Microbiology, Genetics, and Immunology 3+2 Agreement

Between
Michigan State University
and
Bennett College

1. Preamble

The purpose of this articulation agreement is to provide a basis for a cooperative relationship between Michigan State University (MSU) and Bennett College (BC) to benefit students who desire to earn a Bachelor of Science (BS) in Biology and a Plan B (non-thesis) master's (MS) in Microbiology and Molecular Genetics. This relationship arose out of discussions as part of the Alliance for Expanding Pathways to the Professoriate developed between faculty and administrators at MSU and several minority-serving institutions, including BC. We envision this partnership contributing to ongoing efforts to enhance diversity within MSU and the biology research profession, as well as providing an opportunity for BC biology students to find fulfilling and advanced research and education opportunities in the biology field, especially in microbiology, genetics, and immunology.

2. General purposes

The purpose of this articulation agreement is to provide a basis for a cooperative relationship between MSU and BC to benefit students who desire to earn a BS in biology followed by a MS degree in Microbiology and Molecular Genetics from MSU. Under the 3+2 program, a student first completes 95 credits of course work at BC, after which they enroll at MSU to complete a minimum of 25 credits of coursework to obtain a BS degree in biology from BC. The student will complete a total of 30 credits of coursework at MSU to obtain a MS (Plan B) degree in Microbiology and Molecular Genetics. The BS degree will be conferred by BC, and the MS degree will be conferred by MSU. Students may share up to 9 credits of coursework (400-level or above) earned as an undergraduate toward the 30 credits required for the master's degree.

3. Specific activities to be pursued and implementation plans

Activity 1. Recruiting BC students.
From MSU Department of Microbiology, Genetics, and Immunology (MGI), the director of graduate studies and the undergraduate advisor will share responsibility for this activity. They will prepare promotional materials, answer questions from interested students, encourage participation in the Summer Research Opportunities Program (SROP) at MSU and potentially travel to BC for recruiting visits. This will be supported at the staff level by the MGI Graduate Coordinator.

Activity 2. Advising of students at BC.
Designated BC biology faculty will identify and advise interested BC students on course selection while in residence at BC to ensure that they stay on track to meet requirements for both degrees (BS and MS).

Activity 3. Advising of students at MSU.
The undergraduate advisor and director of graduate studies from the Department of Microbiology, Genetics, and Immunology will share the responsibility of advising 3+2 students, along with the student's research guidance committee, while in residence at MSU. This will include course selection, processing of any needed overrides, planning for summer semesters, monitoring research progress, and networking and career services. This will be supported at the staff level by the MGI Graduate Coordinator.

Activity 4. Cross-institutional communication during undergraduate study at MSU.
MSU and BC advisors will have shared responsibility to ensure that problems arising for students during undergraduate study at MSU (e.g., dropped classes, medical withdrawal, poor academic performance) are addressed collaboratively by both institutions. MSU advisors are responsible for making timely reports to the BC advisor on student progress. In the event a 3+2 student encounters problems during undergraduate study at MSU, MSU advisors will address them according to university policies and include BC advisors whenever possible in any intervention.

4. **University units involved**
This agreement will involve the following MSU units: Department of Microbiology, Genetics, and Immunology, College of Natural Science, and The Graduate School.
This agreement will involve the following BC units: Biology Program and Office of Academic Affairs.

5. **Parameters of the agreement**
Students in the BC Biology degree track may transfer and apply a minimum of 25 credits earned as an undergraduate student in MSU's Department of Microbiology, Genetics, and Immunology to complete degree requirements for a BS in biology from BC.

BC students are guaranteed admission to MSU under the following conditions:

a. The student has submitted a complete **non-degree** application for admission to Michigan State University.
b. The student has a minimum 3.0 grade point average on a four-point scale.

BC students will be admitted as non-degree students and coded accordingly by the Registrar until the initial 25 credits are completed fulfilling the BS Biology degree requirements. Students will then submit a graduate application and be re-classified as traditional graduate students.

Students can expect to graduate with a BS degree from BC under the following conditions:

a. They pass the required coursework as described in Addendum 1.
b. If, for any reason, a BC 3+2 student withdraws from MSU prior to completion of the credits required for the BS degree (Addendum 1), the student may return to BC to complete the BS degree by fulfilling credit, course work, and other requirements. The student may transfer MSU semester credits to BC, provided a 2.0 or higher grade is earned in each class.

Students can expect to graduate with a MS (Plan B) degree from MSU provided they complete the requirements described in Addendum 2. Briefly, this entails progress on a research project with a professor at MSU, and completion of a total of 30 credits of research and coursework (at least 16 credits must be 800-level or higher).

Once enrolled in the MS (Plan B) program at MSU, progress through the degree will be governed by the policies and academic regulations established for all MS (Plan B) students as detailed in the MGI graduate handbook. Most importantly, although the curriculum outlined in Addendum 2 can be completed in a single academic year, there is no specific requirement that students follow this timeline.

Addendum One: Curriculum and Requirements for BS in biology from Bennett College

Addendum Two: Curriculum and Requirements for MS (Plan B) in Microbiology and Molecular Genetics from Michigan State University.

Recognizing that changes in curricula and course content are inevitable, each institution agrees to discuss with the other institution all curriculum changes affecting this agreement before the changes are implemented.

This document, including its addenda, constitutes the entire agreement between the parties, and all prior discussions, agreements, and understandings, whether verbal or in writing, are merged in this document. Furthermore, the agreement is not considered to be a contract creating legal and financial relationships between the parties. The agreement is designed, rather, to facilitate and develop a genuine and mutually beneficial relationship.

6. Funding Arrangements

While students are pursuing their undergraduate degree, BC will be considered the home school. The home school is responsible for coordinating financial aid and reporting a student's enrollment information to the National Student Loan Data System (NSLDS) for students enrolled under this agreement. Students in this program will be charged in-state MSU undergraduate tuition until the BS degree is conferred.

Like other approved 3+2 agreements at MSU, BC students will be eligible for Michigan in-state tuition for coursework towards the MS in Microbiology and Molecular Genetics. Additional support may be available through scholarships, grant funding, and/or teaching assistantships that are available to support BS/MS students in MGI. It is noted that once a student is admitted to the graduate program, MSU will administer any applicable financial aid for the student.

7. Duration of the agreement

This Agreement shall become effective as of the last date of signatures of both parties and shall remain in effect for five years following that date.

8. Termination

The agreement may be terminated by written notice by either party with a minimum of 120 days written notice. Should a decision be made to modify or dissolve this agreement, students who

are already attending MSU at the time will be permitted to complete the program if their academic performance remains in good standing.

9. **Review and Evaluation**
   A review of this agreement and the resulting programs will take place every five years by representatives from both institutions. The MSU Microbiology, Genetics, and Immunology Graduate Committee and Undergraduate Committee will be responsible for carrying out this evaluation for the Department of Microbiology, Genetics, and Immunology.

10. **Nondiscrimination**
    Both parties subscribe to a policy of equal opportunity and do not discriminate on the basis of race, color, gender, age, height, weight, marital or familial status, ethnicity, religion, national origin, or disability.

11. **Communication between the parties**
    Official communications between parties should take place via email, with informal communication via phone.

    MSU Microbiology, Genetics, and Immunology contacts:
    Department Chairperson, Victor DiRita, diritavi@msu.edu, 517-884-5292
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    Graduate Coordinator, Amber Bedore, bedoream@msu.edu, 517-884-5288

    BC Biology Program contacts:
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    Laura Colson, BC VP of Academic Affairs, lcolson@bennett.edu, 336-517-2100

Bennett College

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Michigan State University

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Philip Duxbury, PhD
College of Natural Science, Dean

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on 2024-06-07 08:02:57 EST

Victor DiRita, PhD
Microbiology, Genetics, and Immunology Department, Chair

E-SIGNED by Anthony Krolak
on 2024-06-04 08:01:25 EST

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on 2024-06-04 09:00:16 EST

Addendum One: *Curriculum and Requirements for B.S. in biology from Bennett College.*

Years one-three at BC and Year four at MSU: BACHELOR OF SCIENCE IN BIOLOGY

Notes: 95 credits to be completed at BC and 25 credit hours to be completed at MSU.

First Year (BC)	Fall Semester			Spring Semester		
Course	**Course Title**	**Credit**		**Course**	**Course Title**	**Credit**
OR 100AB	Orientation	2				
BI 103	**Intro to Biology**	**1**				
LW 102	Literature & Writing I	3		LW 103	Literature & Writing II	3
BI 101	**Principles of Biology I**	**4**		**BI 102**	**Principles of Biology II**	**4**
MA 111B	**College Algebra**	**3**		**MA 130**	**Pre-Calculus**	**3**
CH100/101	**College Chemistry I***	**4**		**CH 102**	**College Chemistry II**	**4**
Total		**17**		**Total**		**14**

**CH 100 if no HS Chemistry*
boldface indicates Bennett College major course requirements

Second Year (BC)	Fall Semester			Spring Semester		
Course	**Course Title**	**Credit**		**Course**	**Course Title**	**Credit**
CS 170	**Intro to Inform Tech**	**3**		PE	PE Elective	1
BI 225	**Zoology**	**4**		**MA/CH Elective/ MA221**	**Calculus I**	**4**
SH 103	**Public Speaking**	**3**		**MAJ ELECT/ BI 424**	**Major Elective Group A/ Microbiology**	**4**
RS 200	Research Methods	3		GEN ED	Gen Education Area Elective	3
CH 221	**Organic Chemistry I**	**4**		**CH 222**	**Organic Chemistry II**	**4**
Total		**17**		**Total**		**16**

Third Year (BC)	Fall Semester			Spring Semester		
Course	**Course Title**	**Credit**		**Course**	**Course Title**	**Credit**
PE I	PE Elective	1		**BI 403**	**Human Physiology**	**4**
PY 201	**Physics I**	**4**		**PY 202**	**Physics II**	**4**
BI 328	**Cell Biology**	**4**		**BI 423**	**Genetics**	**4**
LANG I	Foreign Language I	3		LANG II	Foreign Language II	4
GEN ED	General Education Area Elective	3				
Total		**15**		**Total**		**16**

Student status after Year 3: 95 credits completed, eligible to transfer to MSU.
MSU Summer activities after Year 3 to include:

I. Participation in SROP program.
II. Laboratory research rotations

Fourth Year (MSU)	Fall Semester			Spring Semester		
Course	**Course Title**	**Credit**		**Course**	**Course Title**	**Credit**
MMG 499 **(eq BI 431)**	UG Research **(Special Problems)**	2		MMG 492 **(eq BI 442)**	UG Research Seminar **(Senior Seminar)**	1
BMB 401 **(eq CH 326)**	Comp Biochemistry **(Major Elective Group A, Biochem)**	4		IBIO 355 **(eq BI 326)**	Ecology **(Ecology)**	3
MAJ ELECT	****Major Elective Group B**	**3**		**MAJ ELECT**	****Major Elective Group B**	**3**
MMG 431 (UG&GR)	*Microbial Genetics*	*3*		*MMG 434 (UG&GR)*	*Genomics Lab*	*4*
				MMG433 or MMG 890 (UG&GR)	*Genomics or Special Problems Research*	*2-3*
Total	*Guidance committee identified.*	**12**		**Total**	*Meet with guidance committee to plan coursework and research for MS.*	**13-14**

boldface indicates Bennett College major course requirements

Italics indicate credits that would be elective for UG and shared with MS program.

** Major Elective Group B includes Anatomy, Botany, Evolution, Vertebrate Embryology, Comparative Anatomy of Vertebrates, and Plant Physiology

Student status after Year 4: 120 credits completed, BS in Biology awarded by BC. Student continues as MSU graduate student.

Courses to be transferred from MSU and their equivalents at BC

MSU course to be transferred		BC course equivalent		
MMG 499 Undergraduate Research	2	BI 431 Special Problems (core course)	2	Fourth Year
MMG 492 UG Research Seminar	1	BI 442 UG Senior Seminar (core course)	1	Fourth Year
BMB 401 Comprehensive Biochemistry	4	Major Elective Group A	4	Fourth Year
IBIO 355 Ecology	3	BI 326 Ecology (core course)	3	Fourth Year
IBIO 445 Evolution or other	3	Major Elective Group B	3	Fourth Year
IBIO425 Cells and Development or other	3	Major Elective Group B	3	Fourth Year
MMG431 (UG+GR)	3	BI 428	3	Fourth Year
MMG 434 Genomics Laboratory (UG+GR)	4	Free elective	4	Fourth Year
MMG 433 Genomics	3	Free elective	3	Fourth Year
MMG890 Special Problems Research (UG+GR)	2	Free elective	2	Fourth Year

Bennett College Major Electives and MSU equivalent courses, for reference.

BC Major Electives, Group A (complete two)		**MSU course equivalent**	
BI 205 Histology and Microtechniques	4	n/a	
BI 424 Microbiology	4	MMG 301 Introductory Microbiology	3
BI 426 Immunology	3	MMG 451 Immunology, BLD 434 Clinical Immunology	3
BI 427 Biotechnology	4	n/a	
BI 428 Molecular Biology	3	n/a	
CH 326 Biochemistry	4	BMB 401 Comprehensive Biochemistry	4

BC Major Electives, Group B: (Complete two)		**MSU course equivalent**	
BI 205 Human Anatomy	4	ANTR350 Human Anatomy	4
BI 227 Botany	4	PLB 105 Plant Biology	3
BI 316 Evolutionary Biology	3	IBIO 445 Evolution	3
BI 321 Vertebrate Embryology	4	IBIO 425 Cells and Development	4
BI 322 Comparative Anatomy of Vertebrates	4	IBIO328 Comparative Anatomy & Biology of Vertebrates	4
CH 354 Plant Physiology	4	PLB 415 Plant Physiology	3

BC Major Electives, Group C: (Complete 3-4 credits)		**MSU course equivalent**	
MA 221 or 222 Calculus I or II	4	MTH 132 or 133 Calculus I or II	3 or 4

Addendum 2: *Curriculum and Requirements for MS (Plan B) in Microbiology and Molecular Genetics from Michigan State University.*

A minimum of 30 credits are required for the Plan B MS degree, with at least 16 credits at 800-level or higher.

Students may share a maximum of 9 credits earned prior to BS conferral (400-level and above courses that are relevant to the research project and approved by the MS guidance committee). The remaining 21 credits (or number required to reach 30 credits) are earned during the second year at MSU. This timeline may be extended for an additional 4 years maximum based on the research progress and the student's needs.

Summer after BS conferred by BC	**Summer Semester**					
Course	**Course Title**	**Credit**				
MMG890	Special Problems Master's research	5				
Total		5				
Fifth Year (MSU)	**Fall Semester**			**Spring Semester**		
Course	**Course Title**	**Credit**		**Course**	**Course Title**	**Credit**
MMG8XX	Advanced Microbiology course	3-4		MMG8XX	Advanced Microbiology course	3-4
MMG890	Special Problems Master's research	3		MMG890	Special Problems Master's research	3
MMG991	Topics course	1		MMG892	Seminar	1
Total		**7-8**		**Total**		**7-8**
	Meet with Guidance committee for recommendations.				*Prepare written report, present project, and pass oral exam for degree.*	

Plan B MS Requirements in summary:

1. Complete a total of (30) credits for the Plan B MS degree (without thesis), including:
   - *One (1) credit of MMG 892 Seminar course*
   - *(1) Topics Course – eg. MMG 991*
   - *Minimum of (6) credits of 800 level or above coursework in Microbiology and Molecular Genetics or equivalent with prior approval*
   - *(7-15 credits) of MMG 890 Special Problems Master's Research*
   - *Additional coursework at 400 level or above related to the project*
2. Provide progress reports to MS guidance committee.
3. Complete Year 1 *Responsible Conduct of Research* training plus 6 hours workshop or discussion-based RCR training.
4. Prepare a written report describing the research project and findings, present the project in a public seminar, and pass an oral examination in defense of the MS that covers both coursework and research.

Microbiology, Genetics and Immunology graduate courses that may be transferred to BC

MMG 801: Integrative Microbial Biology. Structural, metabolic, phylogenetic, and genomic diversity of microbes and microbial communities. Microbial ecology, evolution, and behavior. Regulation of gene expression. Microbial interactions with other microbes, animals, or plants.

MMG 813: Molecular Virology. Molecular nature and biochemistry of replication of animal viruses. Current advances, research concepts, and the role of viruses in molecular biology research.

MMG 825: Cell Structure and Function. Molecular basis of structure and function. Cell properties: reproduction, dynamic organization, integration, programmed and integrative information transfer.

MMG 833: Microbial Genetics. Gene structure and function. Genetic regulation at classical and molecular levels in prokaryotes and lower eukaryotes.

MMG 835: Eukaryotic Molecular Genetics. Gene structure and function in animals, plants, and fungi. Basic aspects of modern human genetics and the genetic basis for disease. Molecular genetic analyses.

MMG 861: Advanced Microbial Pathogenesis. Virulence factors of microorganisms and the relationship of these factors to disease; host-pathogen interactions.

MMG 847: Advanced Mycology. Systematics, identification, physiology, genetics, and molecular biology of plant pathogenic fungi.

MMG 852: Molecular Immunology. Protein structures and functions of immune receptors and molecules, gene expression and regulation, DNA rearrangements and antigen receptors diversifications.

MMG 853: Cellular Immunology. Cells in the immune system, lymphocytes development and differentiation, cellular interactions in immune responses.

MMG 854: Applied Immunology. Immunity against bacterial and viral infections, and cancer cells. Vaccines, Transplantation and Immunotherapies. Immunodeficiency and autoimmune diseases

MMG 890: Special Problems Master's Research. Builds upon the UG research experience through a continuation of activities and projects in various research fields of inquiry, including Microbiology, Genetic or Microbial Basis of Disease, Environmental Quality and Resilience, Cancer Genetics, Computational Analysis, Biotechnology and more.

MMG 892: Seminar. Student review and presentation of selected topics in microbiology and public health.

MMG 991: Topics in Microbiology: eg. Metals in Biology, Microbial Evolution and Infectious Disease, Molecular Immunology, Quantitative Methods in Inorganic Physiology, Opportunistic Pathogens, Evolutionary Game Theory, Cancer Biology