be on a plant topic to count towards the PCMB specialization	6**, 7**, 8**, 9*
Mol Gen 5193	Individual Studies	1-3		Mol Gen 693 and PCMB 693	1-10	Repeatable; not more than 3 semester hours can count towards a major; must be on a plant topic to count towards the PCMB specialization	6**, 7**, 8**, 9**
Mol Gen 5194	Group Studies	1-3		PCMB 694	1-5	Repeatable; not more than 3 semester hours can count towards a major; must be on a plant topic to count towards the PCMB specialization	2**, 8**, 9**
Mol Gen 5640	Genetic Basis of Evolution	3		Mol Gen 640	5	Same content	1*, 2*, 3*, 4*, 5*
Mol Gen 5643	Plant Anatomy	3		PCMB 643	5	Same content	2**, 8**, 9**
Mol Gen 5797	Study at a Foreign Institution	1-15		PCMB 698.02	1-15	Not more than 3 semester hours of either 5797 or 5798 can counts towards the major; must have a plant focus to count towards the PCMB specialization;	6**, 7**, 8**, 9**

Mol Gen 5798	Study Tour: Domestic	1-15		PCMB 698.01	1-15	Not more than 3 semester hours of either 5797 or 5798 can counts towards the major must have a plant focus to count towards the PCMB specialization	6**, 7**, 8**, 9**
Mol Gen 5998	Undergraduate Research in Molecular Genetics	1-5		Mol Gen 699	1-18	Repeatable; not more than 4 credit hours can count towards the major; must be on a plant topic to count towards the PCMB specialization	3**, 4**, 5**, 6**, 7**, 8**, 9**

Mol Gen 6625	Plant Metabolic Engineering	2		PCMB 625	3	Same content	2**, 3**, 4**, 8**, 9**
Mol Gen 6631	Plant Physiology	3		PCMB 630 and 631	3 + 3	Merging of 630 and 631 with reduction in content	2**, 3**, 4**, 8**, 9**
Mol Gen 6735	Plant Biochemistry	3		PCMB 735 and 736	3 + 3	Merging of 735 and 736 with reduction in content	2**, 3**, 4**, 8*,* 9**
Mol Gen 6741	Reproductive Biology of Flowering Plants	2		PCMB 741	3	Same content	2**, 3**, 4**, 8**, 9**
Mol Gen 6795	Special Topics in Molecular Genetics	1-3		Mol Gen 795 or PCMB 795	1-3	Repeatable; not more than 3 semester hours can count towards the major; must be	2**, 3**, 4**, 8**, 9**

6. Undergraduate Molecular Genetics majors effectively communicate their understanding of genetics and molecular biology both orally and in writing.

7. Undergraduates majors participate in academic research and/or outreach activities that are consistent with their interests and postgraduate plans.

8. Undergraduate majors acquire expertise relevant to their chosen area of specialization.

9. Undergraduate majors with a PCMB specialization acquire mastery of concepts and approaches fundamental and/or unique to plant biology.

Program learning goals with no asterisk = beginner's level; * = intermediate level; ** = advanced level

MG Undergraduate Major

Part A. Required Prerequisites (do not count toward the 30 hour major)

Bio 1113 (1113H) (4 semester hours), 1114 (1114H) (4 semester hours)
Equivalent of Chem 121, 122, 123 [likely General Chemistry I (5) and General Chemistry II (5)]
Equivalent of Chem 251, 252, 245 or 254, 246 or 255 [likely Organic Chemistry I (4), Organic Chemistry II (4), Organic Chemistry Lab I (2), and Organic Chemistry Lab II (2)]
Math 1150 Pre-Calculus (5), 1156 Calculus for Biological Sciences (5) [recommended] or 1151 Calculus (5)
Physics 1200 (5) or 1250 (5), 1201 (5) or 1251 (5)

Part B. Core Requirements (the core comprises at least 21 credit hours of the 30 credit hour major):

1. Biochemistry 4511 (4 semester hours) or Biochemistry 5613 (3 semester hours, spring) and Biochemistry 5614 (3 semester hours, fall)
2. MG 5606 Molecular Genetics (4 semester hours, 3 x 1 hr lecture + 1 hr recitation; offered fall and spring).
3. MG 5607 Cell Biology (3 semester hours, 3 x 1 hr lecture). A 4 hr honors embedded version will also be offered (5607E). Offered fall.
4. MG 5608 Genes and Development (3 semester hours, 3 x 1 hr lecture). A 4 hr honors embedded version will also be offered (5608E). Offered spring.
5. MG 5640 Genetic Basis of Evolution (3 semester hours).
6. MG 5601 Molecular Genetics Lab (4 semester hours, 2 x 5 hr labs) or MG5602 Cell and Developmental Biology Lab (4 semester hours, 2 x 5 hr labs). Both lab courses will require either MG 5606 or MG 4500 as a prerequisite. MG majors may substitute 4 semester hours of MG 5998 Undergraduate Research for the MG laboratory requirement.

Part C. Electives (choose at least 3 electives from the following list; electives plus the core must total at least 30 credit hours):

MG 2220H Introduction to Molecular Life Sciences: Research Opportunities and Career Options (1 semester hour)
MG 4503 Molecular Genetics Writing Project (1 semester hour)
MG 4591S DNA Fingerprinting Workshop (1 semester hour)
MG 5194 Group Studies (1-3 semester hours)
MG 5632 Insect Molecular Genetics (2 semester hours; offered alt years)
MG 5643 Plant Anatomy (3 semester hours)
MG 5650 Analysis and Interpretation of Biological Data (3 semester hours)

MG 5998 Undergraduate Research (up to 4 hours can counts towards the 30 credit hour major requirement and can count as one of the three required electives if not used as a substitute for the MG lab requirement).

(Completion of the MG Core (MG 5606, 5607, 5608, and 5640) is a prerequisite for some 6000 level MG courses.)

MG 6623 Genetics and Genomics (2 semester hours)
MG 6625 Plant Metabolic Engineering (2 semester hours)
MG 6630 Plant Physiology (3 semester hours)
MG 6700 Systems of Genetic Analysis (3 semester hours)
MG 6701 DNA Transactions and Gene Regulation (4 semester hours)
MG 6705 Advances in Cell Biology (2 semester hours)
MG 6715 Developmental Genetics (2 semester hours)
MG 6725 Circadian Biology (2 semester hours)
MG 6733 Human Genetics (2 semester hours)
MG 6735 Plant Biochemistry (3 semester hours)
MG 6770 Molecular Biology of Animal and Plant Viruses (4? semester hours)
MG 6796 Current Topics in Signal Transduction (2 semester hours)

Biochem 4521 Introduction to Biological Chemistry Laboratory (4 semester hours)

Micro 5000 General Microbiology (5 semester hours)
Micro 5081 Microbial Genetics (3 semester hours)
Micro 5082 Molecular Microbiology Lab (3 semester hours)
Micro 5161H Bioinformatics and Molecular Microbiology (Microbial Genomes) (3 semester hours)
Micro 6080 Advanced Microbial Genetics (3 semester hours)

EEOB 4520 Comparative Physiology (4 semester hours)

Other elective courses may be substituted with permission of advisor.

MG Undergraduate Major with a Plant Cellular and Molecular Biology (PCMB) Specialization

Part A. Required Prerequisites (do not count toward the 30 hour major)

Bio 1113 (1113H) (4 semester hours), 1114 (1114H) (4 semester hours)
Equivalent of Chem 121, 122, 123 [likely General Chemistry I (5) and General Chemistry II (5)]
Equivalent of Chem 251, 252, 245 or 254, 246 or 255 [likely Organic Chemistry I (4), Organic Chemistry II (4), Organic Chemistry Lab I (2), and Organic Chemistry Lab II (2)]
Math 1150 Pre-Calculus (5), 1156 Calculus for Biological Sciences (5) [recommended] or 1151 Calculus (5)
Physics 1200 (5) or 1250 (5), 1201 (5) or 1251 (5)

Part B. Core Requirements (the core comprises at least 20 credit hours of the 30 credit hour major):

1. Biochemistry 511 (4 semester hours) or Biochemistry 613 (3 semester hours, spring) and Biochemistry 614 (3 semester hours, fall)
2. MG 5606 Molecular Genetics (4 semester hours, 3 x 1 hr lecture + 1 hr recitation; fall and spring).
3. MG 5607 Cell Biology (3 semester hours, 3 x 1 hr lecture). A 4 hr honors embedded version will also be offered (5607E).
4. MG 5608 Genes and Development (3 semester hours, 3 x 1 hr lecture). A 4 hr honors embedded version will also be offered (5608E).
5. MG 3300 General Plant Biology (3 semester hours)
6. MG 3436 Introductory Plant Physiology (3 semester hours)

Part C. Electives (choose at least 3 electives from the following list; electives plus the core must total at least 30 credit hours):

1. MG 5601 Eukaryotic Molecular Genetics Lab with a plant module or MG 5602 Cell and Developmental Biology Lab with a plant module (4 semester hours, 2 x 5 hr labs).
2. MG 5640 Evolutionary Genetics (3 semester hours)
3. MG 5643 Plant Anatomy (3 semester hours)
4. MG 6630 Plant Physiology (3 semester hours)
5. MG 6735 Plant Biochemistry (3 semester hours)
6. MG 6625 Plant Metabolic Engineering (2 semester hours)
7. MG 5998 (5998H) Undergraduate Research (in a plant lab). Up to 4 semester hours can count towards the PCMB specialization.
8. MG 4503 Molecular Genetics Writing Project (on a PCMB topic) (1 semester hour)
9. Plant Pathology 703(?) Agricultural Genomics: Principles and Applications (2? Semester hours)

Other elective courses may be substituted with permission of advisor.

Major Program Form

Colleges of the Arts and Sciences

Name_____ Major Molecular Genetics
Last First Middle

SSN_____ Degree Sought: BA ___ BS _X_ BAJur ___

Local Address_____ (Zip)_____

Phone: resident _____ Expected Date of Graduation_____
(Quarter and Year)

business _____ Email Address_____

Have you filed a degree application in the College of Arts and Sciences: ☐ Yes ☐ No
(Note: This form is **NOT** A degree application.)

If completing two majors, list both below and file a separate from for each one:

1) _____ 2) _____

Part A. Required Prerequisites (and/or supplementary requirements)

Courses	Hours	Grade	Courses	Hours	Grade
Biology 113, 114	**10**		**Chemistry**		
Chemistry 121,122,123	**15**		**Math 148,150,151,152**		
Chemistry 251,252			**Physics 111,112,113**	**15**	

Part B. Major Program (Minimum grade of "C-"required. Minimum gpa of "C" (2.00)
Core Requirements (Substitutions are rarely if ever permitted)

Courses	Hours	Grade	Courses	Hours	Grade
Biochemistry 511	**5**		**Molecular Genetics 608**	**3**	
Molecular Genetics 605	**4**		**Molecular Genetics 601**	**5**	
Molecular Genetics 606	**4**				
Molecular Genetics 607	**3**				

Additional Major Program Courses

Courses	Hours	Grade	Courses	Hours	Grade

Total of Part B only: _____

Check whether this is: ☐ original ☐ revision

See back for information about major programs
Distribution: One copy each – Faculty adviser
Student
College Office
130 Denney Hall

_____
Signature of faculty adviser

_____
Name of Faculty Adviser (Please Print)

Molecular Genetics 292-3472
Department Campus Phone

_____
Date

The Ohio State University
Form 9988 – /rev. 2/03

THE OHIO STATE UNIVERSITY

Major Program Form

Colleges of the Arts and Sciences

Name_____ Major **Molecular Genetics**
Last First Middle

SSN_____ Degree Sought: BA ___ BS _X_ BAJur ___

Local Address_____ (Zip)_____

Phone: resident _____ Expected Date of Graduation_____
(Quarter and Year)

business _____ Email Address_____

Have you filed a degree application in the College of Arts and Sciences: ☐ Yes ☐ No
(Note: This form is **NOT** A degree application.)

If completing two majors, list both below and file a separate from for each one:

1) _____ 2) _____

Part A. Required Prerequisites (and/or supplementary requirements)

Courses	Hours	Grade	Courses	Hours	Grade
Biology 1113, 1114	**8**		**Org Chemistry Lab I & II**	**4**	
Chemistry (121,122,123)	**10**		**Math 1150, 1156 or 1151**	**10**	
Org Chemistry Lect I & II	**8**		**Physics 1200, 1201**	**10**	

Part B. Major Program (Minimum grade of "C-"required. Minimum gpa of "C" (2.00)
Core Requirements (Substitutions are rarely if ever permitted)

Courses	Hours	Grade	Courses	Hours	Grade
Biochemistry 4511 (or 5613 and 5614)	**4**		**Molecular Genetics 5608**	**3**	
Molecular Genetics 5606	**4**		**Molecular Genetics 5640**	**4**	
Molecular Genetics 5607	**3**		**Molecular Genetics 5601 or 5602**		

Additional Major Program Courses

Courses	Hours	Grade	Courses	Hours	Grade

Total of Part B only: ____

Check whether this is: ☐ original ☐ revision

See back for information about major programs
Distribution: One copy each – Faculty adviser
Student
College Office
130 Denney Hall

_____
Signature of faculty adviser

_____
Name of Faculty Adviser (Please Print)

Molecular Genetics 292-3472
Department Campus Phone

_____
Date

THE OHIO STATE UNIVERSITY

Major Program Form

Colleges of the Arts and Sciences

Name_____ Major **Molecular Genetics with PCMB Specialization**
Last First Middle

SSN_____ Degree Sought: BA ___ BS _X_ BAJur ___

Local Address_____ (Zip)_____

Phone: resident _____ Expected Date of Graduation_____
(Quarter and Year)

business _____ Email Address_____

Have you filed a degree application in the College of Arts and Sciences: ☐ Yes ☐ No
(Note: This form is **NOT** A degree application.)

If completing two majors, list both below and file a separate from for each one:

1) _____ 2) _____

Part A. Required Prerequisites (and/or supplementary requirements)

Courses	Hours	Grade	Courses	Hours	Grade
Biology 1113, 1114	**8**		**Org Chemistry Lab I & II**	**4**	
Chemistry (121,122,123)	**10**		**Math 1150, 1156 or 1151**	**10**	
Org Chemistry Lect I & II	**8**		**Physics 1200, 1201**	**10**	

Part B. Major Program (Minimum grade of "C-"required. Minimum gpa of "C" (2.00)
Core Requirements (Substitutions are rarely if ever permitted)

Courses	Hours	Grade	Courses	Hours	Grade
Biochemistry 4511 (or 5613 and 5614)	**4**		**Molecular Genetics 5608**	**3**	
Molecular Genetics 5606	**4**		**Molecular Genetics 3300**	**3**	
Molecular Genetics 5607	**3**		**Molecular Genetics 3436**	**3**	

Additional Major Program Courses

Courses	Hours	Grade	Courses	Hours	Grade

Total of Part B only:

Check whether this is: ☐ original ☐ revision

See back for information about major programs
Distribution: One copy each – Faculty adviser
Student
College Office
130 Denney Hall

_____
Signature of faculty adviser

_____
Name of Faculty Adviser (Please Print)

Molecular Genetics 292-3472
Department Campus Phone

_____
Date

The Ohio State University
Form 9988 – /rev. 2/03

Molecular Genetics Undergraduate Major
Sample Semester Program

Year 1			
Autumn:		**Spring:**	
Biology 1113	4	Biology 1114	4
General Chemistry I	5	General Chemistry II	5
Math 1150	5	Math 1156	5
GEC/Free Electives	3	GEC/Free Electives	4
A&S Survey	1		
Semester Total	**18**	**Semester Total**	**18**

Year 2			
Autumn:		**Spring:**	
Mol Gen 5606	4	Physics II	5
Organic Chemistry I	4	Organic Chemistry II	4
Physics I	5	Organic Chemistry Lab I	2
GEC/Free Electives	5	GEC/Free Electives	7
Semester Total	**18**	**Semester Total**	**18**

Year 3			
Autumn:		**Spring:**	
Mol Gen 5607	3	Mol Gen 5608	3
Biochemistry 4511	4	Mol Gen 5640	3
Organic Chemistry Lab II	2	Mol Gen 5601 or 5602	4
GEC/Free Electives	9	GEC/Free Electives	8
Semester Total	**18**	**Semester Total**	**18**

Year 4			
Autumn:		**Spring:**	
Major Elective I	3	Major Elective III	3
Major Elective II	3	GEC/Free Electives	15
GEC/Free Electives	12		
Semester Total	**18**	**Semester Total**	**18**

Molecular Genetics Undergraduate Major
with PCMB Specialization
Sample Semester Program

Year 1			
Autumn:		**Spring:**	
Biology 1113	4	Biology 1114	4
General Chemistry I	5	General Chemistry II	5
Math 1150	5	Math 1156	5
GEC/Free Electives	3	GEC/Free Electives	4
A&S Survey	1		
Semester Total	**18**	**Semester Total**	**18**

Year 2			
Autumn:		**Spring:**	
Mol Gen 5606	4	Physics II	5
Organic Chemistry I	4	Organic Chemistry II	4
Physics I	5	Organic Chemistry Lab I	2
GEC/Free Electives	5	GEC/Free Electives	4
		Mol Gen 3300	3
Semester Total	**18**	**Semester Total**	**18**

Year 3			
Autumn:		**Spring:**	
Mol Gen 5607	3	Mol Gen 5608	3
Biochemistry 4511	4	Mol Gen 3436	3
Organic Chemistry Lab II	2	GEC/Free Electives	12
GEC/Free Electives	9		
Semester Total	**18**	**Semester Total**	**18**

Year 4			
Autumn:		**Spring:**	
Major Elective (PCMB) I	3	Major Elective (PCMB) III	3
Major Elective (PCMB) II	3	GEC/Free Electives	15
GEC/Free Electives	12		
Semester Total	**18**	**Semester Total**	**18**

Molecular Genetics Undergraduate Major
Sample Quarter Program

Year 1

Autumn:		Winter:		Spring:	
Chem 121	5	Chem 122	5	Chem 123	5
Math 150	5	Math 151	5	Math 152	5
GEC		Bio 113	5	Bio 114	5
				GEC	

Year 2

Autumn:		Winter		Spring:	
Chem 251	4	Chem 252	4	Chem 246	2
Physics 111	5	Physics 112	4	Physics 113	5
GEC		Chem 245	2	GEC	
GEC		GEC		GEC	

Year 3

Autumn:		Winter:		Spring:	
Biochem 511	5	Mol Gen 605	4	Mol Gen 606	4
GEC		GEC		Mol Gen 602	5
GEC		GEC		Elective	
				GEC	

Year 4

Autumn:		Winter:		Spring:	
Mol Gen 607	3	Mol Gen 608	3	Major Elective	
GEC		GEC		Major Elective	
Major Elective		Major Elective		Elective	
Elective		Elective			

Molecular Genetics Undergraduate Major
Sample Curriculum for Students Graduating 2013

Year 1

Autumn:		Winter:		Spring:	
Chem 121	5	Chem 122	5	Chem 123	5
Math 150	5	Math 151	5	Math 152	5
GEC		Bio 113	5	Bio 114	5
				GEC	

Year 2

Autumn:		Winter		Spring:	
Chem 251	4	Chem 252	4	Chem 246	2
Physics 111	5	Physics 112	4	Physics 113	5
GEC		Chem 245	2	GEC	
GEC		GEC		GEC	

Year 3

Autumn:		Winter:		Spring:	
Biochem 511	5	Mol Gen 605	4	Mol Gen 606	4
GEC		GEC		Mol Gen 602	5
GEC		GEC		Elective	
				GEC	

Year 4

Autumn:		Spring:	
Mol Gen 5607	3	Mol Gen 5608	3
Major Elective I	3	Major Elective III	3
Major Elective II	3	Major Elective IV	3
GEC/Free Electives	9	GEC/Free Electives	9
Semester Total	**18**	**Semester Total**	**18**

Molecular Genetics Undergraduate Major
Sample Curriculum for Students Graduating 2014

Year 1

Autumn:		Winter:		Spring:	
Chem 121	5	Chem 122	5	Chem 123	5
Math 150	5	Math 151	5	Math 152	5
GEC		Bio 113	5	Bio 114	5
				GEC	

Year 2

Autumn:		Winter		Spring:	
Chem 251	4	Chem 252	4	Elective	
Physics 111	5	Physics 112	4	Physics 113	5
GEC		Chem 245	2	GEC	
GEC		GEC		GEC	

Year 3

Autumn:		Spring:	
Biochemistry 4511	4	Mol Gen 5640	3
Organic Chemistry Lab I	2	Mol Gen 5601 or 5602	4
Mol Gen 5606	4	Organic Chemistry Lab II	2
GEC/Free Electives	8	GEC/Free Elective	9
Semester Total	**18**	**Semester Total**	**18**

Year 4

Autumn:		Spring:	
Mol Gen 5607	3	Mol Gen 5608	3
Major Elective I	3	Major Elective III	3
Major Elective II	3	GEC/Free Electives	12
GEC/Free Electives	9		
Semester Total	**18**	**Semester Total**	**18**

Molecular Genetics Undergraduate Major
Sample Curriculum for Students Graduating 2015

Year 1

Autumn:		Winter:		Spring:	
Chem 121	5	Chem 122	5	Chem 123	5
Math 150	5	Math 151	5	Math 152	5
GEC		Bio 113	5	Bio 114	5
				GEC	

Year 2

Autumn:		Spring:	
Mol Gen 5606	4	Physics II	5
Organic Chemistry I	4	Organic Chemistry II	4
Physics I	5	Organic Chemistry Lab I	2
GEC/Free Electives	5	GEC/Free Electives	7
Semester Total	**18**	**Semester Total**	**18**

Year 3

Autumn:		Spring:	
Mol Gen 5607	3	Mol Gen 5608	3
Biochemistry 4511	4	Mol Gen 5640	3
Organic Chemistry Lab II	2	Mol Gen 5601 or 5602	4
GEC/Free Electives	9	GEC/Free Electives	8
Semester Total	**18**	**Semester Total**	**18**

Year 4

Autumn:		Spring:	
Major Elective I	3	Major Elective III	3
Major Elective II	3	GEC/Free Electives	15
GEC/Free Electives	12		
Semester Total	**18**	**Semester Total**	**18**