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DEPARTMENT OF MICROBIOLOGY

University of Washington

GRADUATE CURRICULUM REQUIREMENTS FOR THE PH.D.

The requirements listed below are the minimum requirements to be met by all students in the Ph.D. program. The student's supervisory committee may require or recommend additional courses as deemed appropriate, based on the student's background and research plans.

GRADED COURSE REQUIREMENTS

1) **18 *Graded*** credits are required before taking the General Exam, and a minimum 2.7 grade in each course is required. The Graduate School accepts numerical grades in approved 400-level courses accepted as part of the major, and in all 500-level courses.

2) Courses amounting to 9 credits must be chosen from the following list. Students are required to take virology (V) courses equal to at least 3 credits, bacteriology (B) courses equal to at least 3 credits, and biostatistics courses (S) equal to at least 2 credits. There is no minimum requirement for immunology (I) classes. If you have never taken immunology, take IMMUN 441 before taking IMMUN 532. If you have never taken virology, both MICROM 450 and MCB 532 may be of interest. MCB 532 is not dependent upon MICROM 450. If you have taken undergraduate virology, choose MCB 532.

Course		Credits	Quarter		Instructor	Name
CONJ	557	2	Spring	B	Sokurenko	Microbial Evolution
MICROM	553	3	Spring	B	Mougous/Woodward	Molecular Mechanisms of Bacterial Pathogenesis
CONJ	549	1.5	Spring	B	Mittler	Population Biology of Microorganisms
CONJ	558	1.5	Winter	B	Harwood	Prokaryotic Biology
MCB	532	3	Autumn (odd years)	V	Emerman	Human Pathogenic Viruses
MICROM	450	3	Winter	V	Champoux	Molecular Biology of Viruses
CONJ	539	1.5	Spring	I	Fuller	Modern Approaches to Vaccines
IMMUN	441	4	Autumn	I	Savan	Introduction to Immunology
IMMUN	532	4	Winter	I	Hammerman	Intersection of Innate and Adaptive Immunity in Disease
BIOSTAT	511	4	Autumn	S	Hughes	Introduction to Statistics in Health Sciences
UCONJ	510	2	Summer	S	Mancl	Introductory Laboratory Based Biostatistics

3) The remaining 9 credits can come from additional conjoint (CONJ) courses or other 500-level graduate courses. *Note that the CMB Training Grant requires four CONJ classes.* The following courses were commonly chosen by previous Microbiology students (which doesn't necessarily make them the best choices!):

Course		Credits	Quarter	Name
CONJ	514	1.5	Winter	Molecular Medicine
CONJ	526	1.5	Winter	Introduction to Systems Biology and Quantitative Approaches to Biomedical Sciences
CONJ	537	1.5	Autumn	Mechanism of Transcriptional Regulations
CONJ	544	1.5	Winter	Protein Structure, Modification and Regulation
CONJ	559	1.5	Winter	Scientific Ideas at Work

Additional classes to consider are listed in Appendix 1. Note that courses change, so verify course details online. Also investigate the anticipated workload, which varies considerably among graduate classes. If you are interested in a class that is not on these lists, please petition the Graduate Program and Advising Committee for permission to have it count towards the degree.

PROGRAM REQUIREMENTS

1) Attending department seminars and journal club is mandatory. Departmental seminars are crucial for contributing to the breadth of student knowledge, while journal club serves to develop oral presentation skills. There are also research discussion groups that may be required by the student's mentor. Students should register for the appropriate course numbers during each year of graduate school for credit.
2) While completing the course requirements, students should register for enough MICROM 500 or MICROM 600 to bring their total credits to 10-15 per quarter. When graded credit requirements have been fulfilled, register for MICROM 600 prior to completing the qualifying exam and for MICROM 800 after passing the qualifying exam up to a total of 10 credits per quarter during the academic year and for 2 credits during the summer.
3) BIOETHICS. All of our students will take either the Biomedical Research Integrity (BRI) series in the first or second summer (register at http://depts.washington.edu/uwbri/front) or Bioethics 101 taught by the Biochemistry Department (register for the Winter Quarter BIOC 533).
4) TA in at least two lab courses for undergraduates, which is usually satisfied in the first and/or second year.
5) Give at least two formal lectures in an undergraduate course (third or fourth year).
6) Be first author on at least one paper related to thesis research, which is published or accepted for publication in refereed journals prior to the thesis defense.

First Year Students (mandatory, not graded)				
MICROM	599	2	A	Faculty Research Presentations for 1st year students
Throughout Graduate School (mandatory, not graded)				
MICROM	520	1	A,W,Sp	Micro Seminar series
MICROM	522	1	A,W,Sp	Journal Club
Conditional (mandatory, not graded)				
MICROM	500	(var)	A,W,Sp, Su	Lab Rotations. Minimum of 3 quarters. First Year
MICROM	600	(var)	A,W,Sp, Su	Independent Study Lab research. Prior to passing general exam.
MICROM	800	(var)	A,W,Sp, Su	Doctoral Dissertation. After passing general exam.

GRADUATE SCHOOL REQUIREMENTS

(see https://grad.uw.edu/policies-procedures/doctoral-degree-policies/doctoral-degree-requirements/)

1) Completion of a program of study and research as planned by the Graduate Program Coordinator in the student's major department or college and by the Ph.D. Supervisory Committee. At least 18 credits of course work at the 500 level and above must be completed prior to scheduling the General Examination. Note that this includes classes that are not graded (CR/NC).
2) Presentation of 90 credits, 60 of which must be taken at the University of Washington.
3) Numerical grades must be received in at least 18 quarter credits of course work taken at the University of Washington prior to scheduling the General Examination. The Graduate School accepts numerical grades in approved 400-level courses accepted as part of the major and in 500-level courses. A minimum cumulative GPA of 3.00 is required for a graduate degree at the University.
4) Completion of a total of 60 credits prior to scheduling the General Examination (a master's degree from the UW or another institution may be used as a substitute for 30 of these credits).
5) Creditable passage of the General Examination. Registration and completion of credits as a graduate student is required the quarter the exam is taken and candidacy is conferred.
6) The Candidate must register and complete a minimum of 27 credits of dissertation (MICROM 800) over a period of at least three quarters. At least one quarter must come after the student passes the General Examination. With the exception of summer, when students take 2 credits, students are limited to a maximum of 10 credits per quarter of dissertation (MICROM 800).
7) Creditable passage of a Final Examination, which is usually devoted to the defense of the dissertation in the field with which it is concerned. The General and Final Examinations cannot be scheduled during the same quarter. Registration and completion of credit as a graduate student is required the quarter the exam is taken AND the degree is conferred.
8) Preparation of and acceptance by the Dean of the Graduate School of a dissertation that is a significant contribution to knowledge and clearly indicates training in research.
9) Completion of all work for the doctoral degree within ten years. This includes quarters spent On-Leave or out of status as well as applicable work from the master's degree from the University of Washington or a master's degree from another institution, if used to substitute for 30 credits of enrollment.
10) Registration and completion of credits as a full- or part-time graduate student at the University for the quarter in which the degree is conferred (see detailed information under Final Quarter Registration).

TRAINING GRANTS

All U.S. citizens are strongly encouraged to apply for training grants. A list of available Training Grants can be found at http://blogs.uw.edu/tgrants/graduate-students/. The CMB training grant in particular requires completion of 4 conjoint (CONJ) courses. Most conjoint courses or modules are 1.5 credits and meet for half of a quarter (5-6 weeks). Normally students register for 2 modules per quarter although other configurations are possible.

APPENDIX 1: Other Courses

The following courses are not specifically recommended; however, they may be of interest to Microbiology graduate students. Keep in mind that we try to keep this list accurate; however, departmental offerings change from year to year. And, the quarter in which courses are offered, especially conjoints, can vary. Note that the categories are based on the course title rather than a thorough review of the syllabus.

BIOCHEMISTRY CLASSES:

Dept	Number	Title	Credits	A	W	Sp	Su
B STR	515	Biological X-Ray Structure Analysis	3		X		
B STR	519	Current Problems in Macromolecular Structure	2			X	
B STR	520	Structure Based Design of Drugs	3		X		
B STR	590	Electron Cryo-Microscopy of Biological Macromolecules and Complexes	3	X		X	
BIOC	440	Biochemistry	4	X			
BIOC	441	Biochemistry	4		X		
BIOC	442	Biochemistry	4			X	
BIOC	530	Introduction to Structural Biology	3	X			
BIOC	540*	Literature Review	2	X			
BIOC	541*	Literature Review	2		X		
BIOC	542*	Literature Review	2			X	
CONJ	545	Molecular Interactions and Medicine	1.5			X	
GENOME	540	Introduction to Computational Molecular Biology: Genome and Protein Sequence Analysis	4		X		
GENOME	555**	Protein Technology	1.5			X	
MEDCH	541	Biological Mass Spectrometry	3			X	

CELL BIOLOGY CLASSES:

Dept	Number	Title	Credits	A	W	Sp	Su
CONJ	524	Structural Basis of Signal Transduction	1.5		X		
CONJ	530	Directing Stem Cells Toward Regenerative Medicine	3			X	
CONJ	531	Signaling Mechanisms in Excitable Cells	1.5	X			
CONJ	532	Signal Transduction from the Cell Membrane to the Nucleus	1.5	X			
CONJ	533	The Dynamic Chromosome	1.5	X			
CONJ	542	Development	1.5	X			
CONJ	583	Molecular Targets in Cancer Therapy	1.5	X			
GENOME	551**	Principles of Gene Regulation	1.5		X		
MCB	539	Biological Basis of Neoplasia	3			X	
MCB	543	Logic Constructs and Methodologies of Biological Research	3			X	

COMMUNICATING SCIENCE AND COMMERCIALIZATION:

Dept	Number	Title	Credits	A	W	Sp	Su
BIOEN	504	Introduction to Technology Commercialization	4	X			
CONJ	512	Scientific Speaking Seminar	1.5		X		

GENETICS:

Dept	Number	Title	Credits	A	W	Sp	Su
GENOME	541	Introduction to Computational Molecular Biology: Molecular Evolution	4			X	
GENOME	552**	Technologies for Genome Analysis	1.5	X			
GENOME	553**	Advanced Genetic Analysis	1.5	X			
GENOME	559	Introduction to Statistical and Computational Genomics	3		X		
GENOME	565	Advanced Human Genetics	4		X		
GENOME	570	Phylogenetic Inference (every other year)	3		X		
MCB	533	Evolutionary Genetics and Genomics	3			X	

IMMUNOLOGY, MEDICINE, and PATHOGENESIS:

Dept	Number	Title	Credits	A	W	Sp	Su
IMMUN	537	Immunological Methods	1.5	X			
IMMUN	538	Immunological Based Diseases and Treatments	2			X	
IMMUN	550	Selected Topics in Immunology	1	X	X	X	
CONJ	504	Topics of Molecular Medicine	1.5			X	
MICROM	555	Advanced Clinical Microbiology	2.5	X	X	X	
MOLMED	540	Medicine in Action	1.5	X	X	X	
EPI	529	Emerging Infections of International Public Health Importance	3				
G H	560	Principles of STD/HIV Research	3				X
G H	566	Biochemistry and Genetics of Pathogens and Their Hosts	4	X			
MEDCH	561	Immunizing and Antimicrobial Agents	4			X	
PABIO	552	Cell Biology of Human Pathogens and Disease	4		X		

***** These classes are primarily for Biochemistry graduate students, who take them as a cohort. Microbiology students can take them with permission of the instructor.

** These are smaller Genome Sciences class, so registration may be difficult.