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|--|--|
| <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-BS  |
| <b>Current Degree Title</b>                    | 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   | 50  | 4.0                       |

### 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 reorganized and expanded content amongst the required core courses for our major. The first two courses in the quarter-based sequence (MG 605 and 606) have been merged into a single four semester hour class (MG 5606) that undergraduates will take during their sophomore year. Some content from MG 605 and 606 has been moved to MG 5607 and MG 5608. In addition, we are now requiring a course in Population and Evolutionary Genetics (MG 5640) as part of the core sequence. These changes will allow our majors to start their Molecular Genetics core courses as sophomores with completion of the core sequence as juniors. This will open up the senior year for upper level electives to complete the 30 semester hour major.

Required prerequisites for the major have increased due to changes in the Organic Chemistry Lecture and Lab courses. We were uncomfortable with a decrease in the organic chemistry requirement and decided that a slight increase in organic chemistry credit hours was acceptable and more desirable choice for our undergraduate majors.

## 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 Molecular Genetics majors participate in academic research and/or outreach activities that are consistent with their interests and postgraduate plans.
- 8. Undergraduate Molecular Genetics 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 Cellular and Molecular Biology (PCMB) Specialization shares the first eight learning goals with the standard Molecular 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**

- MG Major Proposal Cover Letter.pdf: MG Major Program Cover Letter and Rationale  
*(Program Proposal. Owner: Shannon, Laurel Jean)*
- MGMajorDoc.pdf: MG Major Requirements, Curriculum Map and Advising  
*(Curricular Map(s). Owner: Shannon, Laurel Jean)*
- MolGen BS major 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  | 11/29/2010 01:29 PM | Submitted for Approval |
| Approved           | Vaessin, Harald Emil Friedrich  | 11/29/2010 04:50 PM | Unit Approval          |
| Revision Requested | Andereck, Claude David  | 12/08/2010 12:41 PM | College Approval       |
| Submitted          | Shannon, Laurel Jean  | 01/19/2011 02:00 PM | Submitted for Approval |
| Approved           | Vaessin, Harald Emil Friedrich  | 01/19/2011 05:21 PM | Unit Approval          |
| Revision Requested | Andereck, Claude David  | 01/26/2011 05:10 PM | College Approval       |
| Submitted          | Shannon, Laurel Jean  | 01/28/2011 05:59 PM | Submitted for Approval |
| Revision Requested | Vaessin, Harald Emil Friedrich  | 01/28/2011 06:11 PM | Unit Approval          |
| Submitted          | Vaessin, Harald Emil Friedrich  | 01/28/2011 06:12 PM | Submitted for Approval |
| Approved           | Vaessin, Harald Emil Friedrich  | 01/28/2011 06:13 PM | Unit Approval          |
| Approved           | Andereck, Claude David  | 02/01/2011 01:21 PM | College Approval       |
| Pending Approval   | Nolen, Dawn<br>Jenkins, Mary Ellen Bigler<br>Meyers, Catherine Anne<br>Vankeerbergen, Bernadette Chantal<br>Hanlin, Deborah Kay | 02/01/2011 01:21 PM | ASCCAO Approval        |

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February 1, 2011

Larry Krissek  
Chair, Arts and Sciences CCI

Dear Larry:

It is a pleasure to forward to you the proposal for the undergraduate Bachelor of Science major in Molecular Genetics under semesters. This program incorporates the formerly separate Plant Cellular and Molecular Biology (PCMB) major as a specialization of the Molecular Genetics major, reflecting the merger of the two departments. The common core will now have examples drawn from plant biology, thus enhancing and generalizing the experience for the Molecular Genetics majors. Molecular Genetics majors will begin their major-specific courses in the sophomore year, more rapidly than in the quarter version. Other changes involve some course content modifications (including a somewhat broader coverage of topics in the PCMB specialization courses), and the addition of a new core course in evolutionary genetics (elective for the PCMB specialization) and two embedded honors courses.

Beyond my own review of the documents, the proposal has been discussed with colleagues from other NMS units at a meeting on December 8, 2010. Feedback from the discussions has been incorporated in the proposal.

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

Sincerely,



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



Department of Molecular Genetics

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To: Office of Academic Affairs  
From: Anita Hopper, Chair, Department of Molecular Genetics

Mark Seeger, Associate Chair, Department of Molecular Genetics

Date: January 27, 2011

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 Major in Molecular Genetics (BS) and the Molecular Genetics Major with Specialization in Plant Cellular and Molecular Biology (BS).

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 not be available 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 meetings, they've had a clear opportunity to contribute to this proposal. The contents of the proposal were approved by unanimous vote (21-0) 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 adequate resources to meet the increased advising that is anticipated throughout the semester conversion process. Molecular Genetics Majors are advised by three faculty members: Drs. Fisk and Simcox advise all undergraduates in the Honors Program, and Dr. Booton advises all other undergraduates. The total number of Molecular Genetics majors fluctuates between 250 and 300 students. Students pursuing a PCMB Specialization with their Molecular Genetics Major or the PCMB Minor will be advised by a faculty member with expertise in plant biology (currently this faculty member is Dr. David Somers). The number of current PCMB undergraduate majors is less than 15 students; the number of PCMB minors is even less. Thus, any increases in advising of plant-focused undergraduates due to the transition to semesters can be easily accommodated within our current advising plan.

### **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 the 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. Currently we offer a stand-alone honors version of MG 607. The staffing of a stand-alone honors course has proven problematic as the enrollment in the majority of our classes continues to increase substantially.

### **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 (less than 20 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. An additional advantage is the increased exposure to plants that all Molecular Genetics majors will encounter. The faculty felt that the Molecular Genetics Major with Specialization in PCMB was favorable to maintaining a stand alone PCMB Undergraduate Major. If the PCMB Specialization proves successful and meets the needs of students desiring a more plant specific focus, we can imagine proposing other specializations within the Molecular Genetics Undergraduate Major in the future.

**Transition Policy**

Students who begin their degree under quarters will not be penalized as we move to semesters. Our major and minor are 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 for 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. 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 Credit Hours | Quarter Equivalent Course Number | Quarter Credit Hours | Notes  | Program Goals |
|--------------|------------------------|--------------------------|-----------------------|----------------------------------|----------------------|--|---------------|
| Biology      | Bio 1113               | Intro Biology            | 4                     | Bio 113                          | 5                    | Expanded content; Bio 1113H also accepted                              | 1, 2, 3, 4, 5 |
|              | Bio 1114               | Intro Biology            | 4                     | Bio 114                          | 5                    | Expanded content; Bio 1114H also accepted                              | 1, 2, 3, 4, 5 |
| Chemistry    | Chem 1210, 1220        | General Chemistry I & II | 10                    | Chem 121, 122, 123               | 15                   | Simple conversion; Chem 1610, 1620 or Chem 1910H, 1920H also accepted  | 1             |
|              | Chem 2510, 2520        | Organic Chemistry I & II | 8                     | Chem 251, 252                    | 8                    | Increase in the organic chemistry requirement; Chem 2610, 2620 or Chem | 1             |

|         |   |  |                          |                          |                          |  |  |    |  |                                  |                          |  |  |
|---------|---|--|--------------------------|--------------------------|--------------------------|--|--|----|--|----------------------------------|--------------------------|--|--|
|         |   |  |                          |                          |                          |  |  |    |  | 2910H,<br>2920H also<br>accepted |                          |  |  |
|         | Chem<br>2540, 2550                                  | Organic<br>Chemistry Lab I<br>& II                                 | 4                        | 4                        | Chem 245, 246            |  |  | 4  | Increase in<br>the organic<br>chemistry lab<br>requirement;<br>Chem 2940H,<br>2950H also<br>accepted |                                  | 1, 5                     |  |  |
| Math    | Math 1150   | Pre-Calculus   | 5                        | 5                        | Math 150                 |  |  | 5  | Or<br>appropriate<br>placement<br>level  |                                  | 1                        |  |  |
|         | Math 1156<br>-----OR-----<br>Math 1151              | Calculus for<br>Biological<br>Sciences<br>-----OR-----<br>Calculus | 5                        | 5<br>-----OR-----<br>5   | Math 151, 152            |  |  | 10 | Either version<br>is acceptable  |                                  | 1, 3, 5<br>-----<br>1, 5 |  |  |
| Physics | Physics<br>1200, 1201<br>-----OR-----<br>1250, 1251 | General Physics<br>-----OR-----<br>Physics                         | 10<br>-----OR-----<br>10 | 10<br>-----OR-----<br>10 | Physics 111, 112,<br>113 |  |  | 15 | Simple<br>Conversion;<br>Honors<br>Physics<br>sequence also<br>accepted                              |                                  | 1                        |  |  |

Core major requirements in the department

| Semester Course Number        | Course Title                        | Semester Credit Hours | Quarter Equivalent Course Number | Quarter Credit Hours | 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                  | Cell Biology                        | 3                     | Mol Gen 607 and PCMB 648         | 3<br>4               | Merged content of Mol Gen 607 and PCMB 648 with elimination of redundant subject matter  | 1*, 2*, 3*, 4*, 5* |
| -----OR-----<br>Mol Gen 5607E | -----OR-----<br>Honors Cell Biology | -----OR-----<br>4     |                                  |                      | -----OR-----<br>Embedded Honor's version includes an extra 55-min recitation with instructor   |                    |
| Mol Gen 5608                  | Genes and Development               | 3                     | Mol Gen 608                      | 3                    | Enhanced content and addition of material previously taught in MG 605, 606   | 1*, 2*, 3*, 4*, 5* |
| -----OR-----<br>Mol Gen       | -----OR-----<br>Honors Genes        | -----OR-----          |                                  |                      | -----OR-----<br>Embedded Honor's version   |                    |

|              |                                    |     |  |                             |               |  |                        |
|--------------|------------------------------------|-----|--|-----------------------------|---------------|--|------------------------|
| 5608E        | and Development                    | 4   |  |                             |               | includes an extra 55-min recitation with instructor                        |                        |
| 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 | Molecular Genetics Lab             | 3-4 |  | Mol Gen 601                 | 5             | Enhanced content for both Mol Gen 5601 or 5602;                            | 2*, 3*, 4*, 5*, 6*, 7* |
| Mol Gen 5602 | Cell and Developmental Biology Lab | 3-4 |  | -----OR-----<br>Mol Gen 602 | ---OR---<br>5 | 3 semester credit hour version limited to May-semester or summer offerings |                        |

**Core major requirements outside the department**

| Semester Course Number | Course Title                       | Semester Credit Hours | Quarter Equivalent Course Number | Quarter Credit Hours | Notes             | Program Goals      |
|------------------------|------------------------------------|-----------------------|----------------------------------|----------------------|-------------------|--------------------|
| Biochem 4511           | Biochemistry                       | 4                     | Biochem 511                      | 5                    | Enhanced content  | 1*, 2*, 3*, 4*, 5* |
| -----OR-----           | -----OR-----                       | -----OR-----          | -----OR-----                     | -----OR-----         |                   |                    |
| Biochem 5613 AND 5614  | Biochemistry and Molecular Biology | 3 AND 3               | Biochem 613 AND 614              | 4 AND 4              | Simple conversion |                    |

### Elective Courses in Molecular Genetics that count towards the major

| Semester Course Number | Course Title  | Semester Credit Hours | Quarter Equivalent Course Number | Quarter Credit Hours | Notes   | Program Goals |
|------------------------|---|-----------------------|----------------------------------|----------------------|---|---------------|
| Mol Gen 2220H          | Intro to Molecular Life Sciences: Research Opportunities and Career Options | 1                     | Mol Gen 220H                     | 1                    | Expanded content.   | 1, 2          |
| 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 credit 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 credit 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 credit hours of either 5797 or 5798 can count towards the major | 6*, 7*, 8*                   |
| Mol Gen 5798            | Study Tour: Domestic                           | 1-15 | PCMB 698.01 | 1-15 | Not more than 3 semester credit hours of either 5797 or 5798 can count towards the major | 6*, 7*, 8*                   |
| Mol Gen 5998 (or 5998H) | Undergraduate Research in Molecular Genetics   | 1-5  | Mol Gen 699 | 1-18 | Repeatable; not more than 4 semester credit hours can count towards the major            | 3**, 4**, 5**, 6**, 7**, 8** |
| Mol Gen 6623            | Genetics and Genomics                          | 2    | PCMB 623    | 4    | Similar content  | 2**, 3**, 4**, 8**           |

|              |                             |   |                             |       |  |                    |
|--------------|-----------------------------|---|-----------------------------|-------|--|--------------------|
| Mol Gen 6625 | Plant Metabolic Engineering | 2 | PCMB 625                    | 3     | Same content                                     | 2**, 3*, 4**, 8**  |
| Mol Gen 6630 | 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        | 4 | Mol Gen 701 and Biochem 702 | 3 + 3 | Merged content                                   | 2**, 3**, 4**, 8** |

|              |   |     |  |                         |  |       |  |   |                         |
|--------------|---|-----|--|-------------------------|--|-------|--|---|-------------------------|
|              | Gene Regulation                               |     |  |                         |  |       |  |   |                         |
| 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 credit hours can count towards the major                           | 2**, 3**, 4**, 6**, 8** |
| Mol Gen 6796 | Current Topics in Signal Transduction         | 2   |  | PCMB 796                |  | 3     |  | Same content  | 2**, 3**, 4**, 6**, 8** |

**Elective courses outside the department that count towards the major**

| Semester Course Number | Course Title                                    | Semester Credit Hours | Quarter Equivalent Course Number | Quarter Credit Hours | Notes  | Program Goals          |
|------------------------|---|-----------------------|----------------------------------|----------------------|--|------------------------|
| Biochem 4521           | Introduction to Biological Chemistry Laboratory | 4                     | Biochem 521                      | 5                    | Enhanced content; honors version also available and acceptable | 2*, 3*, 4*, 5*, 6*, 7* |
| EEOB 4520              | Comparative Physiology                          | 3                     | EEOB 410                         | 4                    | New course title, enhanced content                             | 1*, 3, 5               |
| Micro 5000             | General Microbiology                            | 5                     | Micro 520 and 521                | 10                   | Combined aspects of 520 and 521 with reduction in content      | 1*, 2, 3, 4, 5         |
| Micro 5081             | Microbial Genetics                              | 3                     | Micro 581.01                     | 3                    | Enhanced content   | 1*, 2*, 3*, 4*, 5*     |
| Micro 5082             | Molecular Microbiology Lab                      | 3                     | Micro 581.02                     | 3                    | Combined content of 581.02 and 522.02                          | 2*, 3*, 4*, 5*, 6*, 7* |
| Micro 5161H            | Bioinformatics and Molecular Microbiology       | 3                     | Micro 610H                       | 5                    | Direct conversion  | 2**, 3**, 4**, 8**     |
| Micro 6080             | Advanced Microbial Genetics                     | 3                     | Micro 680                        | 3                    | Expanded 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. Undergraduate 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 Credit Hours | Quarter Equivalent Course Number | Quarter Credit Hours | Notes   | Program Goals |
|--------------|------------------------|--------------------------|-----------------------|----------------------------------|----------------------|---|---------------|
| Biology      | Bio 1113               | Intro Biology            | 4                     | Bio 113                          | 5                    | Expanded content; Bio 1113H also accepted                             | 1, 2, 3, 4, 5 |
|              | Bio 1114               | Intro Biology            | 4                     | Bio 114                          | 5                    | Expanded content; Bio 1114H also accepted                             | 1, 2, 3, 4, 5 |
| Chemistry    | Chem 1210, 1220        | General Chemistry I & II | 10                    | Chem 121, 122, 123               | 15                   | Simple conversion; Chem 1610, 1620 or Chem 1910H, 1920H also accepted | 1             |
|              | Chem 2510, 2520        | Organic Chemistry I & II | 8                     | Chem 251, 252                    | 8                    | Increase in the organic chemistry requirement;                        | 1             |

|         |   |  |    |    |                          |    |  |                          |  |  |
|---------|---|--|----|----|--------------------------|----|--|--------------------------|--|--|
|         |   |  |    |    |                          |    |  |                          | Chem 2610,<br>2620 or Chem<br>2910H,<br>2920H also<br>accepted |  |
|         | Chem<br>2540, 2550                                  | Organic<br>Chemistry Lab I<br>& II                                 | 4  | 4  | Chem 245, 246            | 4  | Increase in<br>the organic<br>chemistry lab<br>requirement;<br>Chem 2940H,<br>2950H also<br>accepted | 1, 5                     |  |  |
| Math    | Math 1150   | Pre-Calculus   | 5  | 5  | Math 150                 | 5  | Or<br>appropriate<br>placement<br>level  | 1                        |  |  |
|         | Math 1156<br>-----OR-----<br>Math 1151              | Calculus for<br>Biological<br>Sciences<br>-----OR-----<br>Calculus | 5  | 5  | Math 151, 152            | 10 | Either version<br>is acceptable  | 1, 3, 5<br>-----<br>1, 5 |  |  |
| Physics | Physics<br>1200, 1201<br>-----OR-----<br>1250, 1251 | General Physics<br>-----OR-----<br>Physics                         | 10 | 10 | Physics 111, 112,<br>113 | 15 | Simple<br>Conversion;<br>Honors<br>Physics<br>sequence also<br>accepted                              | 1                        |  |  |

Core major requirements in the department

| Semester Course Number        | Course Title                        | Semester Credit Hours | Quarter Equivalent Course Number | Quarter Credit Hours | 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                  | Cell Biology                        | 3                     | Mol Gen 607 and PCMB 648         | 3<br>4               | Merged content of Mol Gen 607 and PCMB 648 with elimination of redundant subject matter  | 1*, 2*, 3*, 4*, 5* |
| -----OR-----<br>Mol Gen 5607E | -----OR-----<br>Honors Cell Biology | -----OR-----<br>4     |                                  |                      | -----OR-----<br>Embedded Honor's version includes an extra 55-min recitation with instructor   |                    |
| Mol Gen 5608                  | Genes and Development               | 3                     | Mol Gen 608                      | 3                    | Enhanced content and addition of material previously taught in MG 605, 606   | 1*, 2*, 3*, 4*, 5* |
| -----OR-----<br>Mol Gen       | -----OR-----<br>Honors Genes        | -----OR-----          |                                  |                      | -----OR-----<br>Embedded Honor's version   |                    |

|              |                               |   |  |          |   |            |
|--------------|-------------------------------|---|--|----------|---|------------|
| 5608E        | and Development               | 4 |  |          | includes an extra 55-min recitation with instructor |            |
| Mol Gen 3300 | General Plant Biology         | 3 |  | PCMB 300 | Same content  | 1*, 2*, 9* |
| Mol Gen 3436 | Introductory Plant Physiology | 3 |  | PCMB 436 | Same content  | 1*, 2*, 9* |

**Core major requirements outside the department**

| Semester Course Number        | Course Title                       | Semester Credit Hours | Quarter Equivalent Course Number | Quarter Credit Hours | Notes            | Program Goals      |
|-------------------------------|------------------------------------|-----------------------|----------------------------------|----------------------|------------------|--------------------|
| Biochem 4511                  | Biochemistry                       | 4                     | Biochem 511                      | 5                    | Enhanced content | 1*, 2*, 3*, 4*, 5* |
| -----OR-----                  | -----OR-----                       | -----OR-----          | -----OR-----                     | -----OR-----         | -----OR-----     |                    |
| Biochem 5613 AND Biochem 5614 | Biochemistry and Molecular Biology | 3 AND 3               | Biochem 613 AND Biochem 614      | 4 AND 4              | Enhanced content |                    |

**Elective Course in Molecular Genetics that count towards the major**

| Semester Course Number                       | Course Title   | Sem Credit Hours              | Quarter Equivalent Course Number           | Quarter Credit Hours  | Notes  | Program Goals  |
|--|--|-------------------------------|--|-----------------------|--|--|
| 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 credit 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 credit hours can count towards a major; must be on a plant topic to count towards the PCMB specialization                                     | 2**, 8**, 9**  |
| Mol Gen 5601<br>-----OR-----<br>Mol Gen 5602 | Molecular Genetics Lab<br>-----OR-----<br>Cell and Developmental Biology Lab | 3-4<br>-----OR--<br>--<br>3-4 | Mol Gen 601<br>-----OR-----<br>Mol Gen 602 | 5<br>-----OR----<br>5 | Enhanced content for both Mol Gen 5601 or 5602; 3 semester credit hour version limited to May-semester or summer offerings; lab must have a plant module to count towards the PCMB | 2*, 3*, 4*, 5*, 6*, 7*, 9*<br>-----OR-----<br>2*, 3*, 4*, 5*, 6*, 7*, 9* |

|                         |  |      |              |       |  |                                   |
|-------------------------|--|------|--------------|-------|--|-----------------------------------|
| Mol Gen 5640            | Genetic Basis of Evolution                   | 3    | Mol Gen 640  | 5     | specialization   | 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 credit hours of either 5797 or 5798 can count 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 credit hours of either 5797 or 5798 can count towards the major must have a plant focus to count towards the PCMB specialization  | 6**, 7**, 8**, 9**                |
| Mol Gen 5998 (or 5998H) | Undergraduate Research in Molecular Genetics | 1-5  | Mol Gen 699  | 1-18  | Repeatable; not more than 4 semester 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 6630            | Plant Physiology                             | 3    | PCMB 630 and | 3 + 3 | Merging of 630 and 631   | 2**, 3**                          |

|              |  |     |  |                         |       |  |  |  |                         |
|--------------|--|-----|--|-------------------------|-------|--|--|--|-------------------------|
|              |  |     |  | 631                     |       |  |  | with reduction in content  | 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 credit hours can count towards the major; must be on a plant topic to count towards the PCMB specialization | 2**, 3**, 4**, 8**, 9** |

### Elective Course outside Molecular Genetics that count towards the major

| Semester Course Number        | Course Title                                       | Sem Credit Hours | Quarter Equivalent Course Number | Quarter Credit Hours | Notes | Program Goals           |
|-------------------------------|--|------------------|----------------------------------|----------------------|-------|-------------------------|
| Plant Pathology 703 Successor | Agricultural Genomics: Principles and Applications | 2                | Plant Pathology 703              | 3                    |       | 2**, 3**, 4**, 8**, 9** |

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.
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 - Semesters

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

1. Bio 1113 or 1113H (4), AND 1114 or 1114H (4)
2. Chem 1210 (5) or 1610 (5) or 1910H (5) AND Chem 1220 (5) or 1620 (5) or 1920H (5)
3. Chem 2510 (4), 2520 (4), 2540 (2), and 2550 (2)
4. Math 1150 Pre-Calculus (5), 1156 Calculus for Biological Sciences OR Math 1151 (5)
5. Physics 1200 (5) or 1250 (5) AND 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) OR  
Biochemistry 5613 (3) AND Biochemistry 5614 (3)
2. MG 5606 Molecular Genetics (4).
3. MG 5607 Cell Biology (3) or MG5607E (4)
4. MG 5608 Genes and Development (3) or MG5608E (4)
5. MG 5640 Genetic Basis of Evolution (3)
6. MG 5601 Molecular Genetics Lab (4) or MG5602 Cell and Developmental Biology Lab (4). Both lab courses will require either MG 5606 or MG 4500 as a prerequisite. MG majors may substitute 4 semester credit hours of MG 5698 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)
- MG 4503 Molecular Genetics Writing Project (1)
- MG 4591S DNA Fingerprinting Workshop (1)
- MG 5193 Individual Studies (1-3)
- MG 5194 Group Studies (1-3)
- MG 5632 Insect Molecular Genetics (2)
- MG 5643 Plant Anatomy (3)
- MG 5650 Analysis and Interpretation of Biological Data (3)
- MG5797 Study at a Foreign Institution (1-15)
- MG 5798 Study Tour: Domestic (1-15)
- MG 5698 or 5998H Undergraduate Research (up to 4 semester credit 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 most 6000 level MG courses.)

MG 6623 Genetics and Genomics (2)  
MG 6625 Plant Metabolic Engineering (2)  
MG 6630 Plant Physiology (3)  
MG 6700 Systems of Genetic Analysis (3)  
MG 6701 DNA Transactions and Gene Regulation (4)  
MG 6705 Advances in Cell Biology (2)  
MG 6715 Developmental Genetics (2)  
MG 6725 Circadian Biology (2)  
MG 6733 Human Genetics (2)  
MG 6735 Plant Biochemistry (3)  
MG 6741 Reproductive Biology of Flowering Plants (2)  
MG 6770 Molecular Biology of Animal and Plant Viruses (4)  
MG 6795 Special Topics in Molecular Genetics (1-3)  
MG 6796 Current Topics in Signal Transduction (2)

Biochem 4521 Introduction to Biological Chemistry Laboratory (4)

EEOB 4520 Comparative Physiology (3)

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

Other elective courses may be substituted with permission of advisor.

## **MG Undergraduate Major with a Plant Cellular and Molecular Biology (PCMB) Specialization - Semesters**

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

1. Bio 1113 or 1113H (4), AND 1114 or 1114H (4)
2. Chem 1210 (5) or 1610 (5) or 1910H (5) AND Chem 1220 (5) or 1620 (5) or 1920H (5)
3. Chem 2510 (4), 2520 (4), 2540 (2), and 2550 (2)
4. Math 1150 Pre-Calculus (5), 1156 Calculus for Biological Sciences OR Math 1151 (5)
5. Physics 1200 (5) or 1250 (5) AND 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 4511 (4) OR  
Biochemistry 5613 (3) AND Biochemistry 5614 (3)
2. MG 5606 Molecular Genetics (4).
3. MG 5607 Cell Biology (3) or MG5607E (4)
4. MG 5608 Genes and Development (3) or MG5608E (4)
5. MG 3300 General Plant Biology (3)
6. MG 3436 Introductory Plant Physiology (3)

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

- MG 4503 Molecular Genetics Writing Project (on a PCMB topic) (1)
- MG 5193 Individual Studies (on a PCMB topic) (1-3)
- MG 5194 Group Studies (on a PCMB topic) (1-3)
- MG 5601 Molecular Genetics Lab or MG 5602 Cell and Developmental Biology Lab with a plant module (4)
- MG 5640 Evolutionary Genetics (3)
- MG 5643 Plant Anatomy (3 semester hours)
- MG 5998 (5698H) Undergraduate Research (in a plant lab). Up to 4 semester credit hours can count towards the PCMB specialization.
- MG 6625 Plant Metabolic Engineering (2)
- MG 6630 Plant Physiology (3)
- MG 6735 Plant Biochemistry (3)
- MG 6741 Reproductive Biology of Flowering Plants (2)
- MG 6795 Special Topics in Molecular Genetics (on a PCMB topic) (1-3)

Plant Pathology 703 Successor: Agricultural Genomics: Principles and Applications (2?)

Other elective courses may be substituted with permission of advisor.



# SEMESTERS

## Major Program Form

Colleges of the Arts and Sciences

Name \_\_\_\_\_ Major Molecular Genetics  
Last First Middle

Student ID \_\_\_\_\_ 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 form for each one:

1) \_\_\_\_\_ 2) \_\_\_\_\_

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

| Courses              | Hours | Grade | Courses                         | Hours | Grade |
|----------------------|-------|-------|---------------------------------|-------|-------|
| Biology 1113, 1114   | 8     |       | Chemistry 2540, 2550            | 4     |       |
| Chemistry 1210, 1220 | 10    |       | Math 1150, plus<br>1156 or 1151 | 10    |       |
| Chemistry 2510, 2520 | 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<br>(or 5613 and 5614) | 4     |       | Molecular Genetics 5608            | 3     |       |
| Molecular Genetics 5606                 | 4     |       | Molecular Genetics 5640            | 3     |       |
| Molecular Genetics 5607                 | 3     |       | Molecular Genetics 5601<br>or 5602 | 4     |       |

### Additional Major Program Courses (choose at least 3 electives from approved list)

| Courses | Hours | Grade | Courses | Hours | Grade |
|---------|-------|-------|---------|-------|-------|
|         |       |       |         |       |       |
|         |       |       |         |       |       |
|         |       |       |         |       |       |

Total of Part B only (must total at least 30 semester credit hours):

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

Department

292-8084

Campus Phone

Date



# SEMESTERS

## Major Program Form

### Colleges of the Arts and Sciences

Name \_\_\_\_\_ Major Molecular Genetics with PCMB Specialization

Student ID \_\_\_\_\_ 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 form for each one:

1) \_\_\_\_\_ 2) \_\_\_\_\_

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

| Courses              | Hours | Grade | Courses                         | Hours | Grade |
|----------------------|-------|-------|---------------------------------|-------|-------|
| Biology 1113, 1114   | 8     |       | Chemistry 2540, 2550            | 4     |       |
| Chemistry 1210, 1220 | 10    |       | Math 1150, plus<br>1156 or 1151 | 10    |       |
| Chemistry 2510, 2520 | 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<br>(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 (choose at least 3 electives from approved list)

| Courses | Hours | Grade | Courses | Hours | Grade |
|---------|-------|-------|---------|-------|-------|
|         |       |       |         |       |       |
|         |       |       |         |       |       |
|         |       |       |         |       |       |

Total of Part B only (must total at least 30 semester credit hours):

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 292-8084  
Department Campus Phone

Date



# QUARTERS

## Major Program Form

### Colleges of the Arts and Sciences

Name \_\_\_\_\_ Major Molecular Genetics  
Last First Middle

Student ID # \_\_\_\_\_ 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 form for each one:

1) \_\_\_\_\_ 2) \_\_\_\_\_

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

| Courses               | Hours | Grade | Courses              | Hours | Grade |
|-----------------------|-------|-------|----------------------|-------|-------|
| Biology 113, 114      | 10    |       | Chemistry 245, 246   | 4     |       |
| Chemistry 121,122,123 | 15    |       | Math 148,150,151,152 |       |       |
| Chemistry 251,252     | 8     |       | 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

Department

292-8084

Campus Phone

Date

## Molecular Genetics Undergraduate Major Sample Semester Program

### Year 1

|                       |           |                       |           |
|-----------------------|-----------|-----------------------|-----------|
| <b>Autumn:</b>        |           | <b>Spring:</b>        |           |
| Biology 1113          | 4         | Biology 1114          | 4         |
| Chemistry 1210        | 5         | Chemistry 1220        | 5         |
| Math 1150             | 5         | Math 1156             | 5         |
| A&S Survey            | 1         | GE/Free Electives     | 3         |
| <b>Semester Total</b> | <b>15</b> | <b>Semester Total</b> | <b>17</b> |

### Year 2

|                       |           |                       |           |
|-----------------------|-----------|-----------------------|-----------|
| <b>Autumn:</b>        |           | <b>Spring:</b>        |           |
| Mol Gen 5606          | 4         | Physics 1201          | 5         |
| Chemistry 2510        | 4         | Chemistry 2520        | 4         |
| Physics 1200          | 5         | Chemistry 2540        | 2         |
| GE/Free Electives     | 3         | GE/Free Electives     | 4         |
| <b>Semester Total</b> | <b>16</b> | <b>Semester Total</b> | <b>15</b> |

### Year 3

|                       |           |                       |           |
|-----------------------|-----------|-----------------------|-----------|
| <b>Autumn:</b>        |           | <b>Spring:</b>        |           |
| Mol Gen 5607          | 3         | Mol Gen 5608          | 3         |
| Biochemistry 4511     | 4         | Mol Gen 5640          | 3         |
| Chemistry 2550        | 2         | Mol Gen 5601 or 5602  | 4         |
| GE/Free Electives     | 6         | GE/Free Electives     | 5         |
| <b>Semester Total</b> | <b>15</b> | <b>Semester Total</b> | <b>15</b> |

### Year 4

|                       |           |                       |           |
|-----------------------|-----------|-----------------------|-----------|
| <b>Autumn:</b>        |           | <b>Spring:</b>        |           |
| Major Elective I      | 3         | Major Elective III    | 3         |
| Major Elective II     | 3         | GE/Free Electives     | 11        |
| GE/Free Electives     | 8         |                       |           |
| <b>Semester Total</b> | <b>14</b> | <b>Semester Total</b> | <b>14</b> |

**GRAND TOTAL:     121 Semester Credit Hours**



**Molecular Genetics Undergraduate Major  
with PCMB Specialization  
Sample Semester Program**

**Year 1**

|                       |           |                       |           |
|-----------------------|-----------|-----------------------|-----------|
| <b>Autumn:</b>        |           | <b>Spring:</b>        |           |
| Biology 1113          | 4         | Biology 1114          | 4         |
| Chemistry 1210        | 5         | Chemistry 1220        | 5         |
| Math 1150             | 5         | Math 1156             | 5         |
| A&S Survey            | 1         | GE/Free Electives     | 3         |
| <b>Semester Total</b> | <b>15</b> | <b>Semester Total</b> | <b>17</b> |

**Year 2**

|                       |           |                       |           |
|-----------------------|-----------|-----------------------|-----------|
| <b>Autumn:</b>        |           | <b>Spring:</b>        |           |
| Mol Gen 5606          | 4         | Physics 1201          | 5         |
| Chemistry 2510        | 4         | Chemistry 2520        | 4         |
| Physics 1200          | 5         | Chemistry 2540        | 2         |
| GE/Free Electives     | 3         | GE/Free Electives     | 3         |
|                       |           | Mol Gen 3300          | 3         |
| <b>Semester Total</b> | <b>16</b> | <b>Semester Total</b> | <b>17</b> |

**Year 3**

|                       |           |                       |           |
|-----------------------|-----------|-----------------------|-----------|
| <b>Autumn:</b>        |           | <b>Spring:</b>        |           |
| Mol Gen 5607          | 3         | Mol Gen 5608          | 3         |
| Biochemistry 4511     | 4         | Mol Gen 3436          | 3         |
| Chemistry 2550        | 2         | GE/Free Electives     | 8         |
| GE/Free Electives     | 5         |                       |           |
| <b>Semester Total</b> | <b>14</b> | <b>Semester Total</b> | <b>14</b> |

**Year 4**

|                          |           |                           |           |
|--------------------------|-----------|---------------------------|-----------|
| <b>Autumn:</b>           |           | <b>Spring:</b>            |           |
| Major Elective (PCMB) I  | 3         | Major Elective (PCMB) III | 3         |
| Major Elective (PCMB) II | 3         | GE/Free Electives         | 11        |
| GE/Free Electives        | 8         |                           |           |
| <b>Semester Total</b>    | <b>14</b> | <b>Semester Total</b>     | <b>14</b> |

**GRAND TOTAL: 121 Semester Credit Hours**

## Molecular Genetics Undergraduate Major Sample Quarter Program

### Year 1

| <b>Autumn:</b> | <b>Winter:</b> | <b>Spring:</b> |
|----------------|----------------|----------------|
| 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

| <b>Autumn:</b> | <b>Winter:</b> | <b>Spring:</b> |
|----------------|----------------|----------------|
| 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

| <b>Autumn:</b> | <b>Winter:</b> | <b>Spring:</b> |
|----------------|----------------|----------------|
| Biochem 511 5  | Mol Gen 605 4  | Mol Gen 606 4  |
| GEC            | GEC            | Mol Gen 602 5  |
| GEC            | GEC            | Elective       |
|                |                | GEC            |

### Year 4

| <b>Autumn:</b> | <b>Winter:</b> | <b>Spring:</b> |
|----------------|----------------|----------------|
| 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         |
| GE/Free Electives     | 9         | GE/Free Electives     | 9         |
| <b>Semester Total</b> | <b>18</b> | <b>Semester Total</b> | <b>18</b> |

**Molecular Genetics Undergraduate Major  
Sample Curriculum for Students Graduating 2014**

**Year 1**

|                |   |                |   |                |   |
|----------------|---|----------------|---|----------------|---|
| <b>Autumn:</b> |   | <b>Winter:</b> |   | <b>Spring:</b> |   |
| 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**

|                |   |                |   |                |   |
|----------------|---|----------------|---|----------------|---|
| <b>Autumn:</b> |   | <b>Winter:</b> |   | <b>Spring:</b> |   |
| Chem 251       | 4 | Chem 252       | 4 | Elective       |   |
| Physics 111    | 5 | Physics 112    | 4 | Physics 113    | 5 |
| GEC            |   | GEC            |   | GEC            |   |
| GEC            |   |                |   | GEC            |   |

**Year 3**

|                       |           |                       |           |
|-----------------------|-----------|-----------------------|-----------|
| <b>Autumn:</b>        |           | <b>Spring:</b>        |           |
| Biochemistry 4511     | 4         | Mol Gen 5640          | 3         |
| Chemistry 2540        | 2         | Mol Gen 5601 or 5602  | 4         |
| Mol Gen 5606          | 4         | Chemistry 2550        | 2         |
| GE/Free Electives     | 8         | GE/Free Elective      | 9         |
| <b>Semester Total</b> | <b>18</b> | <b>Semester Total</b> | <b>18</b> |

**Year 4**

|                       |           |                       |           |
|-----------------------|-----------|-----------------------|-----------|
| <b>Autumn:</b>        |           | <b>Spring:</b>        |           |
| Mol Gen 5607          | 3         | Mol Gen 5608          | 3         |
| Major Elective I      | 3         | Major Elective III    | 3         |
| Major Elective II     | 3         | GE/Free Electives     | 12        |
| GE/Free Electives     | 9         |                       |           |
| <b>Semester Total</b> | <b>18</b> | <b>Semester Total</b> | <b>18</b> |

## Molecular Genetics Undergraduate Major Sample Curriculum for Students Graduating 2015

### Year 1

| <b>Autumn:</b> |   | <b>Winter:</b> |   | <b>Spring:</b> |   |
|----------------|---|----------------|---|----------------|---|
| Chem 121       | 5 | Chem 122       | 5 | Chem 123       | 5 |
| Math 150       | 5 | Math 151       | 5 | Math 152       | 5 |
| GEC            | 5 | Bio 113        | 5 | Bio 114        | 5 |

### Year 2

| <b>Autumn:</b>        |           | <b>Spring:</b>        |           |
|-----------------------|-----------|-----------------------|-----------|
| Mol Gen 5606          | 4         | Physics 1201          | 5         |
| Chemistry 2510        | 4         | Chemistry 2520        | 4         |
| Physics 1200          | 5         | Chemistry 2540        | 2         |
| GE/Free Electives     | 3         | GE/Free Electives     | 5         |
| <b>Semester Total</b> | <b>16</b> | <b>Semester Total</b> | <b>16</b> |

### Year 3

| <b>Autumn:</b>        |           | <b>Spring:</b>        |           |
|-----------------------|-----------|-----------------------|-----------|
| Mol Gen 5607          | 3         | Mol Gen 5608          | 3         |
| Biochemistry 4511     | 4         | Mol Gen 5640          | 3         |
| Chemistry 2550        | 2         | Mol Gen 5601 or 5602  | 4         |
| GE/Free Electives     | 6         | GE/Free Electives     | 5         |
| <b>Semester Total</b> | <b>15</b> | <b>Semester Total</b> | <b>15</b> |

### Year 4

| <b>Autumn:</b>        |           | <b>Spring:</b>        |           |
|-----------------------|-----------|-----------------------|-----------|
| Major Elective I      | 3         | Major Elective III    | 3         |
| Major Elective II     | 3         | GE/Free Electives     | 11        |
| GE/Free Electives     | 8         |                       |           |
| <b>Semester Total</b> | <b>14</b> | <b>Semester Total</b> | <b>14</b> |