# Microbiology and Infectious Diseases Course Descriptions 12-14

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<th>Course Number and Title</th>
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<td><strong>INTRODUCTORY COURSES</strong></td>
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| BIO 311C: Introductory Biology I | Introduction to biological energy transformation, cell structure and physiology, and gene expression.  
*Prerequisites:* Credit or registration for CH 301 or 301H. |
| BIO 311D: Introductory Biology II | Introduction to mechanisms of inheritance, evolution, physiology, and species interactions. Basic principles of Mendelism, molecular genetics, structure and function of genes and chromosomes, populations and evolution.  
*Prerequisites:* BIO 311C with a grade of at least C-. |
| BIO 325: Genetics | Basic principles of Mendelism, molecular genetics, structure and function of genes and chromosomes, populations and evolution.  
*Prerequisites:* BIO 311C and 311D with a grade of at least C-in each. |
| CH 301: Principles of Chemistry I | Three lecture hours a week for one semester. Some sections also require one enrichment/discussion hour a week; these are identified in the Course.  
*Prerequisites:* Credit with a grade of at least C- or registration for one of the following: Mathematics 305G, 408C, 408D, 408K, 408L, 408M, 408N, 408S, Statistics and Scientific Computation 302; and an appropriate score on the ALEKS chemistry placement examination. |
| CH 302: Principles of Chemistry II | Development and application of concepts, theories, and laws underlying chemistry.  
*Prerequisites:* Credit with a grade of at least C- in Chem 301 or 301H; and credit with a grade of at least C- or registration for one of the following: M408C, 408D, 408K, 408L, 408M, 408N, 408S, SSC 302 |
| CH 204: Introduction to Chemical Practices | Introduction to the techniques of modern experimental chemistry. Designed to provide basic laboratory and analytical skills. May include organic, analytical, and physical chemistry, as well as materials science.  
*Prerequisites:* Credit or registration for CH 302. |
| **CALCULUS COURSE – CHOOSE ONE OF THE FOLLOWING SEQUENCES** | |
| M408C: Differential and Integral Calculus | Introduction to the theory and applications of differential and integral calculus of functions of one variable; topics include limits, continuity, differentiation, the mean value theorem and its applications, integration, the fundamental theorem of calculus, and transcendental functions.  
*Prerequisites:* A score of at least 80 on the ALEKS placement examination. |
| AND | |
| M408 D: Sequences, Series, and Multivariable Calculus | Introduction to the theory and applications of sequences and infinite series, including those involving functions of one variable, and to the theory and applications of differential and integral calculus of functions of several variables; topics include parametric equations, sequences, infinite series, power series, vectors, vector calculus, functions of several variables, partial derivatives, gradients, and multiple integrals.  
*Prerequisites:* M 408C, 408L, or 408S with a grade of at least C-. |
| OR | |
| M 408N: Differential Calculus for | Introduction to the theory of differential calculus of functions of one variable, |
and its application to the natural sciences. Subjects may include limits and differentiation, with applications to rates of change, extremes, graphing, and exponential growth and decay.

Prerequisites: A score of at least 70 on the ALEKS placement examination.

AND

M 408S: Integral Calculus for Science

Restricted to students in the College of Natural Sciences. Introduction to the theory of integral calculus of functions of one variable, and its applications to the natural sciences. Subjects may include integration and its application to area and volume, and transcendental functions, sequences, and series and their application to numerical methods.

Prerequisites: M 408C, 408K, or 408N with a grade of at least C-.

INTRODUCTORY BIO LAB

BIO 206L: Intro Lab Experiments in Biology

The organizing principles of biology (such as molecular and cellular functions, reproduction, development, homeostatic mechanisms, and organismal physiology and behavior) are used within a comparative and evolutionary framework to train students in modern laboratory techniques, bioinformatics, experimental design, and interpretation of results.

Prerequisites: Credit or registration for Biology 311C or 311D (or credit for Biology 211 or 214).

ORGANIC CHEMISTRY – CHOOSE ONE OF THE SEQUENCES

CH 320M: Organic Chemistry I

The development of organic chemical structure, nomenclature, and reactivity.

Prerequisites: CH 302 with a grade of at least C-, and credit or registration for CH 204 or 317.

CH 320N: Organic Chemistry II

The development of organic chemical reactivity, with a focus on carbohydrates, proteins, and nucleic acids.

Prerequisites: CH 204 or 317 and CH 310M with a grade of at least C- in each, and credit or registration for CH 210C.

CH 220C: Organic Chemistry Laboratory

Prerequisites: CH 204 or 317 and CH 310M with a grade of at least C- in each, and credit or registration for CH 310N

CH 369: Fundamentals of Biochemistry (Required)

A survey course covering the basics of protein structure and function, carbon and nitrogen metabolism, and molecular biology of macromolecules.

Prerequisites: CH 320M or 318M with a grade of at least C-.

OR

CH 320M: Organic Chemistry I

The development of organic chemical structure, nomenclature, and reactivity.

Prerequisites: CH 302 with a grade of at least C-, and credit or registration for CH 204 or 317.

CH 320N: Organic Chemistry II

The development of organic chemical reactivity, with a focus on carbohydrates, proteins, and nucleic acids.

Prerequisites: CH 204 or 317 and CH 310M with a grade of at least C- in each, and credit or registration for CH 210C.

CH 339K: Biochemistry I

Structure and function of amino acids, proteins, carbohydrates, lipids, and nucleic acids.

Prerequisites: Eight semester hours of coursework in organic chemistry.

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CH 339L: Biochemistry II

A second-semester biochemistry course designed for chemistry, premedical, predental, and life sciences majors. Biosynthesis of nucleic acids and proteins.
**PHYSICS SEQUENCE – CHOOSE ONE 8 HOUR SEQUENCE**

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<tr>
<td>PHY 302 &amp; 102M; and 302L &amp; 102N: General Physics--Technical Course</td>
<td>Noncalculus technical courses in physics: Mechanics, Heat, and Sound. Electricity and Magnetism, Light, Atomic and Nuclear Physics. <strong>Prerequisites:</strong> M 305G and credit or registration for PHY 102M; PHY 302K and 102M and credit or registration for PHY 102N.</td>
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<tr>
<td>PHY 317K &amp; 117M; and 317L &amp; 112N: General Physics I and II</td>
<td>Introductory courses designed and recommended primarily for premedical students and others in the biomedical sciences whose professional or preprofessional training includes an introductory course in calculus. Mechanics, heat, and sound, with biomedical applications. Electricity and magnetism, light, atomic and molecular physics, nuclear physics, and their biomedical applications. <strong>Prerequisites:</strong> M 408C, or 408K and coenrollment in 408L or M408N and coenrollment in M408S and credit or registration for PHY 117M; PHY 317K and 117M and credit or registration for PHY 117N.</td>
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<tr>
<td>PHY 301 &amp; 101L; and 316 &amp;112L: Mechanics; Electricity and Magnetism</td>
<td>Designed for students who intend to major in science or mathematics. <strong>Prerequisites:</strong> M 408C, or 408K and coenrollment in 408L or M408N and coenrollment in M408S and credit or registration for PHY 101L; PHY 301 and 101L, M 408D, or 408L and coenrollment in 408M and credit or registration for PHY 116L.</td>
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<tr>
<td>PHY 303K and 103M; and 303L &amp; 103N: Engineering Physics I and II</td>
<td>A general survey of physics. Primarily laws of motion, heat, and wave phenomena. Electricity and magnetism, optics, and atomic phenomena. <strong>Prerequisites:</strong> M 408C, or 408K and coenrollment in 408L or M408N and coenrollment in M408S and credit or registration for PHY 103M; PHY 303K and 103M, M 408D, or 408L and coenrollment in 408M and credit or registration in PHY 103N.</td>
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**26 HOURS OF UPPER DIVISION BIOLOGY COURSEWORK**

**REQUIRED UPPER-DIVISION BIOLOGY COURSES**

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<tr>
<td>SSC 328M: Biostatistics</td>
<td>Introduction to methods of statistical analysis of biological data. <strong>Prerequisites:</strong> Four hours of coursework in BIO and either M 408D or 408L.</td>
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<tr>
<td>BIO 326R: General Microbiology</td>
<td>Overview of the major areas of micro-biological study, including cell structure and function, genetics, host-microbe interactions, physiology, ecology, diversity, and virology. <strong>Prerequisites:</strong> BIO 325 or 325H and CH 302 or 302H with grades of at least C-.</td>
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<td>BIO 326M: Medical Microbiology</td>
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<tr>
<td>BIO 226L: General Microbiology Laboratory</td>
<td>Introduction to microbiology laboratory techniques and experimental demonstration of principles of microbiology. <strong>Prerequisites:</strong> Credit with a grade of at least C- or registration for BIO 326M or 326R.</td>
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<tr>
<td>BIO 330: Animal Virology</td>
<td>Mechanisms by which viruses replicate and kill or transform cells. <strong>Prerequisites:</strong> BIO 325 or 325H and BIO 126L and 326R with grades of at least C- in each.</td>
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<tr>
<td>BIO 339: Metabolism and Biochemistry of Microorganisms</td>
<td>A study of the metabolic processes of microorganisms, using a biochemical approach.</td>
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**Prerequisites:** Chemistry 339K with a grade of at least C-.
**BIO 360K: Immunology**

The basic concepts of humoral and cell-associated immune phenomena. **Prerequisites:** BIO 325 or 325H and BIO 126L and 326R with a grade of at least C- in each.

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**BIO 366: Microbial Genetics**

Molecular biology of nucleic acids; biosynthesis of macromolecules, transfer of genetic material from cell to cell, recombination, mutagenesis, and regulatory mechanisms. **Prerequisites:** BIO 325 or 325H and BIO 126L and 326R with a grade of at least C- in each.

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**BIO 370: Evolution**

Introduction to modern evolutionary biology, focusing on the evolution of molecular, developmental, morphological, and behavioral traits. Genetic and ecological bases of evolutionary changes within populations and of evolutionary divergence in animals and plants. **Prerequisites:** BIO 325 or 325H with a grade of at least C-.

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**ADDITIONAL UPPER DIVISION BIOLOGY COURSEWORK – CHOOSE AT LEAST 3 HOURS**

**BIO 328: Introductory Plant Physiology**

General principles of the mineral nutrition, water relations, metabolic activities, growth and development of green plants. **Prerequisites:** BIO 325 or 325H with a grade of at least C-, and CH 302 or 302H.

**BIO 361T: Comparative Animal Physiology**

Physiology of organ systems in animal phyla, with special emphasis on physiological adaptations of organisms to their environment. **Prerequisites:** BIO 325 or 325H with a grade of at least C-.

**BIO 365R: Vertebrate Physiology**

Introduction to the nervous system and other excitable tissues. Subjects may include membrane potentials, ion channels, synaptic transmission, learning and memory, skeletal and cardiac muscle, and how systems of neurons lead to sensation and motor output. Human diseases are used to illustrate perturbation of normal function. **Prerequisites:** BIO 325 or 325H with a grade of at least C-.

**BIO 365S: Vertebrate Systems Physiology**

Overview of body fluids, the cardiovascular system, respiration, digestion, metabolism, and endocrinology. **Prerequisites:** BIO 311C; 325 or 325H; Chem 301 and one of the following: M408C, 408K, 408N, 408R, SSC 302 with a grade of at least C- in each.

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**ADDITIONAL UPPER DIVISION BIOLOGY COURSEWORK – CHOOSE AT LEAST 3 HOURS**

**BIO 320: Cell Biology**

Principles of eukaryotic cell structure and function; macromolecules, energetics, membranes, organelles, cytoskeleton, gene expression, signaling, division, differentiation, motility, and experimental methodologies. **Prerequisites:** BIO 325 or 325H with a grade of at least C-.

**BIO 332: Yeast Cell Biology**

Yeast is used as a model to teach some of the more actively researched areas of cell biology, such as chromosome structure, mating type, cell-cell interaction, DNA replication, mitosis, cytoskeletal motors, cell polarity, signal transduction, cell cycle, checkpoints, secretion, protein modification, yeast genetics, and yeast technology. **Prerequisites:** BIO 325 or 325H and BIO 126L and 326R with a grade of at least C- in each.
BIO 344: Molecular Biology  Molecular basis of cellular processes: gene structure and function; DNA replication; RNA and protein synthesis; viruses; molecular aspects of immunology and cancer, and recombinant DNA.
Prerequisites: BIO 325 or 325H with a grade of at least C-.

**REQUIRED UPPER DIVISION BIOLOGY LABORATORY COURSES – CHOOSE AT LEAST 2 LABS**

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<tr>
<td>Bio 230L: Virology Laboratory</td>
<td>Basic experimental techniques applied to selected bacteriophages and animal viruses.</td>
<td>BIO 325 or 325H, and 126L with a grade of at least C- in each, and credit with a grade of at least C- or registration for BIO 330 or 333.</td>
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<tr>
<td>BIO 160L: Immunology Laboratory</td>
<td>Current techniques in experimental cellular and humoral immunology.</td>
<td>Prerequisites: Credit with a grade of at least C- or registration for BIO 360K.</td>
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<tr>
<td>BIO 361L: Public Health Bacteriology Laboratory</td>
<td>Training in techniques required for independent work in diagnostic and epidemiological bacteriology.</td>
<td>Prerequisites: BIO 325 or 325H and BIO 126L and 326R with a grade of at least C- in each.</td>
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