

MICROBIOLOGY AND MOLECULAR GENETICS DEPARTMENT STUDENT AND ADVISOR'S PROGRAM MANAGEMENT FORM

STUDENT'S NAME _____

MAJOR: MICROBIOLOGY _____ MOLECULAR GENETICS _____

COLLEGE CREDIT REQUIREMENTS FOR GRADUATION: 120 course credit hours, 2 Physical Education credits and a cumulative avg. > 2.0

CALS CORE REQUIREMENTS:

	<u>Semester &Year Taken</u>	<u>Or By Transfer¹</u>	<u>Credits</u>	<u>Remarks</u>
1. Knowledge:				
A. Science				
1. Physical and Life Sciences:	Satisfied by Program Core Requirements			
2. <u>Social Sciences Courses²</u> (6 crs.)	1. _____	_____	_____	
(Consumer, Agricul'l& Resource Eco, Sml.Bus., Int'l.Studies, Eco., Geog., Geol., Poli. Sci.,Soc. or Hist., Historic Preserv'n., Psychol., Soc. Work, and Women's Studies)	2. _____	_____	_____	
B. <u>Fine Arts & Humanities Courses²</u> (6 crs.)				
(Art, Anthrop., Classics, Music, Philos., Relig., Langs., Lit.,Poetry, Film and some History courses)	1. _____	_____	_____	
	2. _____	_____	_____	
2. Skills:				
A. Communication skills:				
1. <u>Oral</u> : (3 crs.) (AGRI 183, or SPCH 11)	_____	_____	_____	
Plus one of the following: (MMG 195TA, MMG 203, MMG 197/8, MMG 201, MMG 222, MMG 295-Bond)	_____	_____	_____	
The remaining requirements are satisfied by MMG's core requirements.				
2. <u>Written</u> : (3 crs.) (ENG 1 or ENG 50)	_____	_____	_____	
Plus one of the following: (ENG 50)	_____	_____	_____	
or two of the following: (MMG 195/6, MMG 197/8, MMG 201, MMG 222)	_____	_____	_____	
The remaining requirements are satisfied by MMG's core requirements.				
B. Information Tech:(3 crs.)(AGRI 85, CS2 or CS3)				
Plus one of the following: (MMG 201, MMG 203, MMG 240, MMG 295-Bond)	_____	_____	_____	
	_____	_____	_____	
C. Quantitative Skills:				
1. Mathematics: (MATH 19/20 or MATH 21/22)				
2. Statistics: (STAT 141)				
3. Quantitative Skills Application: (MMG 102)				
D. Critical Thinking Skills: (MMG 102)				
E. Interpersonal Skills: (MMG 101/102)				

	<u>Semester & Year Taken</u>	<u>Or By Transfer¹</u>	<u>Credits</u>	<u>Remarks</u>
3. Values:				
A. Cit'ship/Soc Resp: (1-3 crs)(AGRI 95) ⁴	_____	_____	_____	
Additional coursework: (AGRI 99 and MMG 102)				
 B. Env'l. Stewardship: (MMG 101/102)				
Plus one of the following:				
(MMG 203, MMG 220, MMG 225)				
 C. Personal Growth:(2crs.) (AGRI 99) ³	_____	_____	_____	
plus (2 crs) (Physical Ed.)	1. _____	_____	_____	
	2. _____	_____	_____	
Plus one or more courses that cover these values	_____	_____	_____	

TOTAL COLLEGE CORE COMPETENCIES..... _____

¹ The University's Transfer sheet that will arrive with a transferring advisee's folder, will list the course(s) being transferred and whether UVM accepts or rejects the transfer. The course(s) may be acceptable to UVM but not for a particular UVM course, in which case it will be listed with X's in the number. It will then be up to the department to decide if this course will replace one of our required or elective courses. If so, we note it with a copy to the advisee's file.

² All of these are 3 credit courses.

³ This course must be taken during the first semester of the students first year. Taking this course can be waived for transfer students or those who have earned another degree.

⁴ This course (AGRI 95) may only be taken during the first year for one credit. However, if one of the following three credit courses, which may substitute for AGRI 95, is taken, one may do so at any time during the student's tenure at UVM. Further, if one of these is chosen, it can also suffice to fulfill three credits of the CALS Social Science requirement: ALANA 51 or 55, SOC 19, 31, 118 or 119, ANTH 187, CMSI 160, EC 153, ENG 57, GEOG 60, HST 60 or 68, POLS 29 or 129.

* 300-level courses should only be taken with special permission of both the course instructor and the student's faculty advisor.

ADDITIONAL REQUIREMENTS FOR MOLECULAR GENETICS MAJORS

MMG 211	Prokaryotic Molecular Genetics	3 credit hours	
<i>Six credit hours chosen from among the following:</i>			
MMG 201	Molecular Cloning Lab	3 credit hours	_____
MMG 203	Mammalian Cell & Molec. Biol.Lab	4 credit hours	_____
MMG 223	Immunology	3 credit hours	_____
MMG 225	Eukaryotic Virology	3 credit hours	_____
MMG 312*	Yeast Molecular Genetics	3 credit hours	_____
MMG 350*	Nucleic Acids I	3 credit hours	_____
<small>(Listed as MMG254 in Catalog)</small>			
MMG 352*	Nucleic Acids II	3 credit hours	_____
<small>(Listed as BIOC 331 in Catalog)</small>			

Six additional credit hours chosen from the list above or the following:

MMG 195,196	SpecialTopics#	variable credit hours	_____
MMG 197,198	Undergraduate Research	variable credit hours	_____
MMG 240	Intro.to Macromolec. Structure of Proteins & Nucleic Acids	3 credit hours	_____
Biology 263	Genetics of Cell Cycle Regulation	3 credit hours	_____
Biology 265	Developmental Molecular Genetics	3 credit hours	_____
MMG 320*	Physiol. of Microbial Pathogenesis	4 credit hours	_____

* 300-level courses should only be taken with special permission of both the course instructor and the student's faculty advisor.

TOTAL CREDITS (must total 15 credits)....._____

LIST ELECTIVE COURSES TAKEN HERE:

	<u>COURSE TITLE</u>	<u>COURSE NUMBER</u>	<u>COURSE CRS.</u>
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____

TOTAL ELECTIVE CREDITS_____

OTHER COURSES: List here other courses taken, which can be used toward graduation credits, but which do not fulfill credits toward either MMG major:

	<u>COURSE TITLE</u>	<u>COURSE NUMBER</u>	<u>COURSE CRS.</u>
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____

ADDITIONAL REQUIREMENTS FOR MMG DOUBLE MAJORS[#]

Any student enrolled as either a Microbiology or Molecular Genetics Major, takes 15 additional credits beyond the Core courses, chosen from among those listed on pages 2 and 3. However, to do a double major, the student must take 12 additional credits beyond the 15 required for a single major (i.e. 27 total credits beyond the Core courses) and must also satisfy the distribution requirements of each individual major. Only one of these courses may be double-counted. *To declare a second major, students obtain the appropriate form from Student Services, Dean's Office, Morrill Hall, complete the form, obtain the signature of department chair or Undergraduate Program Director, and return the form to the Dean's Office.*

List the 12 credits of Additional Courses taken here:

	<u>COURSE TITLE</u>	<u>COURSE NUMBER</u>	<u>COURSE CRS.</u>
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____

TOTAL ADDITIONAL CREDITS (MUST TOTAL 12 CRS.)....._____

[#] To do a Major/Minor requires 6 additional credits beyond the Major; no courses may be double - counted.

FINAL TALLY OF CREDITS TOWARD GRADUATION FOR MAJORS:

Total COLLEGE DISTRIBUTION Credits.....	_____
Total CORE Credits.....	_____
Total ADDITIONAL Credits.....	_____
Total ELECTIVE Credits.....	_____
Total OTHER Credits.....	_____
Additional DOUBLE-MAJOR Credits (must be 12).....	_____

TOTAL Credits for graduation - These must total a minimum of 120 course credits (132 course credits for the double major) + 2 credits of Physical Education.....

DEPARTMENTAL MINORS

Requires obtaining proper form from 108 Morrill Hall and obtaining signatures of primary advisor, minor advisor and chair or undergrad. program director. Return signed form to 108 Morrill Hall.

MINORING IN: MICROBIOLOGY _____ OR MOLECULAR GENETICS _____

CORE REQUIREMENTS FOR MINORS - All departmental minors must take the following courses:

<u>CORE REQUIREMENTS</u>	<u>Semester & Year Taken</u>	<u>Taken By Transfer</u>	<u>Credits</u>	<u>Remarks</u>
Microbiol. (4 cr. hrs. each).....MMG 101.....	_____	_____	_____	
MMG 102.....	_____	_____	_____	
Prin. of Gen. (3 cr. hrs.).....BOT 132*.....	_____	_____	_____	

PREREQUISITES FOR:

MMG 101: Introductory Biology (4 cr. hrs. each) - BIOL 1,2; 11,12; Intro. Chemistry (4 cr. hrs. each) CHEM 31,32

MMG 102: MMG101, BOT132

BOT 132: Introductory Biology (4 cr. hrs. each) - BIOL 1,2; Intro. Chemistry (4 cr. hrs. each) CHEM 31,32

***(to be taken concurrently with MMG101)**

ADDITIONAL REQUIREMENTS FOR DEPARTMENTAL MINORS - Six additional credit hours of MMG courses, chosen from among the following courses offered are required **for the MICROBIOLOGY minor:**

MMG 201	Molecular Cloning Lab	3 credit hours	_____
MMG 203	Mammalian Cell & Molec.Biol.Lab	4 credit hours	_____
MMG 211	Prokaryotic Molecular Genetics	3 credit hours	_____
MMG 220	Environmental Microbiology	3 credit hours	_____
MMG 222	ClinicalMicrobiology	4 credit hours	_____
MMG 223	Immunology	3 credit hours	_____
MMG 225	Eukaryotic Virology	3 credit hours	_____
MMG 240	Int. Macromol.Struct. Prots. & NA	3 credit hours	_____
MMG 320*	Physiol. of Microbial Pathogenesis	4 credit hours	_____

TOTAL CREDITS (Core + Additional must total 17 crs.)..... _____

Six additional credit hours of MMG courses, chosen from among the following courses offered are required **for the MOLECULAR GENETICS minor:**

MMG 201	Molecular Cloning Lab	3 credit hours	_____
MMG 203	Mamm. Cell & Molec. Biol. Lab	4 credit hours	_____
MMG 211	Prokaryotic Molecular Genetics	3 credit hours	_____
MMG 223	Immunology	3 credit hours	_____
MMG 225	Eukaryotic Virology	3 credit hours	_____
MMG 240	Int. Macromol.Struct. Prots. & NA	3 credit hours	_____
MMG 312*	Yeast Molecular Genetics	3 credit hours	_____
MMG 320*	Physiol. of Microbial Pathogenesis	4 credit hours	_____
MMG 350*	Nucleic Acids I	3 credit hours	_____
MMG 352*	Nucleic Acids II	3 credit hours	_____

TOTAL CREDITS Core + Additional must total 17 crs.)..... _____

* 300-level courses should only be taken by undergraduates with special permission of both the course instructor and the student's faculty advisor. **MMG350 is MMG254 in Catalog & MMG352 is BIOC331 in Catalog.**

Special Topics courses will be designated as appropriate for Microbiology, Molecular Genetics, or both at the time that they are offered.

The following descriptions are intended only as examples.

FOR MOLECULAR GENETICS MAJORS*

<u>FALL</u>		<u>SPRING</u>	
<u>FIRST YEAR</u>			
Biol. 1 or 11	4	Biol 2 or 12	4
Chem 31	4	Chem 32	4
Math 19 or 21	3 (4)	Math 20 or 22	3(4)
AGRI 99	2	English 1	3
AGRI 95	1	Physical Education	<u>1</u>
Physical Education	<u>1</u>		15
	15		
 <u>SECOND YEAR</u>			
Chem 141	4	Chem 142	4
MMG 101	4	MMG 102	4
BOT 132 (Genetics)	3	Speech 11 (or alternative)	3
AGRI 85	3	Elective (Fine Arts)	<u>3</u>
Elective (Soc. Sci.)	<u>3</u>		14
	17		
 <u>THIRD YEAR</u>			
Elective	3	Microbiol. Elective	3
MMG 201	3	Elective (Fine Arts)	3
Immunology (MMG 223)	3	Elective (Soc. Sci.)	4
Statistics 141	3	Biochem. II, MMG 206	3
Biochemistry I, MMG 205	<u>3</u>	Biochem Lab, MMG 207	<u>2</u>
	15		15
 <u>FOURTH YEAR</u>			
Physics 11/21	5	Physics 12/22	5
Research** (MMG 197)	3(var)	Research** (MMG 198)	3(var)
Elective	3	Elective	3
Virology (MMG 225)	3	Elective (Fine Arts)	3
Elective	<u>3</u>	Elective	<u>3</u>
	18		17

The minimum number of course credits earned in this illustration is 127. Research credits taken can vary this.

*With the exception of Core Requirement Courses and College Distribution Requirements (see pages 1 and 2), any of the "Additional Requirements" courses can be substituted for courses listed above.

**Undergraduate Research in MMG can serve as the basis for College Honors Projects. With the approval of your advisor, the research can be done in CALS or College of Medicine laboratories.

FOR MICROBIOLOGY MAJORS

FALL

SPRING

FIRST YEAR

Biol. 1 or 11	4	Biol 2 or 12	4
Chem 31	4	Chem 32	4
Math 19 or 21	3(4)	Math 20 or 22	3(4)
AGRI 99	2	English 1	3
AGRI 95	1	Physical Education	<u>1</u>
Physical Education	<u>1</u>		15
	15		

SECOND YEAR

MMG 101	4	Chem 142	4
Chem 141	4	Elective (Soc. Sci.)	3
Elem. Genetics (BOT 132)	3	MMG 102	4
Statistics 141	3	Elective	3
Computers (AGRI85)	<u>3</u>	AGRI 183	<u>3</u>
	17		17

THIRD YEAR

Microbiol. Elective	3-4	Microbiol. Elective	3-4
Biochem. I MMG 205	3	Elective (Fine Arts)	3
Microbiol. Elective	3	Biochem. II, MMG 206	3
Elective	<u>3</u>	Biochem Lab, MMG 207	2
	13-14	Elective (Soc. Sci.)	<u>3</u>
			14-15

FOURTH YEAR

Microbiol. Elective	3	Physics 12/22	5
Physics 11/21	5	Microbiol. Elective	3
Microbiol. Elective	3	Microbiol. Elective	3-4
Elective	3	Elective (Fine Arts)	<u>3</u>
Research** (MMG 197)	<u>var(3-4 suggested)</u>		14-15
	17-18		

The actual number of course credits earned in this illustration is 123-127.

Undergraduate Research in MMG can serve as the basis for College Honors Projects. If interested, and with the approval of your advisor, the research can be done in laboratories in CALS or College of Medicine.

If one is interested in pursuing a program leading to a [clinically oriented career](#), we would suggest substituting the following courses for those in the above illustration designated as "Microbiol. Elective": MMG 201, MMG 222 and MEDT 255 are absolutely essential. Also, MMG 203, MMG 223 and MMG 225 are strongly suggested as well as MMG 197/198.

If one is interested in pursuing a program leading to an [applied microbiology career](#), we would suggest substituting the following courses for those in the above illustration designated as "Microbiol. Elective": MMG 201, MMG 220, ASCI 203 are absolutely essential. Also, MMG 203, MMG 222, MMG 223 and ASCI 204 are strongly suggested.

If one is interested in pursuing a program leading to a [general microbiology experience](#), we would suggest substituting the following courses for those in the above illustration designated as "Microbiol. Elective": MMG 201, MMG 222, MMG 223 and MMG 225 are absolutely essential. MMG 211 or any of the other courses listed in the above descriptions would suffice to fill out the program.

ADDITIONAL PERTINENT INFORMATION

- 1. Accelerated Masters Program**
- 2. Phi Beta Kappa - Page 10**
- 3. Guidelines for Undergraduate Research - Page 11**

1. The following are the salient points concerning MMG's **Accelerated Masters Program**. The complete Program Description can be obtained on request.

1. **DESCRIPTION OF THE PROGRAM**

Microbiology and Molecular Genetics (MMG) offers an Accelerated Masters Program (AMP) in which outstanding students can earn a Master of Science (M.S.) degree with just one additional year of study beyond the Baccalaureate. The AMP program compresses the normal six years required to earn the M.S. (four years to B.S. + 2 years to M.S.) into five years, allowing students to save a year's tuition and reach the job market one year sooner than usual.

2. **ELIGIBILITY:** Only students from MMG, Biomedical Technology or Animal Sciences are eligible. Students typically apply to the AMP Program in the Spring of their third year of undergraduate study, therefore having completed three years of study before entering the program. Typically, applicants must be enrolled as majors or minors in either Microbiology or Molecular Genetics and must also have a GPA of at least 3.0 in their first three years of study to be eligible for the program. Students must also have completed at least one year of Introductory Inorganic Chemistry, one year of Organic Chemistry, one year of Calculus, BOT 132, MMG 101 and 102. Finally, in accordance with Graduate College guidelines, applicants should arrange to take the GRE exam in the Spring of their third year: it is not, however, necessary to take any of the advanced subject tests.

Students interested in, and qualified for, the AMP program must first locate a prospective mentor in whose lab the AMP research will be conducted. The student must include, with his/her application, a short letter from the prospective mentor agreeing to guide the student in his/her research as an AMP student. Students who have an early interest in eventually entering the AMP, should plan to conduct undergraduate research as early as possible in their tenure.

3. **CREDIT REQUIREMENTS**

The total credit requirement for a B.S. degree in Microbiology or Molecular Genetics is 122 course credits. The total credit requirement for a M.S. degree in Microbiology and Molecular Genetics is 24 course credits plus 6 research credits, for a total of 30 credits. Therefore, a student who proceeds through the AMP program will ordinarily take 146 course credits (that is, 122 course credits for the B.S., 24 course credits for the M.S. plus the 6 credits of Masters' level original research).

However, if an AMP student has taken General Biochemistry [BIOC 301, 302] during his/her undergraduate studies, he/she can apply the 6 course credits earned to both the undergraduate and the graduate degrees. In other words, the six credits from BIOC 301 & 302 will satisfy 6 credits of the 122 toward the B.S. degree and 6 credits toward the 24 course for the M.S. degree. This will leave, then, 116 additional course credits for the B.S. degree, 18 course credits for the M.S. degree plus 6 research credits.

4. **CURRICULUM**

Up to and including the last semester of the third year, AMP students follow the curriculum as outlined previously in the simulations.

*****AT THIS POINT THE STUDENT THE STUDENT ENTERS THE AMP*****

5. **FOURTH AND FIFTH YEARS** - The curriculum of the final two years of the AMP will be decided upon via discussions between the student and his/her mentor. AMP students, however, must satisfy the MMG Core Curriculum [for graduate students](#) which includes: six credits each of Biochemistry (BIOC 301/302), Genetics, and Microbiology, at least four credits in current topics in Molecular Genetics (MMG 310) and other approved courses such that at least 16 course credits are taken from courses offered by the Department. AMP students must also successfully pass the qualifying examination and complete the thesis.
- f. **QUALIFYING EXAM for M.S. CANDIDATES:** By the first semester of the fifth year, M.S. candidates will write either an extensive literature review or research proposal that pertains to their research interests. Students can expect some guidance from their advisor and Studies Committee in the writing of the proposal, but must assume responsibility for the final version and must acquire sufficient mastery of their chosen subject area to defend the proposal. Students will present their written proposal to their Studies Committee. That Committee will determine if the written proposal is satisfactory and, if it is, schedule an oral defense. During the oral defense, the Committee shall be free to explore the knowledge of the student on a range of subjects related to the proposal, much as occurs during a thesis defense. If the written review/proposal is deemed unsatisfactory or if a student fails the oral defense, the candidate will be given one opportunity to rewrite or re-defend his/her proposal. If the student fails a second time, s/he will be dismissed from the M.S. program.
- g. **THESIS WRITING:** Decided between student and advisor.

PHI BETA KAPPA INFORMATION

Students with good scholastic records may welcome information about Phi Beta Kappa, founded in 1776, the nation's oldest and most prestigious college honors society (the parent in fact of all Greek-letter societies, both honorary and social). A chapter of Phi Beta Kappa was chartered at UVM in 1848, and we take special pride in having been the very first chapter to admit women (in 1875) and the first to elect an African American (in 1877).

Membership in Phi Beta Kappa is by invitation only (there is no application process). Invited to membership are women and men whose superlative scholastic accomplishments reveal **breadth of exploration and depth of achievement in a broad range of the liberal arts.** Undergraduates from any program or department in the University are eligible for consideration, and the chapter's membership committee systematically examines all undergraduate records--not just those for students in the College of Arts and Sciences.

Election to the chapter cannot take place before a student has completed the first semester of the junior year (75 credit hours).

MINIMUM requirements for consideration are:

- high scholastic standing reckoned both by cumulative GPA and by grades in liberal arts courses
- graded course work adequate to fulfill the requirements in all seven distribution areas defined by the Faculty of Arts & Sciences as explained in the UVM catalogue (Foreign Language, Mathematics, Fine Arts, Literature, Humanities, Social Sciences and Natural Sciences). ***With the exception of the foreign language and literature requirements, all the other requirements are met by those distribution requirements of CALS.***

- at least 50% of course work counted for graduation completed (and with a grade) at UVM
- 75% of course work in liberal arts-usually, although not always necessarily, within the College of Arts & Sciences.

Although the honor bestowed by membership in the Society recognizes academic achievement, qualifications for election to Phi Beta Kappa are entirely independent of any other institutional regulations. It should especially NOT be assumed that the graduation requirements for Arts & Sciences are sufficient for election to Phi Beta Kappa. The conditions listed above are a **minimum** which may enable students with fine academic records to avoid accidentally disqualifying themselves by lack of information. On the other hand, the minimum qualifications set forth here do NOT constitute ELIGIBILITY or ENTITLEMENT to election into Phi Beta Kappa. The membership committee examines the academic record of each individual who meets these minimum standards, and seeks to ensure that there is sufficient breadth and depth in liberal studies to justify an invitation to the Society.

Undergraduate students should discuss these criteria with their academic advisors in planning course schedules for the remainder of their undergraduate program. Academic advisors are encouraged to bring these criteria to the attention of their students. Officers of the chapter will be glad to provide additional advice when needed. For further information point your browser to: <http://www.uvm.edu/~phibeta/welcome.html>

GUIDELINES FOR UNDERGRADUATE RESEARCH PROJECTS CONDUCTED FOR COURSE CREDIT (i.e. MMG 197/198).

PREMISE: Undergraduate research course work should be considered just as any other course within the Department. That is, the faculty member responsible for guiding the student's research serves as course director, and is expected to make clear to the student what the expectations are with respect to the particular project and its scope. The student will be appraised of each of the parameters described below, prior to initiating the project.

Course Credit Hours: These will be assigned in accordance with the general (albeit unwritten) University guidelines which assume that students will spend ~3 hours study time for every ~1 hour lecture in a standard classroom course. A three credit lecture course would therefore entail 150 min. per week in lecture and 450 minutes study time = 600 minutes or 10 hours per week total time. Consequently students should expect to work 3-4 hrs. per week for every one research credit hour. It is understood that a particular research project undertaken may require more time than that allotted and, should this be the case, the student and the mentor may discuss the awarding of additional credit.

COMPLETION OF PROJECT: Upon completion of the project (or at some prescribed point during the project) the student will be expected to summarize the impetus for the project and describe the results of the research conducted. At the discretion of the mentor, this summary may entail the writing of a paper or a presentation at a lab meeting or a regular Departmental seminar.

GRADING: Assignment of grades is the responsibility of the course director. It is assumed that the grade will be assigned in accordance with the expectations agreed upon between the student and the mentor.