

DOCTOR OF PHILOSOPHY IN MICROBIOLOGY

Microbiology Program (<https://catalog.mit.edu/interdisciplinary/graduate-programs/microbiology>)

Degree Requirements

Required Coursework ¹

7.492[J]	Methods and Problems in Microbiology	12
7.493[J]	Microbial Genetics and Evolution	12
7.571 & 7.572	Quantitative Analysis of Biological Data and Quantitative Measurements and Modeling of Biological Systems	12
7.51 or 7.80	Principles of Biochemical Analysis Fundamentals of Chemical Biology	12

Research Rotations

7.499	Research Rotations in Microbiology	24
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Restricted Electives ² **36**

Select at least three subjects from the following list:

1.881[J]	Genomics and Evolution of Infectious Disease
1.89	Environmental Microbial Biogeochemistry
5.062	Principles of Bioinorganic Chemistry
5.52	Tutorial in Chemical Biology
5.54[J]	Advances in Chemical Biology
5.64[J]	Advances in Interdisciplinary Science in Human Health and Disease
5.78	Biophysical Chemistry Techniques
7.58	Molecular Biology
7.62	Microbial Physiology
7.63[J]	Immunology
7.66	Molecular Basis of Infectious Disease
7.70	Regulation of Gene Expression
7.71	Biophysical Technique
7.77	Nucleic Acids, Structure, Function, Evolution, and Their Interactions with Proteins
8.591[J]	Systems Biology
10.542	Biochemical Engineering and Biomanufacturing Principles
10.544	Metabolic and Cell Engineering
10.546[J]	Statistical Thermodynamics
20.420[J]	Principles of Molecular Bioengineering
20.440	Analysis of Biological Networks

20.450	Applied Microbiology
20.490	Computational Systems Biology: Deep Learning in the Life Sciences
HST.508[J]	Evolutionary and Quantitative Genomics

Teaching Requirement

7.498	Teaching Experience in Microbiology	12
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Research and Thesis

7.494	Research Problems in Microbiology ³	180-252
7.MTHG	Microbiology Graduate Thesis ³	108

Total Units **408-480**

¹ Students with a particularly strong background in any of these areas may have the option of placing out of the related course. Approval of the Graduate Education Committee is required.

² Subjects from some other areas may also fulfill the requirement, with the approval of the Graduate Education committee.

³ The units listed here represent an average number taken during the doctoral program.