

<b>Fiscal Unit/Academic Org</b>	Microbiology - D0350
<b>Administering College/Academic Group</b>	Arts And Sciences
<b>Co-administering College/Academic Group</b>	Arts And Sciences
<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>	Microbiology
<b>Proposed Program/Plan Name</b>	Microbiology
<b>Program/Plan Code Abbreviation</b>	MICRBIO-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	26	17.3	20	2.7
	Maximum	35	23.3	26	2.7
Required credit hours offered outside of the unit	Minimum	5	3.3	4	0.7
	Maximum	14	9.3	10	0.7
Required prerequisite credit hours not included above	Minimum	65	43.3	48	4.7
	Maximum	66	44.0	48	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**

Credit hours have increased for required prerequisites: BIOL, CHEM, MATH AND PHYS.

## 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

- Goal 1. Students acquire the ability to interrelate and apply the fundamental concepts of chemistry, physics and mathematics to the functions of living cells.
- Goal 2. Students understand the chemical properties of biological molecules and how these molecules function in the molecular mechanisms underlying physiological processes in microbial cells.
- Goal 3. Students understand evolutionary processes, the diversity of microorganisms, and how microorganisms impact their environment, including their roles in human health and disease.
- Goal 4. Students acquire the ability to design experiments to test hypotheses, perform analyses, interpret and analyze data, and present scientific information in written and oral formats.
- Goal 5. Students acquire the ability to appraise scientific data presented in the popular press for accuracy and scientific merit and understand issues and ethical conflicts associated with applications of biotechnology.

## Assessment

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

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

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

**A full assessment plan has been submitting using the survey form**

## **Program Specializations/Sub-Plans**

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

## **Pre-Major**

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

## **Attachments**

- CCI Subcommittee Chair Letter--MicrobiologyBABS.doc: CCI Subcommittee Chair Letter  
*(Other Supporting Documentation. Owner: Vankeerbergen, Bernadette Chantal)*
- MicrobiologyBS\_rev4.pdf: All documents  
*(Program Proposal. Owner: Daniels, Charles John)*
- Microbiology BS 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	Daniels,Charles John	01/19/2011 11:43 AM	Submitted for Approval
Approved	Daniels,Charles John	01/20/2011 06:51 AM	Unit Approval
Revision Requested	Andereck,Claude David	01/26/2011 05:10 PM	College Approval
Submitted	Daniels,Charles John	02/02/2011 11:45 AM	Submitted for Approval
Approved	Daniels,Charles John	02/03/2011 12:27 PM	Unit Approval
Revision Requested	Andereck,Claude David	02/15/2011 04:03 PM	College Approval
Submitted	Daniels,Charles John	02/21/2011 04:49 PM	Submitted for Approval
Approved	Daniels,Charles John	02/21/2011 04:52 PM	Unit Approval
Approved	Andereck,Claude David	02/22/2011 10:24 AM	College Approval
Revision Requested	Vankeerbergen,Bernadette Chantal	02/28/2011 03:02 PM	ASCCAO Approval
Submitted	Daniels,Charles John	03/01/2011 11:11 AM	Submitted for Approval
Approved	Daniels,Charles John	03/01/2011 11:14 AM	Unit Approval
Approved	Andereck,Claude David	03/01/2011 03:45 PM	College Approval
Revision Requested	Vankeerbergen,Bernadette Chantal	03/04/2011 10:57 AM	ASCCAO Approval
Submitted	Daniels,Charles John	03/04/2011 02:41 PM	Submitted for Approval
Approved	Daniels,Charles John	03/04/2011 02:42 PM	Unit Approval
Approved	Andereck,Claude David	03/05/2011 02:24 PM	College Approval
Revision Requested	Vankeerbergen,Bernadette Chantal	03/14/2011 10:12 AM	ASCCAO Approval
Submitted	Daniels,Charles John	03/14/2011 10:14 AM	Submitted for Approval
Approved	Daniels,Charles John	03/14/2011 10:15 AM	Unit Approval
Revision Requested	Andereck,Claude David	03/14/2011 10:34 AM	College Approval
Submitted	Daniels,Charles John	03/14/2011 11:04 AM	Submitted for Approval
Approved	Daniels,Charles John	03/14/2011 11:05 AM	Unit Approval
Approved	Andereck,Claude David	03/14/2011 11:37 AM	College Approval
Pending Approval	Hanlin,Deborah Kay Vankeerbergen,Bernadette Chantal Meyers,Catherine Anne Jenkins,Mary Ellen Bigler Nolen,Dawn	03/14/2011 11:37 AM	ASCCAO Approval

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March 14, 2011

Larry Krissek  
Chair, Arts and Sciences CCI

Dear Larry:

It is a pleasure to forward to you the proposal for the BS major in Microbiology under semesters. After a very extensive internal review of the program, the department has decided to retain the basic structure, while re-packaging some of the courses, while modifying the content of others. Students enter the program through a new foundational course at the 4000 level, created from the merger of two quarter courses. The core that builds on this will provide a strong base for students to move on to electives in the major.

Beyond my own review of the documents, the proposal has been discussed by colleagues from other NMS units at a meeting on January 26, 2011. Feedback from these discussions, as well as from the CCI Sciences Subcommittee and the CCI itself, 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 English**

421 Denney Hall  
164 W. 17<sup>th</sup> St.  
Columbus, OH 43210

Phone (614) 292-0695

To: Larry Krissek, CCI Chair  
From: James Fredal, CCI Sciences Subcommittee Chair  
Re: Microbiology BA Semester Conversion Proposal

March 4, 2011

Larry:

The CCI Sciences subcommittee reviewed and unanimously approved the semester conversion proposals for the Microbiology BA and BS on February 28, 2011. The programs were last revised in 2001 and underwent an external review in 2007 and an internal departmental review in 2008. The proposed changes reflect the recommendations from those reviews and recent developments in the field. Though the proposal is listed as undergoing significant changes from the quarter degree program, many of these changes arise from changes to course content and course sequences for both degree prerequisites and core courses. Changes include an increase in the required core, from five quarter to six semester courses, and a decrease in elective hours from 19 quarter hours to 9 semester hours. The BS will include a two-semester math sequence (from the three quarter calculus sequence) and the BA a one-semester math requirement (from the two quarter math sequence). Otherwise the two degrees are functionally identical.

We held up the proposals so that a few minor errors could be fixed and now forward both to the full CCI with recommendation for approval.

Thanks

Jim F.



## Department of Microbiology

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January 19, 2011

Office of Academic Affairs  
203 Bricker Hall  
190 North Oval Mall  
CAMPUS

Re: Microbiology Degree Programs

Dear Colleagues,

The Department of Microbiology offers both undergraduate and graduate degree programs. At the undergraduate level, the department offers BS and BA degrees in Microbiology, and a minor in Microbiology. Through the graduate program the department awards MS and Ph.D. degrees in Microbiology.

The department used the transition to semesters as an opportunity to critically review our curriculum and each of our degree programs. During the 2009-2010 academic year the undergraduate and graduate curriculum committees carried out reviews of their courses and degree requirements. A number of factors were considered in the reviews, these included the responses from student surveys in undergraduate courses, discussions with current graduate students, comparisons of undergraduate and graduate programs at peer institutions, and recommendations from the American Society for Microbiology (ASM). The ASM is the national society for the discipline and its educational branch provides recommendations on the content and scope of microbiology degree programs. We were also guided by comments we received in our recent Unit Review and the review of our graduate program for the recent NRC graduate program review. Final plans for the BS and BA degrees, the minor, and the MS and Ph.D. degrees were approved by unanimous votes at a faculty meetings held on October 29, 2010. Recorded votes were 18 for and 0 against, and no abstentions, for all of the programs.

Both undergraduate and graduate programs have substantive changes in their core requirements and some courses will be revised or have expanded content. Consequently, we are presenting these programs as "re-envisioned".

The key changes in the programs are summarized below.

### BS and BA programs:

1. The introductory series, MICRBIOL 520 (5 quarter hrs) and 521 (5 quarter hrs) were merged to a single course, MICRBIOL 4100 (5 semester hrs) with some content reassigned to other courses.
2. The core was expanded from four courses under the quarter system to six courses in semesters. These changes were made to accommodate topics repositioned by the merger of MICRBIOL 520/521 and to ensure the breadth of topics that are expected of all microbiology programs.
3. The minor in Microbiology will also use the new foundations course, MICRBIOL 4100, and students will take a subset of the remaining courses in the new core.
4. Course numbers of the quarter successors that are in the semester core have changed to reflect their new relationships; most others have retained similar numbering.

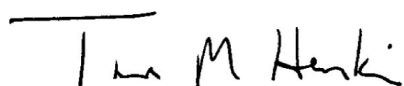
### MS and Ph.D. programs:

1. In the re-envisioned graduate programs, students will complete a four-course core prior to completing their candidacy exam; this will include a new course covering general topics related to graduate research and ethics.

2. The remainder of the program, with respect to candidacy exams and research expectations, are essentially unchanged.

We are also preparing for increased advising demands, especially at the undergraduate level. We have developed a transition plan to direct students completing their undergraduate programs in first two years of the transition. As part of the plan, a bridge course will be offered to accommodate students that may be affected by the merger of MICRBIOL 520/521, and staff changes have been put in place to meet the expected increase for advising. An advising plan is also in place for students who will be in the pre-candidacy stage of their graduate programs. Each plan is designed to limit the possibility that a student will be delayed in graduation for reasons other than academic performance.

The department is excited about the new opportunities these changes will bring to our students, and the university community. We look forward to your response.



Tina Henkin, Ph.D.  
Professor and Chair  
Department of Microbiology



Charles J. Daniels, Ph.D.  
Professor  
Conversion Coordinator

## **Rationale: Microbiology BS and BA**

### **Background**

Since our last major degree program revisions in 2001, the Department of Microbiology has performed a number of departmental reviews: the Unit Review request in 2007, which included a site visit from an external review committee; a Strategic Plan document for the CBS departmental reviews requested by Dean Platz in 2008, and a review of our graduate programs for the recent NRC graduate program review. Each provided valuable insights, and while we have made some minor changes in our undergraduate courses in the intervening time, we have not had the opportunity to fully incorporate many of the ideas and suggestions we have generated from these reviews. During this time there have also been changes in the faculty; Dr. Henkin has assumed the chair position and we recruited two new faculty members, each bringing new and exciting research areas to the department. Coupled with the fast paced changes in the field of Microbiology, and the increasing demands for our courses, we felt the transition to semesters was an ideal opportunity to review the undergraduate and graduate degree programs.

The review processes were similar for both undergraduate and graduate programs. The undergraduate and graduate studies committees, chaired by Drs. Daniels and Ibba, respectively, met with their members during the 2009-2010 academic year and prepared proposals for review by the full faculty. Our reviews were guided in part by suggestions originating from our internal reviews. We also reviewed the Microbiology programs of peer institutions, and considered the recommendations of the American Society For Microbiology (ASM). The ASM is the national society for the discipline and its educational branch provides recommendations on the content and scope of microbiology degree programs. These recommendations are viewed as benchmarks for undergraduate and graduate degree programs in the field. The faculty reviewed proposals in the autumn quarter of the 2010-2011 academic year. Final plans for the BS and BA degrees and the MS and Ph.D. degrees were approved by unanimous votes at a faculty meetings held on October 29, 2010. Recorded votes were 18 for and 0 against, and no abstentions, for all of the programs. Both undergraduate and graduate programs have substantive changes in their core requirements and some courses will have revised or expanded content. Consequently, we are presenting these programs as re-envisioned.

### **Revisions to the BS and BA degree programs**

Under the quarter system the Microbiology BS degree program requires students to complete 40 hrs in the major. The core includes MICRBIOL 520, 521, 581.01, 581.02 and BIOCHEM 511, totaling 21 hrs. Students complete the major requirements by choosing 19 hrs from electives, which are separated into two groups, Group 1 and Group 2. Group 1 courses are from within the department and students must take 10 hrs from this category. Group 2 courses are offered in allied areas and students can take a maximum of 9 hrs from this category. Student can also use 5 hrs of research, MICRBIOL 699 or independent study, MICRBIOL 693, to fulfill their elective requirement. This program is described in detail in the Major planner and Microbiology Handout that accompany this document.

The re-envisioned plan for the BS degree retains the overall structure; however, we have combined some courses and altered the content of others. As a consequence this has led to an increase in the number of courses in the required core. The BS degree program under semesters will require students to complete 30 hrs in the major. The core will consist of six courses totaling 21 hrs:

MICRBIOL 4100	General Microbiology	5 hrs
MICRBIOL 4110	Pathogenesis and Immunobiology	3 hrs
MICRBIOL 4120	Microbial Physiology and Diversity	3 hrs
MICRBIOL 4130	Microbial Genetics	3 hrs
MICRBIOL 4140	Molecular Microbiology Laboratory	3 hrs
BIOCHEM 4511	Biochemistry	4 hrs



To complete their major requirements students will choose 9 hrs of electives. Students must take at least 3 hrs of Group 1 courses and may take all 9 elective hours from Group 1. Students are not required to take any Group 2 courses, but may have up to 6 hrs from this group count as elective hours. As in the quarter scheme, students will be permitted to use 3 hrs of research, MICRBIOL 4998/4999 (or their honors equivalents, MICRBIOL 4998H/4999H) or independent study, MICRBIOL 4193, to fulfill their elective requirement. Students may also apply credits originating from MICRBIOL 4797, Study at a Foreign Institution, or MICRBIOL 4797, Study Tour Domestic, toward their microbiology requirements with approval from the Microbiology undergraduate advisor.

**Microbiology semester core courses: Relationships to quarter predecessors and rationale for their inclusion in the core**

**MICRBIOL 4100, General Microbiology**, 5 hrs. This is a new course derived from the merger of MICRBIOL 520 and MICRBIOL 521, General Microbiology I and II. MICRBIOL 4100 will consist of lecture and lab components and serve as the foundation course for the remaining microbiology courses in the core. The merger will require a slight reduction in content (10 quarter hrs to 5 semester hrs), and as a consequence, some content in the areas of physiology and genetics will be moved to MICRBIOL 4120 and MICRBIOL 4130, respectively. The committee also felt that retaining a two semester introductory series, which was a prerequisite to the other core courses, would be too restrictive. This scheme would force many students to take the remaining major courses in their last two semesters. A single foundation course will also serve as an advanced introduction for non-microbiology majors and graduate students in related fields.

**MICRBIOL 4110, Pathogenesis and Immunobiology**, 3 hrs. This course is a new addition to the core and will contain material from the quarter course MICRBIOL 524.01, Mechanisms of Microbial Disease, and selected material from MICRBIOL 522.01, Immunobiology. These topics are central to modern microbiology and are included in the major programs at nearly all institutions. This course will also provide an advanced introduction to the role of microbes in health and disease, topics important for students planning on postgraduate studies in health sciences.

**MICRBIOL 4120, Microbial Physiology and Diversity**, 3 hrs. This course is the successor to MICRBIOL 661, Microbial Physiology, and is now included in the core. MICRBIOL 661 was an elective in the quarter scheme; however, with the diversity of organisms that now serve as model systems for physiological and biochemical studies, a solid foundation in physiology is essential for advanced studies in nearly all areas of microbiology. Minor changes in the content are planned to accommodate topics shifted from MICRBIOL 521 and additional topics on diversity will be added.

**MICRBIOL 4130, Microbial Genetics**, 3 hrs. This course is the successor to MICRBIOL 581.01, Microbial Genetics, and will remain in the core. Some modifications in content will be made to cover topics reallocated from MICRBIOL 520.

**MICRBIOL 4140, Molecular Microbiology Laboratory**, 3 hrs. This course is the successor to MICRBIOL 581.02, Microbial Genetics Laboratory, and will remain in the core. The main content of the course will remain the same; however, we will modify some experiments to include methods and protocols currently used in MICRBIOL 522.02, Immunobiology Laboratory. MICRBIOL 522.02 will not be carried through in the transition to semesters. MICRBIOL 4140 will now serve as an advanced molecular microbiology laboratory. Decoupling the laboratory from the Genetics and Immunobiology lecture courses will provide the opportunity to incorporate new experiments and emerging technologies.

This newly designed curriculum covers the core areas of microbiology and will provide a strong foundation for students preparing them for careers as microbiologists or for further studies in graduate or professional schools. A comprehensive core also supports our learning goals and will enhance our ability to assess and improve our program.

## Semester Courses: Microbiology BS

### Required Prerequisites for the Major

Semester Course Number	Course Title	Semester Hrs.	Status Under Quarters	Quarter Equivalent Course*	Quarter Hrs.	Notes
BIOL 1113	Biological Sciences: Energy Transfer and Development	4	Required Preq.	BIOL 113	5	
BIOL 1114	Biological Sciences: Form, Function, Diversity, and Ecology	4	Required Preq.	BIOL 114	5	
MATH 1151	Calculus 1	5	Required Preq.	MATH 150,151,152	15	
MATH 1152	Calculus 2	5	Required Preq.	"		
CHEM 1210	General Chemistry 1	5	Required Preq.	CHEM 121,122,123	15	
CHEM 1220	General Chemistry 2	5	Required Preq.	"		
CHEM 2510	Organic Chemistry 1	4	Required Preq.	CHEM 251,252	8	
CHEM 2520	Organic Chemistry 2	4	Required Preq.	"		
CHEM 2540	Organic Chemistry Lab 1	2	Required Preq.	CHEM 245	2	CHEM 254 3hr QHrs. Option
PHYS 1200	Mechanics, Thermal Physics, Waves	5	Required Preq.	PHYS 111,112,113	15	
PHYS 1201	E&M, Optics, Modern Physics	5	Required Preq.	"		
	<b>Total Hrs.</b>	<b>48</b>		<b>Total Hrs.</b>	<b>65</b>	

\* or honors equivalent

### Required Core for the Major

Semester Course Number	Course Title	Semester Hrs.	Status Under Quarters	Quarter Equivalent Course	Quarter Hrs.	Notes
MICRBIOL 4100	General Microbiology	5	Required Core	MICRBIOL 520,521	10	Combined aspects of 520 and 521; some content moved to 5020, 5030 and 5040
MICRBIOL 4110	Pathogenesis and Immunobiology	3		MICRBIOL 524.01	4	524.01 with some content from 522.01
MICRBIOL 4120	Microbial Physiology and Diversity	3		MICRBIOL 661	5	661 with some content from 521; remove redundancies
MICRBIOL 4130	Microbial Genetics	3	Required Core	MICRBIOL 581.01	3	581.01 with some content from 520
MICRBIOL 4140	Molecular Microbiology Laboratory	3	Required Core	MICRBIOL 581.02	3	581.02 with some content from 522.02
BIOCHEM 4511	Biochemistry	4	Required Core	BIOCHEM 511	5	Increased content determined by BIOCHEM
	<b>Total Hrs.</b>	<b>21</b>		<b>Total Hrs.</b>	<b>21</b>	

### Electives: Total Required 9 hrs Group 1: 3-9 hrs

Semester Course Number	Course Title	Semester Hrs.	Status Under Quarters	Quarter Equivalent Course	Quarter Hrs.	Notes
MICRBIOL 4193	Individual Studies	1-3		MICRBIOL 693	1-5	Direct conversion
MICRBIOL 4194	Group Studies	1-3		MICRBIOL 694	1-5	Direct conversion
MICRBIOL 4591S	DNA Finger Printing Workshops in Columbus PS	1		MICRBIOL 591	2	Direct conversion
MICRBIOL 4797	Study at a Foreign Institution	1-19		MICRBIOL 697	1-15	Direct conversion
MICRBIOL 4798	Study Tour Domestic	1-19		MICRBIOL 698.01	1-15	Direct conversion
MICRBIOL 4998	Undergrad Research in Microbiology	1-5		MICRBIOL 699	1-5	Direct conversion
MICRBIOL 4998H	Honors Research	1-5		MICRBIOL 699	1-5	Direct conversion
MICRBIOL 4999	Undergrad Research in Microbiology- Thesis	1-5		MICRBIOL 699	1-5	Direct conversion
MICRBIOL 4999H	Honors Research-Thesis	1-5		MICRBIOL 783H	1-5	Direct conversion
MICRBIOL 5122	Immunology	2		MICRBIOL 522.01	3	Direct conversion
MICRBIOL 5129	Cellular and Molecular Biology of Pathogenic Eukaryotes	3		MICRBIOL 629	5	Direct conversion
MICRBIOL 5147	Eukaryotic Pathogens	3		MICRBIOL 647	3	Increased content
MICRBIOL 5149	Introductory Virology	3		MICRBIOL 649	5	Direct conversion
MICRBIOL 5150	Microbial Ecology	3		MICRBIOL 664	3	Increased content
MICRBIOL 5155	Environmental Microbiology	3		MICRBIOL 665	3	Increased content
MICRBIOL 5161H	Bioinformatics and Molecular Microbiology	3		MICRBIOL 610H	5	Direct conversion
MICRBIOL 5169H	Microbial Evolution	3		MICRBIOL 669H	5	Direct conversion
MICRBIOL 5170	Microbes and Evolution	3		n/a	n/a	New course proposal
MICRBIOL 5536	Food Microbiology Lecture	3		MICRBIOL 636.01	3	Increased content
MICRBIOL 5546	Food Microbiology Laboratory	3		MICRBIOL 636.02	3	Increased content
MICRBIOL 6020*	Microbial Physiology and Biochemistry	3		MICRBIOL 720	4	Direct conversion
MICRBIOL 6080*	Advanced Microbial Genetics	3		MICRBIOL 680	3	Increased content
MICRBIOL 7010*	Cellular and Molecular Immunology	3		MICRBIOL 701	5	Direct conversion
MICRBIOL 7020*	Physiology Meets Pathogenesis	2		MICRBIOL 702	3	Direct conversion
MICRBIOL 7023*	Molecular Immunology: Lecture	3		MICRBIOL 723.01	3	Increased content
MICRBIOL 7050*	Fermentation Biotechnology	3		MICRBIOL 750	5	Direct conversion
MICRBIOL 7060*	Advanced Topics in Molecular Microbiology	2		MICRBIOL 760	3	Direct conversion
MICRBIOL 7536*	Advanced Food Microbiology	3		MICRBIOL 736	3	Increased content
MICRBIOL 7724*	Molecular Pathogenesis	3		MICRBIOL 724	5	Direct conversion
MICRBIOL 7889*	Host-Pathogen Interactions: Research Seminar	1		MICRBIOL 795	1	Direct conversion
MICRBIOL 7899*	Microbiology Colloquium	1		MICRBIOL 799	1	Direct conversion
	<b>Total Hrs.</b>	<b>3-9</b>		<b>Total Hrs.</b>	<b>10-19</b>	

\* Requires permission of the instructor

### Semester Courses: Microbiology BS

Electives: Total Required 9 hrs

Group 2: 0-6 hrs

Semester Course Number	Course Title	Semester Hrs.	Status Under Quarters	Quarter Equivalent Course	Quarter Hrs.	Notes
MICRBIOL 3300	The Biology of Pollution	2		MICRBIOL 301	2	Increased content
BIOCHEM 5621	Intro Biological Chemistry Laboratory	4		BIOCHEM 521	5	Increased content determined by BIOCHEM
MOLGEN 4500	General Genetics	3		MOLGEN 500	5	Direct conversion
MOLGEN 4606	Molecular Genetics I	4		MOLGEN 605	4	Merger of MG605&606
MVIMG 6000	Evolution of Emerging Viruses	1		MVIMG 600	2	Direct conversion
PLPATH 5010	Phytobacteriology	2		PLPATH 600.01	3	Direct conversion
PLPATH 5020	Introduction to Plant Virology	2		PLPATH 600.02	3	Direct conversion
PLPATH 5040	Science of Fungi: Mycology Lecture	3		PLPATH 660	5	Direct conversion
ANSCI 6090	Anaerobic Microbiology	3		ANSCI 690	5	Direct conversion
ENR 5263	Biology of Soil Ecosystems	3		ENR 665	4	Direct conversion
ENR 5266	Field Soil Investigations	3		ENR 740	3	Increased content-Lab added
	<b>Total Hrs.</b>	<b>0-6</b>		<b>Total Hrs.</b>	<b>0-9</b>	
	<b>Total Hrs. for the Major</b>	<b>30</b>		<b>Total Hrs. for the Major</b>	<b>40</b>	

### Required Prerequisites for the Major

### Learning Goals

Semester Course Number	Course Title	Semester hrs	1	2	3	4	5
BIOL 1113	Biological Sciences: Energy Transfer and Development	4	B			B	
BIOL 1114	Biological Sciences: Form, Function, Diversity, and Ecology	4	B			B	
MATH 1151	Calculus 1	5	B				
MATH 1152	Calculus 2	5	B				
CHEM 1210	General Chemistry 1	5	B				
CHEM 1220	General Chemistry 2	5	B				
CHEM 2510	Organic Chemistry 1	4	B	B			
CHEM 2520	Organic Chemistry 2	4	B	B			
CHEM 2540	Organic Chemistry Lab 1	2	B	B		B	
PHYS 1200	Mechanics, Thermal Physics, Waves	5	B			B	
PHYS 1201	E&M, Optics, Modern Physics	5	B			B	
<b>Total Hrs.</b>		<b>48</b>					

Goal: B: Beginning; I, Intermediate; A, Advanced

### Required Core for the Major

### Learning Goals

Semester Course Number	Course Title	Semester hrs	1	2	3	4	5
MICRBIOL 4100	General Microbiology	5	I	I	I	I	I
MICRBIOL 4110	Pathogenesis and Immunobiology	3	A	A	A		
MICRBIOL 4120	Microbial Physiology and Diversity	3	A	A	A		
MICRBIOL 4130	Microbial Genetics	3	A	A	I		
MICRBIOL 4140	Molecular Microbiology Laboratory	3	I	I	I	A	A
BIOCHEM 4511	Biochemistry	4	I	A			I
<b>Total Hrs.</b>		<b>21</b>					

Goal: B: Beginning; I, Intermediate; A, Advanced

### Electives: Total Required 9 hrs Group 1: 3-9 hrs

### Learning Goals

Semester Course Number	Course Title	Semester hrs	1	2	3	4	5
MICRBIOL 4193	Individual Studies	1-3					
MICRBIOL 4194	Group Studies	1-3					
MICRBIOL 4591S	DNA Finger Printing Workshops in Columbus PS	1				A	A
MICRBIOL 4797	Study at a Foreign Institution	1-19					
MICRBIOL 4798	Study Tour Domestic	1-19					
MICRBIOL 4998	Undergrad Research in Microbiology	1-5				A	A
MICRBIOL 4998H	Honors Research	1-5				A	A
MICRBIOL 4999	Undergrad Research in Microbiology- Thesis	1-5				A	A
MICRBIOL 4999H	Honors Research-Thesis	1-5				A	A
MICRBIOL 5122	Immunology	2			A		
MICRBIOL 5129	Cellular and Molecular Biology of Pathogenic Eukaryotes	3		A	A		
MICRBIOL 5147	Eukaryotic Pathogens	3		A	A	A	
MICRBIOL 5149	Introductory Virology	3		A	A		
MICRBIOL 5150	Microbial Ecology	3	A	A	A		
MICRBIOL 5155	Environmental Microbiology	3	A	A	A		
MICRBIOL 5161H	Bioinformatics and Molecular Microbiology	3	A	A	A		A
MICRBIOL 5169H	Microbial Evolution	3			A		
MICRBIOL 5170	Microbes and Evolution	3			A		
MICRBIOL 5536	Food Microbiology Lecture	3		A	I		A
MICRBIOL 5546	Food Microbiology Laboratory	3		A	I	A	A
MICRBIOL 6020*	Microbial Physiology and Biochemistry	3	A	A	A	A	
MICRBIOL 6080*	Advanced Microbial Genetics	3		A		A	
MICRBIOL 7010*	Cellular and Molecular Immunology	3			A	A	
MICRBIOL 7020*	Physiology Meets Pathogenesis	2	A	A	A	A	
MICRBIOL 7023*	Molecular Immunology: Lecture	3			A	A	
MICRBIOL 7050*	Fermentation Biotechnology	3	A			A	A
MICRBIOL 7060*	Advanced Topics in Molecular Microbiology	2		A		A	
MICRBIOL 7536*	Advanced Food Microbiology	3		A	I	A	A
MICRBIOL 7724*	Molecular Pathogenesis	3		A	A	A	
MICRBIOL 7889*	Host-Pathogen Interactions: Research Seminar	1			A	A	
MICRBIOL 7899*	Microbiology Colloquium	1					
<b>Total Hrs.</b>		<b>3-9</b>					

Goal: B: Beginning; I, Intermediate; A, Advanced

Electives: Total Required 9 hrs  
Group 2: 0-6 hrs

Learning Goals

Semester Course Number	Course Title	Semester Hrs.	1	2	3	4	5
MICRBIOL 3300	The Biology of Pollution	2	B				I
BIOCHEM 5621	Intro Biological Chemistry Laboratory	4	I			I	
MOLGEN 4500	General Genetics	3		I			
MOLGEN 4606	Molecular Genetics I	4		I			
MVIMG 600#	Evolution of Emerging Viruses	1			A		
PLPATH 5010	Phytobacteriology	2		I	A		
PLPATH 5020	Introduction to Plant Virology	2		I	A		
PLPATH 5040	Science of Fungi: Mycology Lecture	3	I	I	A		
ANSCI 6090	Anaerobic Microbiology	3		A			
ENR 5263	Biology of Soil Ecosystems	3	I	A			
ENR 5266	Field Soil Investigations	3	I			A	
	<b>Total Hrs.</b>	<b>0-6</b>					
	<b>Total Hrs. for the Major</b>	<b>30</b>					

# Designates TBD semester successor number

Goal: B: Beginning; I, Intermediate; A, Advanced

Goal 1. Students acquire the ability to interrelate and apply the fundamental concepts of chemistry, physics and mathematics to the functions of living cells.

Goal 2. Students understand the chemical properties of biological molecules and how these molecules function in the molecular mechanisms underlying physiological processes in microbial cells.

Goal 3. Students understand evolutionary processes, the diversity of microorganisms, and how microorganisms impact their environment, including their roles in human health and disease.

Goal 4. Students acquire the ability to design experiments to test hypotheses, perform analyses, interpret and analyze data, and present scientific information in written and oral formats.

Goal 5. Students acquire the ability to appraise scientific data presented in the popular press for accuracy and scientific merit and understand issues and ethical conflicts associated with applications of biotechnology

## Transition Plan Microbiology BS:

We anticipate that special accommodations will be required for some students since we are converting a two quarter sequence, MICRBIOL 520 and MICRBIOL 521, to a one semester course, MICRBIOL 4100, and that we are changing the core requirements for the BS and BA degrees under semesters. The student's needs are central to our plans and we have designed plans (outlined below) that will minimize the possibility that any student will be delayed in graduation for reasons other than their academic performance in the major. In anticipation of this situation Ms. Linda Saville-Rath, our undergraduate advisor, has begun to contact our current majors as well as freshman and sophomore students who have declared Microbiology as their major. Ms. Saville-Rath has realigned her duties for this transition period and will serve as the primary contact for students in their planning.

We have defined a number of general policy items for the students in transition, and we will offer a bridge course for students who have not completed MICRBIOL 521, the second course in the introductory sequence. We hope to reduce the demand for the bridge course by advising students to complete the series during the 2011-2012 academic year, or to postpone taking MICRBIOL 520 in the spring quarter preceding the switch to semesters. Our plans are outlined below and modifications in the core course requirements are presented in the accompanying table.

1. Students who have begun the Microbiology core curriculum under the quarter system will have the option to complete their degree using the guidelines set forth under the quarter system. Specifically, they will be required to complete those courses, or their successors, defined as the core under the quarter system. These include: MICRBIOL 4102, if needed (bridge course, see below); MICRBIOL 4130, Microbial Genetics; MICRBIOL 4140, Molecular Microbiology Laboratory; BIOCHEM 4511, Biochemistry. These students will not be required to take MICRBIOL 4110, Pathogenesis and Immunobiology and MICRBIOL 4120, Microbial Physiology and Diversity, required in the semester scheme; however, they will be encouraged to take them as electives. These relationships are outlined in the accompanying table, which will also be used as one of the tools for advising students during the transition period.
2. Using the two-thirds scaling for the credit transition from quarters to semesters, the Microbiology core requirements will be set at 27 semester hr equivalents for students during the transition period. This reflects the transition for a 40 quarter hr core; namely, 26.7 semester hrs. We realize this is the minimum and this total is below what will be required under semesters; however, we don't see this as diluting the curriculum since many of our majors will choose to take additional classes in the major or allied areas.
3. We will offer a bridge course, MICRBIOL 4102, which will serve students that have taken MICRBIOL 520, but not MICRBIOL 521. The course will consist of both lecture and lab components and will bring these students into alignment with those that have completed either the quarter sequence or the semester successor, MICRBIOL 4100. We project a maximum of 75 students and we anticipate that students within this group, who are in good academic standing, will complete the bridge course in the first semester. The bridge course will also be offered in the following autumn semester. Beyond this point, we will consider students' needs on an individual basis.
4. Students taking the bridge course MICRBIOL 4102 will be permitted to enroll in other courses except MICRBIOL 4120, Microbial Physiology and Diversity, which requires MICRBIOL 521 as a prerequisite.
5. To accommodate students who may require 1-2 semester hrs for graduation in 2012-2013, and who might experience undue hardship if forced to take an additional 3 semester hr course, we will offer a specific section of MICRBIOL 4193, Individual Studies. A faculty member will coordinate the course, directing student interactions with specific faculty members as needed. We will also review, on an as needed basis, requests for substitution in the Group 2 course category.

### Transition Plan Microbiology BS

Core Quarter Courses Completed	Course Description	Quarter hrs Completed	Semester hrs Equivalent	Semester Core Course	Course Description	Semester hrs
MICRBIOL 520	General Microbiology I	5	3.3	MICRBIOL 4194	General Microbiology-Bridge	3
				MICRBIOL 4130	Microbial Genetics	3
				MICRBIOL 4140	Molecular Microbiology Laboratory	3
				BIOCHEM 4511	Biochemistry	4
				Quarter carryover		3
				Semester Electives*	Group 1 (5-11)/Group 2 (0-6)	11
<b>Total in major</b>						<b>27</b>

Core Quarter Courses Completed	Course Description	Quarter hrs Completed	Semester hrs Equivalent	Semester Core Course	Course Description	Semester hrs
MICRBIOL 520	General Microbiology I	5	3.3	MICRBIOL 4194	General Microbiology-Bridge	0
MICRBIOL 521	General Microbiology II	5	3.3	MICRBIOL 4130	Microbial Genetics	3
				MICRBIOL 4140	Molecular Microbiology Laboratory	3
				BIOCHEM 4511	Biochemistry	4
				Quarter carryover		7
				Semester Electives	Group 1 (4-10)/Group 2 (0-6)	10
<b>Total in major</b>						<b>27</b>

Core Quarter Courses Completed	Course Description	Quarter hrs Completed	Semester hrs Equivalent	Semester Core Course	Course Description	Semester hrs
MICRBIOL 520	General Microbiology I	5	3.3	MICRBIOL 4194	General Microbiology-Bridge	0
MICRBIOL 521	General Microbiology II	5	3.3	MICRBIOL 4130	Microbial Genetics	0
MICRBIOL 581.01	Microbial Genetics	3	2.0	MICRBIOL 4140	Molecular Microbiology Laboratory	3
				BIOCHEM 4511	Biochemistry	4
				Quarter carryover		9
				Semester Electives	Group 1 (5-11)/Group 2 (0-6)	11
<b>Total in major</b>						<b>27</b>

Core Quarter Courses Completed	Course Description	Quarter hrs Completed	Semester hrs Equivalent	Semester Core Course	Course Description	Semester hrs
MICRBIOL 520	General Microbiology I	5	3.3	MICRBIOL 4194	General Microbiology-Bridge	0
MICRBIOL 521	General Microbiology II	5	3.3	MICRBIOL 4130	Microbial Genetics	0
MICRBIOL 581.01	Microbial Genetics	3	2.0	MICRBIOL 4140	Molecular Microbiology Laboratory	0
MICRBIOL 581.02	Microbial Genetics Laboratory	3	2.0	BIOCHEM 4511	Biochemistry	4
				Quarter carryover		11
				Semester Electives	Group 1 (6-12)/Group 2 (0-6)	12
<b>Total in major</b>						<b>27</b>

Core Quarter Courses Completed	Course Description	Quarter hrs Completed	Semester hrs Equivalent	Semester Core Course	Course Description	Semester hrs
MICRBIOL 520	General Microbiology I	5	3.3	MICRBIOL 4194	General Microbiology-Bridge	0
MICRBIOL 521	General Microbiology II	5	3.3	MICRBIOL 4130	Microbial Genetics	0
MICRBIOL 581.01	Microbial Genetics	3	2.0	MICRBIOL 4140	Molecular Microbiology Laboratory	0
MICRBIOL 581.02	Microbial Genetics Laboratory	3	2.0	BIOCHEM 4511	Biochemistry	0
BIOCHEM 511	Biochemistry	5	3.3	Quarter carryover		14
				Semester Electives	Group 1 (7-13)/Group 2 (0-6)	13
<b>Total in major</b>						<b>27</b>

\*Students are required to complete 19 hrs of electives under quarters. This is minimally met with four courses. Under semesters the most advanced transition student will need to take four classes to meet their elective requirement.

**Sample Curriculum  
Microbiology BS**

<b>Year</b>	<b>Autumn</b>	<b>Credit Hrs</b>	<b>Comment*</b>	<b>Spring</b>	<b>Credit Hrs</b>	<b>Comment</b>	<b>Year Total</b>
<b>1</b>	Gen Chem 1210	5	GE-PhySci/Micro-PreRec	Gen Chem 1220	5	Micro-PreRec	
	Math 1151	5	GE-Math/Micro-PreRec	Math 1152	5	Micro-PreRec	
	Bio 1113	4	GE-BioSci/Micro-PreRec	Bio 1114	4	Micro-PreRec	
	Freshman Survey	1	GE	GE Course	3	GE	
	<b>Semester Sum</b>	<b>15</b>			<b>Semester Sum</b>	<b>17</b>	
<b>Year</b>	<b>Autumn</b>	<b>Credit Hrs</b>	<b>Comment</b>	<b>Spring</b>	<b>Credit Hrs</b>	<b>Comment</b>	<b>Year Total</b>
<b>2</b>	Org Chem 2510	4	Micro-PreRec	Org Chem 2520	4	Micro-PreRec	
	Physics 1200	5	Micro-PreRec	Org Chem Lab 2540	2	Micro-PreRec	
	GE Courses	6	GE	Physics 1201	5	Micro-PreRec	
				GE Course	3	GE	
	<b>Semester Sum</b>	<b>15</b>			<b>Semester Sum</b>	<b>15</b>	
<b>Year</b>	<b>Autumn</b>	<b>Credit Hrs</b>	<b>Comment</b>	<b>Spring</b>	<b>Credit Hrs</b>	<b>Comment</b>	<b>Year Total</b>
<b>3</b>	Micro 4100	5	Micro-Core	Micro 4120	3	Micro-Core	
	BioChem 4511	4	Micro-Core	Micro 4130	3	Micro-Core	
	GE Courses	7	GE	Micro Elective 1	3	Micro-Required	
				GE Courses	6	GE	
	<b>Semester Sum</b>	<b>16</b>			<b>Semester Sum</b>	<b>15</b>	
<b>Year</b>	<b>Autumn</b>	<b>Credit Hrs</b>	<b>Comment</b>	<b>Spring</b>	<b>Credit Hrs</b>	<b>Comment</b>	<b>Year Total</b>
<b>4</b>	Micro 4110	3	Micro-Core	Micro 4140	3	Micro-Core	
	Micro Elective 2	3	Micro-Required	Micro Elective 3	3	Micro-Required	
	GE Courses	6	GE	GE Course	3	GE	
	Free Elective	3		Free Elective	6		
	<b>Semester Sum</b>	<b>15</b>			<b>Semester Sum</b>	<b>15</b>	
						<b>Total Hrs.</b>	<b>123</b>

\*Placement of specific GE courses will vary depending on the student's individual requirements and preferences.  
Where available, honors courses can substitute.



## MICROBIOLOGY MAJOR INFORMATION (For Semesters)

### Department of Microbiology

376 Biosciences Building, 484 West 12th Avenue; Columbus, OH 43210

Tel: (614) 292-2301; Fax: (614) 292-8120

<http://microbiology.osu.edu/>

<b>Department Chair:</b> Dr. Tina Henkin 376 BioSci Bldg. 614-292-2301 Henkin.3@osu.edu	<b>Honors Advisor:</b> Dr. Olli Tuovinen 452 BioSci. Bldg. 614-292-3379 Tuovinen.1@osu.edu
<b>Coordinating Advisor:</b> Ms. Linda Saville-Rath 280 BioSci. Bldg. 614-292-0509 Saville-rath.1@osu.edu	<b>Coordinator Undergraduate Research:</b> Dr. Kurt Fredrick 286 Aronoff 614-292-6679 Fredrick.5@osu.edu

### Required Prerequisites\* to the Major

These courses do NOT count toward the Major. Some of them are prerequisites for required major courses. All of them must be completed prior to graduation. *General education (GE) course requirements are not included in this list. Please see your Arts and Sciences Academic Advisor (ASC AA) for a list of GE requirements. You can contact an ASC AA by calling 614-292-6961.*

- |                              |        |
|------------------------------|--------|
| • Biology 1113, 1114         | 8 hr.  |
| • Mathematics 1151, 1152     | 10 hr. |
| • Chemistry 1210, 1220       | 10 hr. |
| • Chemistry 2510, 2520, 2540 | 10 hr. |
| • Physics 1200, 1201         | 10 hr. |

\*Honors courses can substitute where available.

***Additional organic chemistry courses may be required or suggested for pre-professional students. See an ASC AA pre-professional advisor for further information.***

### Microbiology Major Courses—General Information

The Microbiology Major consists of a minimum of 30 semester hours. Required Core courses make up 21 of these 30 hours. All students must complete the six Core Courses (see next page). The other 9 hours of the major are elective courses.

The elective courses are broken down into two groups: Group 1 and Group 2. Students must take at least 3 hr. of Group 1 courses and may take all 9 elective hours from Group 1. Students are not required to take any Group 2 courses but may have up to 6 hr. from this group count as elective hours. Please discuss with your major advisor any courses NOT listed in Group 2 that you would like to include in your major.

Three semester hours graded S/U, usually earned through Individual Study, Undergraduate Research or Honors Research (Microbiology 4193, 4998, 4998H, 4999 or 4999H) may be counted toward the Microbiology Major. These courses may be scheduled by contacting any faculty member in the department. You may also discuss your research options with the Coordinator of Undergraduate Research. Other major elective courses graded S/U are Microbiology 4591S and 7899. Remember, you can count ONLY 3 elective hours total from the courses graded S/U.

Students must receive a C- or better in Microbiology courses to use them as prerequisites for other courses.

Microbiology 4000 may be taken as an introduction to microbiology. However, credit gained for Microbiology 4000 does NOT count toward the 30 semester hours required for the Microbiology Major.

### Microbiology Major Core Courses—21 Hours of **REQUIRED COURSES**

Department #	Credit Hours	Course Title (Semester taught)	Prerequisites*
Biochemistry 4511	4	Introduction to Biological Chemistry (Au and Sp)	Biology 1114, Chemistry 1220
Microbiology 4100	5	General Microbiology (Au and Sp)	Biology 1114
Microbiology 4110	3	Pathogenesis and Immunobiology (Au)	Microbiology 4100 (C- or better)
Microbiology 4120	3	Microbial Physiology and Diversity (Sp)	Microbiology 4100 (C- or better)
Microbiology 4130	3	Microbial Genetics (Au and Sp)	Microbiology 4100 (C- or better)
Microbiology 4140	3	Molecular Microbiology Laboratory (Au and Sp)	Microbiology 4100 (C- or better)

\*or honors equivalent

### Microbiology Major Courses—**ELECTIVE COURSES, GROUP 1:** Take 3-9 hr. from this group

Micro. Course No.	Credit Hours	Course Title (Semester taught)	Prerequisites
5122	2	Immunobiology (TBD)	C- or better in either Microbiology 4000 or 4100
4591S	1 <i>Graded S/U</i>	DNA Fingerprinting; Service learning course (TBD)	Students present workshops at Columbus Public High Schools;
5161H	3	Bioinformatics and Molecular Microbiology ( <i>offered infrequently</i> )	Microbiology 4130 or Molecular Genetics 5606, and Biochemistry 4511; or permission of instructor
5129	3	Cellular and Molecular Biology of Pathogenic Eukaryotes (TBD)	Microbiology 4100 or permission of instructor
5536	3	Food Microbiology Lecture (Au)	C- or better in either Microbiology 4000 or 4100
5546	3	Food Microbiology Laboratory (Sp)	Microbiology 5536
5147	3	Eukaryotic Pathogens (TBD)	Microbiology 4100 (C- or better); or Molecular Genetics 4500 or 4606; or Biochemistry 4511
5149	5	Introductory Virology (Sp)	Microbiology 4100 (C- or better)
5150	3	Microbial Ecology (TBD)	C- or better in Microbiology 4000 or equivalent
5155	3	Environmental Microbiology (TBD)	C- or better in Microbiology 4000 or equivalent
5169H	3	Microbial Evolution (TBD)	6 semester hours of biological sciences course work
5170	3	Microbes and Evolution (TBD)	TBD
4193 4998/4999 4998H/4999H	1-3 <i>Graded S/U</i>	Individual Studies (Au,Sp,Su) Undergraduate Research (Au,Sp,Su) Honors Research (Au,Sp,Su)	Permission of instructor. Maximum of 3 credit hours for any combination of these courses can be counted toward the Major.

Students may also apply credits originating from MICRBIOL 4797, Study at a Foreign Institution, or MICRBIOL 4797, Study Tour Domestic, toward their microbiology requirements with approval from the Microbiology undergraduate advisor.

### Elective Courses, GROUP 1 (Cont.)

<b>The courses below are GRADUATE courses and should be taken ONLY by advanced (senior year) undergraduates with instructor's permission</b>			
<b>Micro. Course No.</b>	<b>Credit Hours</b>	<b>Course Title (Semester taught)</b>	<b>Prerequisites</b>
6020	3	Microbial Physiology and Biochemistry	(TBD)
6080	3	Advanced Microbial Genetics (TBD)	Microbiology 5030 or Molecular Genetics 4500 or 4606
7010	3	Cellular and Molecular Immunology (TBD)	Biochemistry 5613, Molecular Genetics 4500 or 4606
7020	3	Microbial Physiology Meets Pathogenesis (TBD)	Permission of instructor
7023	3	Molecular Immunology	(TBD)
7724	3	Molecular Pathogenesis (TBD)	Permission of instructor
7536	3	Advanced Food Microbiology (TBD)	Microbiology 5536 and Chemistry 1220
7050	3	Fermentation Biotechnology (TBD)	(TBD)
7060	3	Advanced Topics in Molecular Microbiology (TBD)	Microbiology 4120 or permission of instructor
7889	2 <i>Graded S/U</i>	Host-Pathogen Interactions: Research Seminar	Permission of instructor
7899	1 <i>Graded S/U</i>	Microbiology Colloquium (Au,Sp)	Repeatable for maximum of 2 credit hours.

**Microbiology Major Courses—ELECTIVE COURSES, GROUP 2:  
Take 0-6 hr. from this group**

<b>Department</b>	<b>Credit Hours</b>	<b>Course Title (Semester taught)</b>	<b>Prerequisites</b>
Microbiology 3300	2	The Biology of Pollution (Au)	4 credit hours of biology
Biochemistry 5621	4	Introduction to Biological Chemistry Laboratory (TBD)	Biochemistry 4511 or 5613 or equivalent
Molecular Genetics 4500	3	General Genetics (Au,Sp,Su)	Biology 1113 and 5 additional hours in biological sciences
Molecular Genetics 4606	4	Molecular Genetics (TBD)	Biochemistry 4511 and Mathematics 1152
MVIMG 6000	1	Evolution of Emerging Viruses (TBD)	2 years of course work in the biological sciences suggested
Plant Pathology 5010	2	Phytobacteriology (TBD)	Plant Pathology 3001 or Microbiology 4100, or permission of instructor
Plant Pathology 5020	2	Introduction to Plant Virology (TBD)	Plant Pathology 3001, Biochemistry 4511, or Microbiology 4000 or permission of instructor
Plant Pathology 5040	3	Science of Fungi: Mycology (TBD)	Biology 1114 or Plant Pathology 3001
Animal Science 6090	3	Anaerobic Microbiology (TBD)	Microbiology 4100 and Biochemistry 4511
Envir. & Natural Resources 5263	3	Biology of Soil Ecosystems (TBD)	ENR 300 or 301, or permission of instructor with Micro 4100
Envir. & Natural Resources 5266	3	Field Soil Investigations (TBD)	(TBD)

## Major Planner for Microbiology BS: Semesters



**Major Program Form**

### College of the Arts and Sciences

 Name \_\_\_\_\_  
Last, First, Middle

 Major **MICROBIOLOGY**

Name #: \_\_\_\_\_

 Degree Sought: **MICROBIOLOGY BS**

Email Address: \_\_\_\_\_

 Expected Date of Graduation: \_\_\_\_\_  
Semester and Year

 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): 48 hours.**

Courses	Hours	Grade	Courses	Hours	Grade
Math 1151/1152	10		Chemistry 1210/1220	10	
Physics 1200/1201	10		Chemistry 2510/2520	8	
Biology 1113/1114	8		Chemistry 2540	2	

\*Honors courses can substitute where available
**Part B. Major Program (Minimum grade of "C-" required. Minimum grade of "C" (2.00) Core Requirements: 21 hours.**

Courses	Hours	Grade
Micro 4100	5	
Micro 4110	3	
Micro 4120	3	
Micro 4130	3	
Micro 4140	3	
BioChem 4511	4	

**Additional Elective Major Program Courses: Minimum of 9 hours required.**

GROUP 1 (3-9 hr.)			GROUP 2 (0-6 hr.)		
Courses	Hours	Grade	Courses	Hours	Grade

Total of Part B only:

 Check whether this is:  original  revision

Distribution: One copy each – Faculty advisor

Student  
College Office, Denny Hall

Signature of faculty adviser  
**Linda Saville-Rath**  
Name of Faculty Adviser (Please Print)  
**Microbiology**  
Department

**2-0509**  
Campus Phone

## MICROBIOLOGY MAJOR INFORMATION

### Department of Microbiology

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<p><b>Coordinating Advisor:</b> Ms. Linda Saville-Rath 280 BioSci. Bldg. 614-292-0509 Saville-rath.1@osu.edu</p>	<p><b>Coordinator Undergraduate Research:</b> Dr. Kurt Fredrick 286 Aronoff 614-292-6679 Fredrick.5@osu.edu</p>

### Required Prerequisites or Supplements to the Major

These courses do NOT count toward the Major. Some of them are prerequisites for required major courses. All of them must be completed prior to graduation. *General education course (GEC) requirements are not included in this list. Please see your Arts and Sciences Academic Advisor (ASC AA) for a list of GEC requirements. You can contact an ASC AA by calling 614-292-6961.*

• Biology 113, 114 (or H115, H116)	10 hr.
• Mathematics 148, 150, 151, 152 (or equivalent)	19 hr.
• Chemistry 121, 122, 123	15 hr.
• Chemistry 251, 252 and 245 or 254*	10-11 hr.
• Physics 111, 112, 113 (or 131, 132, 133)	15 hr.

**\*Additional organic chemistry courses may be required or suggested for pre-professional students. For example, it is suggested that pre-med students also take Chem 253 and two organic chemistry labs. See an ASC AA pre-professional advisor for further information.**

### Microbiology Major Courses—General Information

The Microbiology Major consists of a minimum of 40 credit hours. Required courses make up 21 of these 40 hours. All students must complete Microbiology 520, 521, 581.01, 581.02 and Biochemistry 511. The other 19 hours of the major are elective courses.

The elective courses are broken down into two groups: Group 1 and Group 2. Students must take at least 10 hr. of Group 1 courses and may take all 19 elective hours from Group 1. Students are not required to take any Group 2 courses but may have up to 9 hr. from this group count as elective hours. Please discuss with your major advisor any courses NOT listed in Group 2 that you would like to include in your major.

Five credit hours graded S/U, usually earned through Individual Study, Undergraduate Research or Honors Research (Microbiology 693, 699, or H783) may be counted toward the Microbiology Major. These courses may be scheduled by contacting any faculty member in the department. You may also discuss your research options with the Coordinator of Undergraduate Research. Other major elective courses graded S/U are Microbiology 591 and 799. Remember, you can count ONLY 5 elective hours total from the courses graded S/U.

Students must receive a C- or better in Microbiology courses to use them as prerequisites for other courses.

Microbiology 509 may be taken as an introduction to microbiology. However, credit gained for Microbiology 509 does NOT count toward the 40 credit hours required for the Microbiology Major.

**Microbiology Major Courses—21 Hours of REQUIRED COURSES**

Department #	Credit Hours	Course Title (Quarter taught)	Prerequisites	Instructor
Biochemistry 511	5	Introduction to Biological Chemistry (Su, Au, Wi, Sp)	Biology 114 or H116, Chemistry 252	Contact BioChem Dept. at 292-6771
Microbiology 520	5	General Microbiology I (Au, Sp);	Biology 114 or H116	K. Fredrick (Au), B. Alber (Sp)
Microbiology 581.01*	3	Microbial Genetics Lecture (Au, Sp)	Microbiology 520 (C- or better) or Molecular Genetics 500	B. Ahmer
Microbiology 581.02*	3	Microbial Genetics Lab (Au, Wi, Sp)	Microbiology 581.01 (C- or better)	K. Sandman
Microbiology 521	5	General Microbiology II (Wi, Su)	Microbiology 520 (C- or better) and Chemistry 252	M. Ibba (Wi), C. Daniels (Su)

\*Microbiology 581 will be split into 2 courses beginning Sp 2010

**Microbiology Major Courses—ELECTIVE COURSES, GROUP 1:  
Take 10-19 hr. from this group**

Micro. Course No.	Credit Hours	Course Title (Quarter taught)	Prerequisites	Instructor
522.01	3	Immunobiology Lecture (Wi, Su)	C- or better in either Microbiology 520 or 509	A. Satoskar, J. Kwiek, & M. Pradhan
522.02	3	Immunobiology Laboratory (Wi)	Microbiology 522.01 (or concurrent with)	M. Pradhan
524.01	4	Microbial Diseases (Sp)	Microbiology 522.01	S. Seveau
591	2 <i>Graded S/U</i>	DNA Fingerprinting; Service learning course (Sp)	Students present workshops at Columbus Public High Schools;	A. Simcox
H610	5	Bioinformatics and Molecular Microbiology ( <i>offered infrequently in Au</i> )	Microbiology 581 or Molecular Genetics 605, and Biochemistry 511; or permission of instructor	C. Daniels
629	5	Parasitology (Sp)	Microbiology 522.01 or permission of instructor	J. Alfonzo
636.01	3	Food Microbiology Lecture (Au, Sp)	C- or better in either Microbiology 509 or 520	A. Yousef
636.02	3	Food Microbiology Laboratory (Au, Sp)	Microbiology 636.01 (or concurrent with)	A. Yousef
647	3	Eukaryotic Pathogens (Au)	Microbiology 520 (C- or better) or 524; or Molecular Genetics 500 or 605; or Biochemistry 511	C. Rappleye
649	5	Introductory Virology (Wi)	Microbiology 520 (C- or better)	M. Williams
661	5	General Microbial Physiology (Au)	Microbiology 521 (C- or better) and Biochemistry 511	J. Krzycki
664	3	Microbial Ecology (Au/2010)	C- or better in Microbiology 509 or equivalent	O. Tuovinen
665	3	Environmental Microbiology (Au/2011)	C- or better in Microbiology 509 or equivalent	O. Tuovinen
H669	5	Microbial Evolution (Au)	10 credit hours of biological sciences course work	S. Abedon
680	3	Advanced Microbial Genetics (Wi)	Microbiology 581 (C- or better), or Molecular Genetics 500 or 605, or equivalent	I. Artsimovitch

## Elective Courses, GROUP 1 (Cont.)

Micro. Course No.	Credit Hours	Course Title (Quarter taught)	Prerequisites	Instructor
694	3	Microbial Physiology Meets Pathogenesis (Wi 2010)	Advanced undergrads , permission of instructor	T. Henkin & D. Wozniak
693	1-5 Graded S/U	Individual Study (Su, Au, Wi, Sp)	Permission of instructor. Maximum of 5 credit hours for 693 or 699 or any combination of the two courses can be counted toward the Major.	<i>Contact individual faculty member or Dr. Fredrick</i>
699		Undergraduate Research (Su, Au, Wi, Sp)		
<b>The 700-level courses below are GRADUATE courses and should be taken ONLY by advanced (senior year) undergraduates. (Exceptions: Micro H783 and 799)</b>				
701	5	Cellular and Molecular Immunology (Au)	Biochemistry 613, Molecular Genetics 500 or 605	A. Satoskar, et al
724	5	Molecular Biology of Bacterial Pathogens (Au)	Permission of instructor	R. Munson, et al
736	3	Advanced Food Microbiology (Wi 2011)	Microbiology 636.01 and Chemistry 123	H. Wang
760	3	Advanced Bacterial Physiology (Sp 2010)	Microbiology 661 or permission of instructor	J. Krzycki, et al
H783	3-5 Graded S/U	Undergraduate Honors Research (Su, Au, Wi, Sp)	For microbiology major honors with distinction students. Maximum of 5 credit hrs. can count for the Major.	<i>Contact Honors Advisor (Dr. Alfonzo)</i>
799	1 Graded S/U	Microbiology Colloquium (Au, Wi, Sp)	Repeatable for maximum of 2 credit hours.	B. Ahmer

**Microbiology Major Courses—ELECTIVE COURSES, GROUP 2:**  
Take 0-9 hr. from this group

Department	Credit Hours	Course Description (Quarters taught)	Prerequisites
Microbiology 301N	2	The Biology of Pollution (Au)	5 credit hours of biology
Biochemistry 521	5	Introduction to Biological Chemistry Laboratory (Wi, Sp)	Biochemistry 511 or 613 or equivalent
Molecular Genetics 500	5	General Genetics (Su, Au, Wi, Sp)	Biology 113 or H115, 5 additional hours in biological sciences
Molecular Genetics 605	4	Molecular Genetics I (Wi)	Biochemistry 511 and Mathematics 152
Molecular Genetics 606	4	Molecular Genetics II (Sp)	Molecular Genetics 605
MVIMG 600	2	Evolution of Emerging Viruses (Sp)	2 years of course work in the biological sciences suggested
Plant Pathology 600 •600.01 •600.02	6 (3 hr. each)	Intro. To Bacterial and Viral Pathogens of Plants (Au) •Phytobacteriology (1 <sup>st</sup> five weeks) •Plant Virology (2 <sup>nd</sup> five weeks)	Plant Pathology 401 or Microbiology 521, or permission of instructor
Plant Pathology 602	3	Plant-Microbe Interactions (Sp)	Plant Pathology 401, Biochemistry 511, or Microbiology 509 or permission of instructor
Plant Pathology 660	5	Mycology (Wi)	Biology 114 or Plant Pathology 300 or 401
Animal Science 690	5	Anaerobic Microbiology (Sp)	Microbiology 520 and Biochemistry 511
Envir. & Natural Resources 665	4	Biology of Soil Ecosystems (Sp)	ENR 300 or 301, or permission of instructor with Micro 520





# Major Program Form

## College of the Arts and Sciences

Name

Last, First, Middle

Major **MICROBIOLOGY**

Name.#: \_\_\_\_\_

Degree Sought: BA  BS

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. Require Prerequisites (and/or supplementary requirements)

Courses	Hours	Grade	Courses	Hours	Grade
Math 152	15		Chemistry 252	6-8	
Physics 113	15		Chemistry		
Biology 114	10				

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

Courses	Hours	Grade
Micro 520	5	
Micro 521	5	
BioChem 511	5	
Micro 581.01	3	
Micro 581.02	3	

### Additional Major Program Courses

GROUP 1 (10-19 hr.)			GROUP 2 (0-9 hr.)		
Courses	Hours	Grade	Courses	Hours	Grade

Total of Part B only:

Check whether this is:  original  revision

Distribution: One copy each – Faculty adviser

Student

College Office  
130 Denney Hall

Signature of faculty adviser

Linda Saville-Rath

Name of Faculty Adviser (Please Print)

Microbiology

Department

2-0509

Campus Phone

Date