

SCHOOL OF LIFE SCIENCES

The School of Life Sciences has three departments:

1. Biochemistry and Biophysics (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/biochemistry-biophysics/>)
2. Integrative Biology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/integrative-biology/>)
3. Microbiology (<http://catalog.oregonstate.edu/college-departments/science/school-life-sciences/microbiology/>)

Biochemistry and Biophysics (BB)

BB 100, THE MOLECULES OF LIFE, 2 Credits

A brief introduction to molecular biology for nonspecialists. Subjects vary, but have included biochemical basis of the origin of life, biochemical genetics, biochemical aspects of memory and behavior, mutagenesis, bioenergetics and nutrition, and environmental biochemistry.

Equivalent to: BB 100H

BB 111, INTRODUCTION TO BIOCHEMISTRY AND BIOPHYSICS RESEARCH, 1 Credit

Designed to introduce biochemistry and biophysics students to departmental research opportunities and advisors.

BB 211, PROFESSIONAL DEVELOPMENT II: MOLECULAR, MICROBIAL, BIOHEALTH, 1 Credit

Develop awareness of the elements of professional development, identify strategic areas for growth, and design an exploration plan. Emphasis is placed on being able to analyze career opportunities to determine the best mix of technical and professional skills needed for success as a biological science professional. Graded P/N. CROSSLISTED as BB 211/BHS 211.

Equivalent to: BHS 211

BB 220, *CANCER: SOCIETY'S MALIGNANT SHADOW, 3 Credits

Explores the social context of our modern understanding of the group of diseases called cancer. Stimulates critical thinking about how trends in prevention, diagnosis, treatment, and care are influenced by the way we view social categories such as race, gender, and socioeconomic class. Demonstrates that access to medical advances is informed by societal beliefs regarding the role of government and other authoritative institutions. (Bacc Core Course)

Attributes: CPDP – Core, Perspective, Difference/Power/Discrimination

BB 314, CELL AND MOLECULAR BIOLOGY, 4 Credits

Fundamental concepts of prokaryotic and eukaryotic cell biology.

Emphasizes cell structure and function at the molecular level. Lec/rec.

Prerequisite: (((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])) and (CH 331 (may be taken concurrently) [C-] or CH 334 (may be taken concurrently) [C-])

Equivalent to: BB 314H, BI 314, BI 314H

Available via Ecampus

BB 314H, CELL AND MOLECULAR BIOLOGY, 4 Credits

Fundamental concepts of prokaryotic and eukaryotic cell biology.

Emphasizes cell structure and function at the molecular level. Lec/rec.

Attributes: HNRS – Honors Course Designator

Prerequisite: (((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])) and (CH 331 (may be taken concurrently) [C-] or CH 334 (may be taken concurrently) [C-])

Equivalent to: BB 314, BI 314, BI 314H

BB 315, MOLECULAR BIOLOGY LABORATORY, 3 Credits

Laboratory projects exploring the transmission of genetic information from storage to function will introduce students to fundamental molecular biology concepts and techniques, including isolation of DNA, construction of recombinant plasmids, quantification of gene expression in model organisms, polymerase chain reaction, and analysis of protein expression and subcellular localization. Lec/lab.

Prerequisite: BB 314 with C- or better or BB 314H with C- or better

Equivalent to: BI 315

BB 317, ^SCIENTIFIC THEORY AND PRACTICE, 3 Credits

Teaches students the practice of biological science. Topics cover scientific theory, communications, ethics and critical evaluation.

CROSSLISTED as BB 317/BI 317. (Writing Intensive Course)

Attributes: CWIC – Core, Skills, WIC

Prerequisite: (((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])))

Equivalent to: BI 317

BB 331, *INTRODUCTION TO MOLECULAR BIOLOGY, 3 Credits

Course dealing with the molecular basis of cellular function, with emphasis upon modern developments, and the foundation for practical applications of this knowledge. The course will involve the conceptual background necessary to appreciate the applications of molecular biology. Throughout the course opportunities will be given to discuss public policy issues and questions: What are the moral and practical problems that flow from identification of an individual as being at risk for a late-appearing genetic disorder, such as Huntington's disease or certain cancers? Does the scientific or public value of knowing the entire DNA sequence of the human genome justify a situation in which individual or small-scale research cannot be supported? What issues arise when the fruits of biological research, mostly publicly funded, are commercialized? Should a novel organism be patented? How can biotechnology be applied to environmental problems? (Bacc Core Course)

Attributes: CSST – Core, Synthesis, Science/Technology/Society

Prerequisite: CH 122 with D- or better or CH 202 with D- or better or CH 222 with D- or better or CH 225H with D- or better or ((CH 232 with D- or better or CH 232H with D- or better) or (CH 262 with D- or better or CH 262H with D- or better or CH 272 with D- or better))

Available via Ecampus

BB 332, *MOLECULAR MEDICINE, 3 Credits

Provides students an understanding of medical advances from a rapidly evolving molecular point of view. Advances in knowledge of the human genome arising from DNA sequencing efforts and major leaps in understanding of the regulating cellular growth and division are presented in an easy-to-understand fashion appropriate for students in all majors. Course discussions and assignments will cover implications of advances in molecular medicine from ethical, economic, technical and societal standpoints. The aim of the course is to present technical material in a way that non-scientists will understand and conversely to summarize ethical, economic, and philosophical considerations in a way that the scientists understand the implications of these technologies. (Bacc Core Course)

Attributes: CSST – Core, Synthesis, Science/Technology/Society

Recommended: Any biology course.

BB 345, INTRODUCTION TO BIOLOGICAL SEQUENCE ANALYSIS, 2 Credits

Introduction to computer-based analyses of biomolecular data, particularly nucleic acid and protein sequences, with the Python programming language. Topics include reading and writing of sequence files, subsequences, reverse complement, finding sequence patterns, subroutines, control structures, and parsing complex data files.

BB 350, ELEMENTARY BIOCHEMISTRY, 4 Credits

Service course for students desiring a short introduction to biochemistry. Four lectures weekly.

Prerequisite: CH 331 with D- or better and CH 332 (may be taken concurrently) [D-]

Available via Ecampus

BB 360, INTRODUCTION TO NEUROSCIENCE, 3 Credits

An introduction to the field of neuroscience. Topics include structure of neurons, outline of signaling in the central nervous system, Nernst equation, action potentials, synaptic transmission, chemical signaling in vision, disease and drugs.

Prerequisite: (((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-]))) and (CH 233 [C-] or CH 233H [C-]) and (CH 263 [C-] or CH 263H [C-])

Available via Ecampus

BB 361, NEUROSCIENCE OF SENSORY AND MOTOR SYSTEMS, 3 Credits

Provides advanced knowledge and understanding of the structure and function of the sensory and motor systems and the interactions between them. These systems will be considered in the context of human physiology.

Prerequisite: BB 360 with C- or better

BB 399, SPECIAL TOPICS, 1-16 Credits

Equivalent to: BB 399H

This course is repeatable for 16 credits.

BB 399H, SPECIAL TOPICS, 1-16 Credits

Attributes: HNRS – Honors Course Designator

Equivalent to: BB 399

This course is repeatable for 16 credits.

BB 401, UNDERGRADUATE RESEARCH, 1-16 Credits

Equivalent to: BB 401H

This course is repeatable for 16 credits.

BB 403, THESIS, 1-16 Credits

This course is repeatable for 16 credits.

BB 405, READING AND CONFERENCE, 1-16 Credits

Equivalent to: BB 405H

This course is repeatable for 16 credits.

BB 405H, READING AND CONFERENCE, 1-16 Credits

Attributes: HNRS – Honors Course Designator

Equivalent to: BB 405

This course is repeatable for 16 credits.

BB 407, BIOCHEMISTRY/BIOPHYSICS SEMINAR, 1-16 Credits

Informal seminars presenting information about research problems and careers and research programs on campus in biochemistry or biophysics. Graded P/N.

Equivalent to: BB 407H

This course is repeatable for 99 credits.

BB 407H, BIOCHEMISTRY/BIOPHYSICS SEMINAR, 1-16 Credits

Informal seminars presenting information about research problems and careers and research programs on campus in biochemistry or biophysics.

Attributes: HNRS – Honors Course Designator

Equivalent to: BB 407

This course is repeatable for 99 credits.

BB 410, INTERNSHIP, 1-16 Credits

This course is repeatable for 16 credits.

BB 450, GENERAL BIOCHEMISTRY, 4 Credits

Sequence course for students with a limited background in physical chemistry. BB 450/BB 550, three lectures and one recitation. BB 451/BB 551, three lectures.

Prerequisite: CH 332 with D- or better or CH 336 with D- or better

Equivalent to: BB 450H

Available via Ecampus

BB 451, GENERAL BIOCHEMISTRY, 3 Credits

Sequence course for students with a limited background in physical chemistry. BB 450/BB 550, three lectures and one recitation. BB 451/BB 551, three lectures.

Prerequisite: BB 450 with D- or better or BB 450H with D- or better

Equivalent to: BB 451H

Available via Ecampus

BB 453, BIOCHEMISTRY AND MOLECULAR BIOLOGY LABORATORY TECHNIQUES, 4 Credits

Laboratory course for non-majors that introduces students to biochemistry and molecular biology techniques used to investigate the functional relationship between nucleic acid sequence, gene expression, and protein function.

Prerequisite: BB 451 with C- or better

BB 460, ADVANCED CELL BIOLOGY, 3 Credits

History and theory of cell biology; microscopy and other techniques to study cells and organelles; membranes; organelles; protein import; cell signaling; cytoskeleton; polarity; cell cycle; stem cells; pattern formation; cancer biology. Offered every other fall in odd years.

Prerequisite: BB 314 with C- or better or BI 314 with C- or better or BI 314H with C- or better or BB 451 with C- or better or BB 492 with C- or better

BB 481, MACROMOLECULAR STRUCTURE, 3 Credits

An introduction to structural biology, the discipline focused on understanding the structural properties of biological macromolecules—especially proteins and nucleic acids—and relating them to their function. Introduces students to the vocabulary and tools of this discipline, covering both the fundamental physico-chemical principles governing the structure and function of biological macromolecules and a selected set of widely used experimental and theoretical approaches to their characterization. This is done through lectures, and textbook and literature readings. Graduate students receive additional experience in scientific reading, writing and presentation through a literature-based term project.

Prerequisite: BB 450 with D- or better or BB 490 with D- or better

Available via Ecampus

BB 482, BIOPHYSICS, 3 Credits

Examines quantitative properties of biological systems and biological phenomena using concepts derived from mathematics and physics.

Prerequisite: BB 481 with D- or better and CH 440 [D-]

BB 483, ADVANCED BIOCHEMISTRY AND BIOPHYSICS: CAPSTONE, 3 Credits

Covers applications of advanced biophysical techniques, and how these fit within the larger context of biochemistry, biology and society. Explores techniques and their applications to macromolecules as well as the scientific process. Techniques discussed include in vitro, in vivo, and in silico methods, with an emphasis on biomolecular interactions.

Prerequisite: BB 482 with D- or better or BB 582 with D- or better

BB 484, CHROMATIN AND EPIGENETICS, 3 Credits

An in-depth look at 'chromatin' (the complex generated by DNA, RNA and complex protein) and how it behaves during gene activation and silencing. Specific examples of long-lasting gene regulation (across cell cycles) will be used to describe the concept of 'epigenetic' gene regulation by modification of DNA or proteins. The class will combine more traditional lectures with discussion periods where primary research papers will be analyzed. The target audience is third- and fourth-year students as well as graduate students.

Prerequisite: ((BI 314 with C- or better or BI 314H with C- or better or BB 314 with C- or better or BB 314H with C- or better) and (BI 315 [C-] or BB 315 [C-] or BB 493 [C-] or BB 493H [C-]))

BB 485, APPLIED BIOINFORMATICS, 3 Credits

Fundamental concepts needed to understand the software and methods used in bioinformatics. Includes contemporary techniques such as databases, gene and genome annotations, functional annotations, sequence alignment, motif finding, secondary structure prediction, phylogenetic tree construction, high-throughput sequence data, ChIP-Seq peak identification, transcriptome profiling by RNA-Seq, microRNA discovery and target prediction.

Prerequisite: BB 314 with C- or better or BB 314H with C- or better

Available via Ecampus

BB 486, ADVANCED MOLECULAR GENETICS, 3 Credits

Covers aspects of transmission genetics (Mendel's laws, mapping strategies) informed by the machineries required for genetic information storage, transcription, translation, and protein processing. Analyses of state-of-the-art primary literature and lectures give a perspective on important "model" organisms, including examples from among bacteria, plants, fungi, and animals.

Prerequisite: (BB 314 with C- or better or BB 314H with C- or better) and (BB 492 [C-] or BB 451 [C-])

BB 490, BIOCHEMISTRY 1: STRUCTURE AND FUNCTION, 3 Credits

Examines how the structure and function of biological macromolecules arises from the organic chemistry of their fundamental building blocks. The organic chemistry of biochemistry will be a focus, including the mechanisms by which enzymes catalyze biological reactions.

Prerequisite: (CH 332 with C- or better or CH 336 with C- or better) and ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-]))

BB 491, BIOCHEMISTRY 2: METABOLISM, 3 Credits

Sequence professional course to meet the requirements of majors in biochemistry and biophysics. The second course in a series, BB 491/BB 591 covers the mechanisms and regulation of the pathways by which cells break down fuel molecules, conserve some of the released energy in the form of reactive nucleotides, and use this energy to create biological building blocks from simpler metabolites.

Prerequisite: BB 490 with D- or better or BB 590 with D- or better

BB 492, BIOCHEMISTRY 3: GENETIC BIOCHEMISTRY, 3 Credits

Sequence professional course to meet the requirements of majors in biochemistry and biophysics. The third course in the series, BB 492/BB 592 focuses on genetic biochemistry, including the synthesis of nucleotides, DNA synthesis and repair, RNA synthesis and processing, and protein synthesis and modification.

Prerequisite: (BB 490 with D- or better or BB 590 with D- or better) and (BB 491 [D-] or BB 591 [D-])

BB 493, BIOCHEMISTRY LABORATORY MOLECULAR TECHNIQUES 1, 3 Credits

Laboratory course to accompany BB 450, BB 451 or BB 490, BB 491, BB 492. Lec/lab.

Prerequisite: (BB 451 with D- or better or BB 451H with D- or better) or BB 492 with D- or better

Equivalent to: BB 493H

BB 494, BIOCHEMISTRY LABORATORY MOLECULAR TECHNIQUES 2, 3 Credits

Laboratory to accompany BB 450, BB 451 or BB 490, BB 491, BB 492. Lec/lab.

Prerequisite: BB 493 with D- or better or BB 593 with D- or better or BB 315 with D- or better or BI 315 with D- or better

Equivalent to: BB 494H

BB 498, ASBMB CERTIFICATION EXAM, 0 Credits

A comprehensive, standardized test administered by the American Society of Biochemistry and Molecular Biology and used as a direct assessment of the discipline specific knowledge of seniors in the majors administered by the Biochemistry and Biophysics department. A pass will be given to all students who complete the exam. Contact the Biochemistry and Biophysics Program for more information.

BB 499, SPECIAL TOPICS, 0-16 Credits

Topics and credits vary.

This course is repeatable for 16 credits.

BB 501, RESEARCH, 1-16 Credits

This course is repeatable for 16 credits.

BB 503, THESIS, 1-16 Credits

This course is repeatable for 999 credits.

BB 505, READING AND CONFERENCE, 1-16 Credits

This course is repeatable for 16 credits.

BB 507, SEMINAR, 1-2 Credits

Section 1: Descriptions of campus research programs in biochemistry and biophysics, 1 credit fall. Graded P/N. Student presentations of current research literature, 1 credit winter and spring. Should be taken by all entering departmental graduate students. Section 2: Presentation of departmental research seminar, 2 credits any term. PhD candidates in biochemistry and biophysics present a departmental research seminar in the third or fourth year. One registers in the term the seminar is presented.

This course is repeatable for 16 credits.

BB 550, GENERAL BIOCHEMISTRY, 4 Credits

Sequence course for students with a limited background in physical chemistry. BB 450/BB 550, three lectures and one recitation. BB 451/BB 551 and BB 452, three lectures.

Recommended: CH 332

Available via Ecampus

BB 551, GENERAL BIOCHEMISTRY, 3 Credits

Sequence course for students with a limited background in physical chemistry. BB 450/BB 550, three lectures and one recitation. BB 451/BB 551 and BB 452, three lectures.

Recommended: BB 550

Available via Ecampus

BB 560, ADVANCED CELL BIOLOGY, 3 Credits

History and theory of cell biology; microscopy and other techniques to study cells and organelles; membranes; organelles; protein import; cell signaling; cytoskeleton; polarity; cell cycle; stem cells; pattern formation; cancer biology

Recommended: BB 314 or BI 314 or BI 314H or BB 492 or BB 451

BB 581, MACROMOLECULAR STRUCTURE, 3 Credits

An introduction to structural biology, the discipline focused on understanding the structural properties of biological macromolecules—especially proteins and nucleic acids—and relating them to their function. Introduces students to the vocabulary and tools of this discipline, covering both the fundamental physico-chemical principles governing the structure and function of biological macromolecules and a selected set of widely used experimental and theoretical approaches to their characterization. This is done through lectures, and textbook and literature readings. Graduate students receive additional experience in scientific reading, writing and presentation through a literature-based term project.

Recommended: BB 450 or BB 490

Available via Ecampus

BB 582, BIOPHYSICS, 3 Credits

Examines quantitative properties of biological systems and biological phenomena using concepts derived from mathematics and physics.

Prerequisite: BB 581 with D- or better

BB 583, ADVANCED BIOCHEMISTRY AND BIOPHYSICS: CAPSTONE, 3 Credits

Covers applications of advanced biophysical techniques, and how these fit within the larger context of biochemistry, biology and society. Explores techniques and their applications to macromolecules as well as the scientific process. Techniques discussed include in vitro, in vivo, and in silico methods, with an emphasis on biomolecular interactions.

Prerequisite: BB 582 with C or better

BB 584, CHROMATIN AND EPIGENETICS, 3 Credits

An in-depth look at 'chromatin' (the complex generated by DNA, RNA and complex protein) and how it behaves during gene activation and silencing. Specific examples of long-lasting gene regulation (across cell cycles) will be used to describe the concept of 'epigenetic' gene regulation by modification of DNA or proteins. The class will combine more traditional lectures with discussion periods where primary research papers will be analyzed. The target audience is third- and fourth-year students as well as graduate students.

Recommended: (BI 314 or BI 314H) and BI 315

BB 585, APPLIED BIOINFORMATICS, 3 Credits

Fundamental concepts needed to understand the software and methods used in bioinformatics. Includes contemporary techniques such as databases, gene and genome annotations, functional annotations, sequence alignment, motif finding, secondary structure prediction, phylogenetic tree construction, high-throughput sequence data, ChIP-Seq peak identification, transcriptome profiling by RNA-Seq, microRNA discovery and target prediction.

Recommended: BB 314 or BB 314H

Available via Ecampus

BB 586, ADVANCED MOLECULAR GENETICS, 3 Credits

Covers aspects of transmission genetics (Mendel's laws, mapping strategies) informed by the machineries required for genetic information storage, transcription, translation, and protein processing. Analyses of state-of-the-art primary literature and lectures give a perspective on important "model" organisms, including examples from among bacteria, plants, fungi, and animals.

Recommended: (BI 314 or BI 314H) and BI 315 and BB 492

BB 590, BIOCHEMISTRY 1: STRUCTURE AND FUNCTION, 3 Credits

Examines how the structure and function of biological macromolecules arises from the organic chemistry of their fundamental building blocks. The organic chemistry of biochemistry will be a focus, including the mechanisms by which enzymes catalyze biological reactions.

BB 591, BIOCHEMISTRY 2: METABOLISM, 3 Credits

Sequence professional course to meet the requirements of majors in biochemistry and biophysics. The second course in a series, BB 491/BB 591 covers the mechanisms and regulation of the pathways by which cells break down fuel molecules, conserve some of the released energy in the form of reactive nucleotides, and use this energy to create biological building blocks from simpler metabolites.

Prerequisite: BB 590 with C or better

BB 592, BIOCHEMISTRY 3: GENETIC BIOCHEMISTRY, 3 Credits

Sequence professional course to meet the requirements of majors in biochemistry and biophysics. The third course in the series, BB 492/BB 592 focuses on genetic biochemistry, including the synthesis of nucleotides, DNA synthesis and repair, RNA synthesis and processing, and protein synthesis and modification.

Prerequisite: BB 590 with C or better and BB 591 [C]

BB 593, BIOCHEMISTRY LABORATORY MOLECULAR TECHNIQUES 1, 3 Credits

Laboratory course to accompany BB 450, BB 451 or BB 490, BB 491, BB 492. Lec/lab.

Recommended: (BB 451 or BB 451H) or BB 492

BB 594, BIOCHEMISTRY LABORATORY MOLECULAR TECHNIQUES 2, 3 Credits

Laboratory to accompany BB 450, BB 451 or BB 490, BB 491, BB 492. Lec/lab.

Recommended: BB 493 or BB 593 or BB 315 or BI 315

BB 599, SPECIAL TOPICS, 0-16 Credits

Topics and credits vary.

This course is repeatable for 16 credits.

BB 601, RESEARCH, 1-16 Credits

This course is repeatable for 16 credits.

BB 603, THESIS, 1-16 Credits

This course is repeatable for 999 credits.

BB 605, READING & CONFERENCE, 1-16 Credits

This course is repeatable for 16 credits.

BB 607, SEMINAR, 1-2 Credits

Section 1: Descriptions of campus research programs in biochemistry and biophysics, 1 credit fall. Graded P/N. Student presentations of current research literature, 1 credit winter and spring. Should be taken by all entering departmental graduate students. Section 2: Presentation of departmental research seminar, 2 credits any term. PhD candidates in biochemistry and biophysics present a departmental research seminar in the third or fourth year. One registers in the term the seminar is presented.

This course is repeatable for 16 credits.

BB 650, SELECTED TOPICS IN BIOCHEMISTRY AND BIOPHYSICS, 3 Credits

Nonsequence courses designed to acquaint student with current research in biochemistry and biophysics. Courses include enzyme kinetics, cell cycle and cancer, neurochemistry, oxidative stress, cell adhesion and motility. Most courses offered alternate years.

This course is repeatable for 18 credits.

BB 651, SELECTED TOPICS IN BIOCHEMISTRY AND BIOPHYSICS, 3 Credits

Nonsequence courses designed to acquaint student with current research in biochemistry and biophysics. Courses include cell surfaces, enzyme kinetics, metabolism, neurochemistry, trace element metabolism, biological oxidations, and bioenergetics. Most courses offered alternate years.

This course is repeatable for 18 credits.

BB 652, SELECTED TOPICS IN BIOCHEMISTRY AND BIOPHYSICS, 3 Credits

Nonsequence courses designed to acquaint student with current research in biochemistry and biophysics. Courses include enzyme kinetics, metabolism, neurochemistry, trace element metabolism, biological oxidations, and bioenergetics. Most courses offered alternate years.

This course is repeatable for 18 credits.

BB 699, SPECIAL TOPICS, 0-16 Credits

This course is repeatable for 16 credits.

BioHealth Sciences (BHS)

BHS 107, HEALTH PROFESSIONS: DENTAL, 1 Credit

Discussion of matters relating to a dental career. Includes application procedures, the importance of various requirements, admissions, professional school curricula, financing education and related matters. Speakers are included. Graded P/N.

BHS 110, BIOHEALTH SCIENCES ORIENTATION, 1 Credit

Introduction of incoming BioHealth Sciences students to college life with an emphasis on faculties, facilities, services, and curricula in BHS. Exposure to career opportunities for students interested in the BioHealth Sciences. Graded P/N.

BHS 199, SPECIAL TOPICS, 1-16 Credits

Graded P/N.

Equivalent to: GS 199

This course is repeatable for 16 credits.

BHS 211, PROFESSIONAL DEVELOPMENT II: MOLECULAR, MICROBIAL, BIOHEALTH, 1 Credit

Develop awareness of the elements of professional development, identify strategic areas for growth, and design an exploration plan. Emphasis is placed on being able to analyze career opportunities to determine the best mix of technical and professional skills needed for success as a biological science professional. Graded P/N. CROSSLISTED as BB 211/BHS 211.

Equivalent to: BB 211

BHS 255, *ALLIED HEALTH MICROBIOLOGY, 4 Credits

General properties of cellular microbes and viruses, microbial biochemistry and genetics, pathogenesis and disease, immunity, and microbial infections. Lecture and lab emphasis is on medical microbiology, infectious diseases, and public health. Not intended for biological sciences majors. Lec/lab. CROSSLISTED as BHS 255/MB 255.

Attributes: CPBS – Core, Pers, Biological Science

Equivalent to: MB 255

Available via Ecampus

BHS 316, PRINCIPLES OF IMMUNOLOGY, 3 Credits

Interactions of the innate and adaptive immune responses in the context of infectious diseases, autoimmune diseases, immunodeficiencies and immunotherapies. This course is designed for non-microbiology majors.

Prerequisite: MB 230 with C- or better or ((BI 212 with C- or better or BI 212H with C- or better) and (BI 213 [C-] or BI 213H [C-])) or (BI 204 [C-] and BI 205 [C-]) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]))

Available via Ecampus

BHS 320, HUMAN BACTERIOLOGY, 4 Credits

Properties of bacteria, their biology, pathogenesis and concern to society. Emphasis on the role of bacteria in human health and disease. CROSSLISTED as BHS 320/MB 320.

Prerequisite: (BI 204 with C- or better and BI 205 [C-] and BI 206 [C-]) or ((BI 211 [C-] or BI 211H [C-]) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-]))

Equivalent to: MB 320

Available via Ecampus

BHS 323, ^MICROBIAL INFLUENCES ON HUMAN HEALTH, 3 Credits

How microorganisms contribute in beneficial and detrimental ways to human health. Emphasis on microbial contributions to cancer, gut health, chronic infection and autoimmune diseases. This course is part of the Writing Intensive Curriculum for the BioHealth Sciences major. (Writing Intensive Course)

Attributes: CWIC – Core, Skills, WIC

Prerequisite: MB 302 with D- or better or (BB 314 with D- or better or BB 314H with D- or better) or BB 450 with D- or better

Available via Ecampus

BHS 329, MECHANISMS OF DISEASE: INTRODUCTION TO GENERAL PATHOLOGY, 3 Credits

An introduction to basic principles of disease, focused on structural and functional changes of cells, tissues and organs, and their relationships to clinical disease. The emphasis of the course is at the cellular to organ level, but will cover some on molecular mechanisms as pertinent.

Prerequisite: ((BI 211 with D- or better or BI 211H with D- or better) and (BI 212 [D-] or BI 212H [D-])) or ((BI 221 [D-] or BI 221H [D-]) and (BI 222 [D-] or BI 222H [D-]))

Available via Ecampus

BHS 340, HUMAN VIROLOGY, 4 Credits

Properties of viruses, their biology, pathogenesis and concern to society. Emphasis on viruses causing human disease. CROSSLISTED as BHS 340/MB 340.

Prerequisite: (BI 204 with C- or better and BI 205 [C-] and BI 206 [C-]) or ((BI 211 [C-] or BI 211H [C-]) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-]))

Equivalent to: MB 340

Available via Ecampus

BHS 401, RESEARCH, 1-16 Credits

Equivalent to: GS 401

This course is repeatable for 16 credits.

BHS 403, THESIS, 1-16 Credits

Equivalent to: GS 403

This course is repeatable for 16 credits.

BHS 405, READING AND CONFERENCE, 1-16 Credits

Equivalent to: GS 405

This course is repeatable for 16 credits.

BHS 406, PROJECTS, 1-16 Credits

Graded P/N.

This course is repeatable for 16 credits.

BHS 407, SEMINAR, 1-16 Credits

Graded P/N.

Equivalent to: GS 407

This course is repeatable for 16 credits.

BHS 410, SCIENCE INTERNSHIP, 1-12 Credits

Supervised scientific work experience at selected cooperating institutions, agencies, laboratories, or companies. Graded P/N.

Equivalent to: GS 410

This course is repeatable for 12 credits.

BHS 415, ONE HEALTH IN PRACTICE, 3 Credits

One health is the concept that human, animal and environmental health are all intertwined. Utilizes current one health issues such as disease outbreaks and antimicrobial resistance to encourage students from diverse fields to develop interdisciplinary collaboration and communication skills. CROSSLISTED as BHS 415/VMB 415.

Equivalent to: VMB 415

Recommended: At least third-year standing.

BHS 499, SPECIAL TOPICS, 1-16 Credits

This course is repeatable for 16 credits.

Biology (BI)

BI LD1, GENERAL CREDIT, 1-16 Credits

BI LD2, GENERAL CREDIT, 1-16 Credits

BI 003, UNDERGRADUATE RESEARCH, 0 Credits

Engage in research activities appropriate to the discipline; and through the research experience, acquire skills, techniques, and knowledge relevant to the field of study. In consultation with a faculty mentor, engage in research activity, and make and execute a plan for a project.

BI 101, *ENVIRONMENTAL BIOLOGY: ECOLOGY, CONSERVATION, GLOBAL CHANGE, 4 Credits

Introduction to ecosystems, including biodiversity, species interactions, human impacts, and conservation biology. Lectures introduce biological themes and research in the context of current issues in science and society. Hands-on laboratories focus on using organisms and technologies to explore biology and develop skills for lifelong learning. No previous science courses are required, intended for non-biological science majors. This course can be taken alone or in any combination with BI 102 or 103. Lec/lab/rec. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Available via Ecampus

BI 102, *ANIMAL BIOLOGY: GENES, BEHAVIOR AND EVOLUTION OF LIFE, 4 Credits

Introduction to how genetics shapes life on Earth, including how understandings of DNA and environmental factors are leading to biotechnological advances. Lectures introduce biological themes and research in the context of current issues in science and society. Hands-on laboratories focus on using organisms and technologies to explore biology and develop skills for lifelong learning. No previous science courses are required, intended for non-biological science majors. This course can be taken alone or in any combination with BI 101 and BI 103. Lec/lab/rec. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Equivalent to: BI 102H

Available via Ecampus

BI 103, *HUMAN BIOLOGY: ANATOMY, PHYSIOLOGY AND DISEASE, 4 Credits

Introduction to the biology of humans, including aspects of human health and disease. Lectures introduce biological themes and research in the context of current issues in science and society. Hands-on laboratories focus on using organisms and technologies to explore biology and develop skills for lifelong learning. No previous science courses are required, intended for non-biological science majors. This course can be taken alone or in any combination with BI 101 and BI 102. Lec/lab/rec. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Equivalent to: BI 103H

BI 109, HEALTH PROFESSIONS: MEDICAL, 1 Credit

Discussion of matters relating to a medical career. Includes application procedures, the importance of various requirements, admissions, professional school curricula, financing education, and related matters. Speakers are included. Graded P/N.

BI 111, INTRODUCTION TO MARINE LIFE IN THE SEA: MARINE HABITATS, 1 Credit

A field-focused learning experience exploring the varied marine life and habitats on the Oregon coast, including rocky shores, sandy beaches, mud flats, bays and estuaries. Students will also be introduced to the breadth of marine science course offerings and research at Oregon State University's Hatfield Marine Science Center located in Newport, Oregon. Graded P/N.

Equivalent to: FW 111

BI 150, INTRODUCTION TO MARINE BIOLOGY, 3 Credits

Survey of marine organisms, the environments they inhabit, and their evolutionary adaptations for thriving in those environments. The course will also highlight current conservation challenges that threaten marine life, such as climate change, overfishing, and pollution.

BI 175, *GENOMES, IDENTITIES AND SOCIETIES, 3 Credits

DNA's roles in shaping our senses of identity, individuality, and societal interconnectivity will be analyzed. New advances in genetic technology will be explored, along with their potential impacts on society. The relationships between genetics and discrimination will be examined with focus on cases from Oregon, America, and the world. (Bacc Core Course)

Attributes: CPDP – Core, Perspective, Difference/Power/Discrimination

BI 197, PROFESSIONAL DEVELOPMENT I: HEALTH PROFESSIONS, 1 Credit

Integrative Biology faculty and other professionals introduce a variety of human health professions including dentistry, medicine, pharmacy and others (veterinary medicine students take BI 198). Emphasizes professional development through exploring relevant social and cognitive concepts, as well as engaging in experiential learning and networking. Departmental and campus student success resources are highlighted. Graded P/N.

BI 198, PROFESSIONAL DEVELOPMENT I: BIOLOGY AND ZOOLOGY, 1 Credit

Integrative Biology faculty and biology professionals introduce life science careers outside of human health professions (human health profession students take BI 197). Emphasizes professional development through exploring relevant social and cognitive concepts, as well as engaging in experiential learning and networking. Departmental and campus student success resources are highlighted. Graded P/N.

Available via Ecampus

BI 199, SELECTED TOPICS, 1-16 Credits

Field Ecology.

Equivalent to: BI 199H

This course is repeatable for 16 credits.

BI 199H, SELECTED TOPICS, 1-16 Credits

Attributes: HNRS – Honors Course Designator

Equivalent to: BI 199

This course is repeatable for 16 credits.

BI 204, *INTRODUCTORY BIOLOGY I, 4 Credits

Foundations of biological sciences including scientific inquiry, genetics, evolution, and ecology. Significant emphasis throughout on the application of core concepts to solve human and environmental problems. Laboratory emphasizes skills in critical thinking, scientific writing, and experimental design. Not intended for pre-health profession students. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Available via Ecampus

BI 205, *INTRODUCTORY BIOLOGY II, 4 Credits

Fundamental concepts in molecular and cellular biology, beginning with biomolecules and the origin of life, and ending with genomics. Significant emphasis throughout on applications of biotechnology to solve human problems. Laboratory emphasizes skills in critical thinking, scientific writing, and experimental design. Not intended for pre-health profession students. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Prerequisite: CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-] or CH 271H (may be taken concurrently) [D-]))

Available via Ecampus

BI 206, *INTRODUCTORY BIOLOGY III, 4 Credits

Basic plant and animal physiology from an evolutionary perspective. Significant emphasis on topics of importance to human society, including human and plant disease. Laboratory emphasizes skills in critical thinking, scientific writing, and experimental design. Not intended for pre-health professional students. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Prerequisite: CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-] or CH 271H (may be taken concurrently) [D-]))

Available via Ecampus

BI 211, *PRINCIPLES OF BIOLOGY, 4 Credits

Origins of life, energy transformations, plant and animal diversity. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Equivalent to: BI 211H

BI 211H, *PRINCIPLES OF BIOLOGY, 4 Credits

Origins of life, energy transformations, plant and animal physiology. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science; HNRS – Honors Course Designator

Equivalent to: BI 211

BI 212, *PRINCIPLES OF BIOLOGY, 4 Credits

Cell biology, organ systems, plant and animal physiology. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Prerequisite: (CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better or CH 221 (may be taken concurrently) with D- or better or CH 224H (may be taken concurrently) with D- or better or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-])))

Equivalent to: BI 212H

BI 212H, *PRINCIPLES OF BIOLOGY, 4 Credits

Cell biology, organ systems, plant and animal physiology. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science; HNRS – Honors Course Designator

Prerequisite: (CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better or CH 221 (may be taken concurrently) with D- or better or CH 224H (may be taken concurrently) with D- or better or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-])))

Equivalent to: BI 212

BI 213, *PRINCIPLES OF BIOLOGY, 4 Credits

Genetics, evolution, natural selection, and ecology. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Prerequisite: CH 121 with D- or better or CH 201 with D- or better or CH 221 with D- or better or CH 224H with D- or better or ((CH 231 with D- or better or CH 231H with D- or better) and (CH 261 [D-] or CH 261H [D-] or CH 271 [D-]))

Equivalent to: BI 213H

BI 213H, *PRINCIPLES OF BIOLOGY, 4 Credits

Genetics, evolution, natural selection, and ecology. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science; HNRS – Honors Course Designator

Prerequisite: CH 121 with D- or better or CH 201 with D- or better or CH 221 with D- or better or CH 224H with D- or better or ((CH 231 with D- or better or CH 231H with D- or better) and (CH 261 [D-] or CH 261H [D-] or CH 271 [D-]))

Equivalent to: BI 213

BI 221, *PRINCIPLES OF BIOLOGY: CELLS, 4 Credits

Introduction to fundamental biological concepts and theories about the chemical and molecular basis of life, structure and function, transformation of energy and matter and information flow at a cellular and molecular level. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Prerequisite: (CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better) or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-]))

Equivalent to: BI 221H

BI 221H, *PRINCIPLES OF BIOLOGY: CELLS, 4 Credits

Introduction to fundamental biological concepts and theories about the chemical and molecular basis of life, structure and function, transformation of energy and matter and information flow at a cellular and molecular level. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science; HNRS – Honors Course Designator

Prerequisite: (CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better) or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-]))

Equivalent to: BI 221

BI 222, *PRINCIPLES OF BIOLOGY: ORGANISMS, 4 Credits

Introduction to fundamental biological concepts and theories about plant, and animal physiology, evolution, structure and function, transformation of energy and matter and systems at an organismal level. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Prerequisite: (BI 221 with C- or better or BI 221H with C- or better) and ((CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better) or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-]))

Equivalent to: BI 222H

BI 222H, *PRINCIPLES OF BIOLOGY: ORGANISMS, 4 Credits

Introduction to fundamental biological concepts and theories about plant, and animal physiology, evolution, structure and function, transformation of energy and matter and systems at an organismal level. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science; HNRS – Honors Course Designator

Prerequisite: (BI 221 with C- or better or BI 221H with C- or better) and ((CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better) or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-]))

Equivalent to: BI 222

BI 223, *PRINCIPLES OF BIOLOGY: POPULATIONS, 4 Credits

Introduction to fundamental biological concepts and theories about diversity, evolution, and ecology; specifically, evolutionary relationship, transformation of energy and matter, information flow and systems at a population level or above. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Prerequisite: (BI 221 with C- or better or BI 221H with C- or better) and ((CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better) or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-]))

Equivalent to: BI 223H

BI 223H, *PRINCIPLES OF BIOLOGY: POPULATIONS, 4 Credits

Introduction to fundamental biological concepts and theories about diversity, evolution, and ecology; specifically, evolutionary relationship, transformation of energy and matter, information flow and systems at a population level or above. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science; HNRS – Honors Course Designator

Prerequisite: (BI 221 with C- or better or BI 221H with C- or better) and ((CH 121 (may be taken concurrently) with D- or better or CH 201 (may be taken concurrently) with D- or better) or ((CH 231 (may be taken concurrently) with D- or better or CH 231H (may be taken concurrently) with D- or better) and (CH 261 (may be taken concurrently) [D-] or CH 261H (may be taken concurrently) [D-] or CH 271 (may be taken concurrently) [D-]))

Equivalent to: BI 223

BI 231, INTRODUCTION TO HUMAN ANATOMY AND PHYSIOLOGY, 3 Credits

The first of a three-term introductory series. Using a strong gross anatomy focus, course topics address fundamental concepts of biology as they apply to human anatomy and physiology and then focus on understanding the structures, functions, and regulatory mechanisms involved in the human skeleton, muscular and integumentary systems. BI 231 is a required prerequisite to BI 232 and BI 233. The BI 241 Lab is optional but prerequisite for either of the subsequent BI 242 or BI 243 lab courses in the series. Lec.

BI 232, INTRODUCTION TO HUMAN ANATOMY AND PHYSIOLOGY, 3 Credits

The second of a three-term introductory series. Using a strong gross anatomy focus, course topics address the structures, functions and regulatory mechanisms involved in the human nervous, endocrine and reproductive systems. Lec.

Prerequisite: BI 231 (may be taken concurrently) with C- or better

BI 233, INTRODUCTION TO HUMAN ANATOMY AND PHYSIOLOGY, 3 Credits

The third of a three-term introductory series. Using a strong gross anatomy focus, course topics address the structures, functions, and regulatory mechanisms involved in the human cardiovascular, respiratory, urinary and digestive systems. Lec.

Prerequisite: BI 231 (may be taken concurrently) with C- or better

BI 241, INTRODUCTION TO HUMAN ANATOMY AND PHYSIOLOGY LABORATORY, 2 Credits

The first of a three-term introductory series. Using the human cadaver (prosection), course topics address fundamental concepts of biology as they apply to human anatomy and physiology and then focus on understanding the structures, functions, and regulatory mechanisms involved in the human skeletal, muscular and integumentary systems. Physiology demonstrations illustrate functions of organ systems. Lab/rec.

Prerequisite: BI 231 (may be taken concurrently) with C- or better

BI 242, INTRODUCTION TO HUMAN ANATOMY AND PHYSIOLOGY LABORATORY, 2 Credits

The second of a three-term introductory series. Using the human cadaver (prosection) and dissection of preserved specimens with a strong gross anatomy focus, course topics address the structures, functions and regulatory mechanisms involved in the nervous, endocrine and reproductive systems. Physiology demonstrations illustrate functions of organ systems. Lab/rec.

Prerequisite: BI 231 (may be taken concurrently) with C- or better and BI 232 (may be taken concurrently) [C-] and BI 241 (may be taken concurrently) [C-]

BI 243, INTRODUCTION TO HUMAN ANATOMY AND PHYSIOLOGY LABORATORY, 2 Credits

The third of a three-term introductory series. Using the human cadaver (prosection) and dissection of preserved specimens with a strong gross anatomy focus, course topics address the structures, functions, and regulatory mechanisms involved in the human cardiovascular, respiratory, urinary and digestive systems. Physiology demonstrations illustrate functions of organ systems. Lab/rec.

Prerequisite: BI 231 (may be taken concurrently) with C- or better and BI 233 (may be taken concurrently) [C-] and BI 241 (may be taken concurrently) [C-]

BI 298, PROFESSIONAL DEVELOPMENT FOR BIOLOGISTS II, 1 Credit

Students will develop awareness of the elements of professional development, identify strategic areas for growth, and design an exploration plan. Emphasis is placed on being able to analyze career opportunities to determine the best mix of technical and professional skills needed for success as a biological science professional. Graded P/N.

Equivalent to: BI 298H

Available via Ecampus

BI 299, SPECIAL TOPICS, 1-16 Credits

This course is repeatable for 16 credits.

BI 301, *HUMAN IMPACTS ON ECOSYSTEMS, 3 Credits

Selected human impacts on ecosystems are examined in depth, including air quality, global climate change, management of agricultural and forest resources, and threats to biological diversity. The causes, approaches to investigating, and potential solutions for each issue are discussed from a scientific and social perspective. Adverse effects on ecosystems that result from each environmental problem are examined. (Bacc Core Course)

Attributes: CSGI – Core, Synth, Global Issues

Recommended: One year of college biology or chemistry

BI 306, *ENVIRONMENTAL ECOLOGY, 3 Credits

Biological, physical, and chemical nature of both natural and human-disturbed ecosystems. Topics include population and conservation ecology, toxins in the food chain and in the environment, forest decline and acid rain, eutrophication of terrestrial and aquatic ecosystems, and ecosystem restoration. Offered alternate years. (Bacc Core Course)

Attributes: CSGI – Core, Synth, Global Issues

Equivalent to: BI 306H

Recommended: One year of college biology and chemistry

BI 306H, *ENVIRONMENTAL ECOLOGY, 3 Credits

Biological, physical, and chemical nature of both natural and human-disturbed ecosystems. Topics include population and conservation ecology, toxins in the food chain and in the environment, forest decline and acid rain, eutrophication of terrestrial and aquatic ecosystems, and ecosystem restoration. Offered alternate years. (Bacc Core Course)

Attributes: CSGI – Core, Synth, Global Issues; HNRS – Honors Course Designator

Equivalent to: BI 306

Recommended: One year of college biology and chemistry

BI 309, TEACHING PRACTICUM, 1-6 Credits

Introductory experience for students assisting with instruction in Biology or Zoology courses. Admission is by application. See Cordley 3029 for details.

This course is repeatable for 6 credits.

BI 311, GENETICS, 4 Credits

Fundamentals of Mendelian, quantitative, population, molecular, and developmental genetics. Lec/rec.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Equivalent to: BI 311H

Available via Ecampus

BI 311H, GENETICS, 4 Credits

Fundamentals of Mendelian, quantitative, population, molecular, and developmental genetics. Lec/rec.

Attributes: HNRS – Honors Course Designator

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Equivalent to: BI 311

BI 315, MOLECULAR BIOLOGY LABORATORY, 3 Credits

Laboratory projects exploring the transmission of genetic information from storage to function will introduce students to fundamental molecular biology concepts and techniques, including isolation of DNA, construction of recombinant plasmids, quantification of gene expression in model organisms, polymerase chain reaction, and analysis of protein expression and subcellular localization. Lec/lab.

Prerequisite: BB 314 with C- or better or BB 314H with C- or better

Equivalent to: BB 315

BI 319, ^THEORY, PRACTICE AND DISCOURSE IN THE LIFE SCIENCES, 3 Credits

The practice of science and the critical evaluation of scientific claims are explored through writings, discussions and presentations. Topics including the scientific method, ethics and the role of science in society are examined along with implications for professionals ranging from health care to environmental biology. Strategies for effectively communicating science with diverse audiences are emphasized. (Writing Intensive Course).

Attributes: CWIC – Core, Skills, WIC

Prerequisite: (((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-]))) and (ST 351 [D-] or ST 351H [D-])

Available via Ecampus

BI 331, ADVANCED HUMAN ANATOMY AND PHYSIOLOGY, 3 Credits

The first of a three-term advanced series. With a strong focus on the physiological underpinnings of disease, course topics address the fundamental concepts of human anatomy and physiology and then focus on understanding the structures, functions, regulatory mechanisms and common pathologies involved in the skeletal, muscular and integumentary systems. Lec.

Prerequisite: (((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-]))) and (CH 123 [C-] or ((CH 233 [C-] or CH 233H [C-]) and (CH 263 [C-] or CH 263H [C-]))) and BI 341 (may be taken concurrently) [C-]

BI 332, ADVANCED HUMAN ANATOMY AND PHYSIOLOGY, 3 Credits

The second of a three-term advanced series. With a strong focus on the physiological underpinnings of disease, course topics address the structures, functions, and regulatory mechanisms involved in the nervous, endocrine and reproductive systems. Lec.

Prerequisite: BI 331 with C- or better and BI 342 (may be taken concurrently) [C-]

BI 333, ADVANCED HUMAN ANATOMY AND PHYSIOLOGY, 3 Credits

The third part of a three-term advanced series. With a strong focus on the physiological underpinnings of disease, course topics address the structures, functions, and regulatory mechanisms involved in the cardiovascular, respiratory, urinary and digestive systems. Lec.

Prerequisite: BI 332 with C- or better and BI 343 (may be taken concurrently) [C-]

BI 341, ADVANCED HUMAN ANATOMY AND PHYSIOLOGY LABORATORY, 2 Credits

The first of a three-term advanced series. Using the human cadaver (prosection) and physiological data acquisition equipment, course topics address the fundamental concepts of human anatomy and physiology and then focus on understanding the structures, functions, regulatory mechanisms and common pathologies involved in the human skeletal, muscular and integumentary systems. Lab.

Corequisites: BI 331

BI 342, ADVANCED HUMAN ANATOMY AND PHYSIOLOGY LABORATORY, 2 Credits

The second of a three-term advanced series. Using the human cadaver (prosection), dissection of preserved specimens, and physiological data acquisition equipment, course topics address the structures, functions, regulatory mechanisms and common pathologies involved in the human nervous, endocrine and reproductive systems. Lab.

Corequisites: BI 332

BI 343, ADVANCED HUMAN ANATOMY AND PHYSIOLOGY LABORATORY, 2 Credits

The third of a three-term advanced series. Using the human cadaver (prosection), dissection of preserved specimens, and physiological data acquisition equipment, course topics address the structures, functions, regulatory mechanisms and common pathologies involved in the human cardiovascular, respiratory, urinary and digestive systems. Lab.

Corequisites: BI 333

BI 345, *INTRODUCTION TO EVOLUTION, 3 Credits

Elements of evolutionary theory; origin and history of life; evolutionary controversy; origins of species, sex, and humans. (Bacc Core Course)

Attributes: CSST – Core, Synthesis, Science/Technology/Society

Equivalent to: Z 345

Available via Ecampus

BI 347, *OCEANS IN PERIL, 3 Credits

The interactions of society and the marine environment, emphasizing the ecological, biogeochemical, economic, sociological, and political significance of the oceans. Topics of current critical importance will include marine pollution, protecting marine habitats, conserving marine biodiversity, fisheries and aquaculture, ocean energy, biogeochemical change, global warming, ocean acidification, and sea level rise. (Bacc Core Course)

Attributes: CSST – Core, Synthesis, Science/Technology/Society

Prerequisite: BI 101 with C- or better or BI 102 with C- or better or BI 211 with C- or better or BI 211H with C- or better or BI 213 with C- or better or BI 213H with C- or better or BI 204 with C- or better or BI 150 with C- or better or BI 221 with C- or better or BI 221H with C- or better

Available via Ecampus

BI 348, *HUMAN ECOLOGY, 3 Credits

The impact of humans on the environment, emphasizing the political, sociological, and ecological consequences of human population growth. Topics of current critical importance will include global warming trends, destruction of the ozone layer, consequences of pollution, habitat destruction, the loss of biodiversity, and conservation biology. (Bacc Core Course)

Attributes: CSST – Core, Synthesis, Science/Technology/Society

Equivalent to: Z 348

Available via Ecampus

BI 351, MARINE ECOLOGY, 3 Credits

Ecological interactions and principles in different marine habitats. Topics include the organisms (plants, invertebrates, vertebrates) found in major habitats and interactions between organisms. Habitats discussed include coral reefs, rocky shores, kelp forests, near-shore waters, open-ocean waters, and the deep sea. Emphasis is placed on how organism-organism interactions produce varying patterns of distribution, abundance, body size, diversity, stability, and succession.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Equivalent to: Z 351

Available via Ecampus

BI 353, PACIFIC NORTHWEST COASTAL ECOSYSTEMS, 4 Credits

A field-based introduction to the diversity of ecosystems of the Pacific Northwest coast. Biological and physical processes affecting the distribution, structure, community composition and physical features of these systems are explored through a variety of lectures and field trips. Ecosystem services and human impacts are examined.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

BI 358, SYMBIOSES AND THE ENVIRONMENT, 3 Credits

Overview of the diversity of mutualistic symbioses and their roles in the natural environment. Integrative approach, from ecosystem to molecule, to the examination of certain key mutualisms. Lec. Offered alternate years.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-]) and (CH 123 [C-] or (CH 233 [C-] or CH 233H [C-]) and (CH 263 [C-] or CH 263H [C-]))

BI 370, ECOLOGY, 3 Credits

The study of interactions between organisms and their biotic and abiotic environments at the population, community, ecosystem, and biosphere levels of organization.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Equivalent to: BI 370H

Available via Ecampus

BI 370H, ECOLOGY, 3 Credits

The study of interactions between organisms and their biotic and abiotic environments at the population, community, ecosystem, and biosphere levels of organization.

Attributes: HNRS – Honors Course Designator

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Equivalent to: BI 370

BI 371, ^ECOLOGICAL METHODS, 3 Credits

Experimental design, data collection, analysis and synthesis in ecological studies; local ecosystems emphasized. May have field trip fee. Lec/lab. (Writing Intensive Course)

Attributes: CWIC – Core, Skills, WIC

Prerequisite: BI 370 with D- or better or BI 370H with D- or better

BI 373, ^FIELD METHODS IN MARINE ECOLOGY, 3 Credits

Exposure to research methods used in field studies of the marine rocky intertidal ecosystem. Research projects and writing exercises provide students with hands-on experience of collecting, analyzing, and presenting marine ecological data. Field trip fee. Lab fee. Lec/lab. (Writing Intensive Course)

Attributes: CWIC – Core, Skills, WIC

Prerequisite: (BI 351 (may be taken concurrently) with D- or better or BI 370 with D- or better or BI 370H with D- or better) and (ST 351 [D-] or ST 351H [D-])

Recommended: ST 352

BI 375, FIELD METHODS IN ECOLOGICAL RESTORATION, 4 Credits

Observation and application of theory and practice in ecological restoration. Using site visits and hands-on research, explores the roles in restoration of fire, local adaptation, disturbance history, natural history, beaver, and soils, including visits to several active and completed restoration projects and overnights in the field. Lab.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

BI 399, SPECIAL TOPICS, 0-16 Credits

May be repeated for 16 total credits.

Equivalent to: BI 399H

This course is repeatable for 16 credits.

BI 401, RESEARCH AND SCHOLARSHIP, 1-16 Credits

Equivalent to: BI 401H

This course is repeatable for 16 credits.

BI 401H, RESEARCH AND SCHOLARSHIP, 1-16 Credits

Attributes: HNRS – Honors Course Designator

Equivalent to: BI 401

This course is repeatable for 16 credits.

BI 405, READING AND CONFERENCE, 1-16 Credits

Equivalent to: BI 405H

This course is repeatable for 16 credits.

BI 406, PROJECTS: CURATORIAL ASSISTANT, 1-6 Credits

Students assist with curatorial projects in OSU biological collections.

Admission is by application. See Cordley 3029 for details.

This course is repeatable for 6 credits.

BI 407, SEMINAR, 1 Credit

Departmental seminar. Graded P/N.

Equivalent to: BI 407H, BI 407H, BOT 407, BOT 407H

This course is repeatable for 16 credits.

BI 407H, SEMINAR, 1 Credit

Departmental seminar. Graded P/N.

Attributes: HNRS – Honors Course Designator

Equivalent to: BI 407

This course is repeatable for 16 credits.

BI 409, ADVANCED TEACHING PRACTICUM, 1-6 Credits

Advanced practicum experience for students assisting in Biology or Zoology courses. Includes advanced training in course content and development of instructional materials. Admission is by application. See Cordley 3029 for details.

This course is repeatable for 6 credits.

BI 410, INTERNSHIP, 1-16 Credits

Graded P/N.

This course is repeatable for 16 credits.

Available via Ecampus

BI 420, *VIRUSES IN MODERN SOCIETY, 3 Credits

Impact of viruses on modern civilization. Molecular mechanisms of viral infectivity. Approaches to the prevention and cure of viral diseases. Role of viruses in agriculture and industry. Offered alternate years. (Bacc Core Course)

Attributes: CSST – Core, Synthesis, Science/Technology/Society

Prerequisite: BI 311 with D- or better or BI 311H with D- or better or BI 314 with D- or better or BI 314H with D- or better

BI 427, PALEOBIOLOGY, 4 Credits

Fossils provide a direct window into the evolution, extinction, and ecology of past life on Earth. A process-based study of the marine and terrestrial fossil record is taken to explore the topics of preservation, macroevolution, extinction of biotas, biomechanics, paleoecology, and climate change. Required laboratory and weekend field trip.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-]) or GEO 203 [D-]

Equivalent to: Z 427

BI 445, EVOLUTION, 3 Credits

Formal analysis of genetic and ecological mechanisms producing evolutionary change; special topics include speciation, ecological constraints, adaptive radiations, paleontology, biogeography, the origin of life, molecular evolution, and human evolution.

Prerequisite: BI 311 with D- or better or BI 311H with D- or better

Equivalent to: BI 445H

BI 445H, EVOLUTION, 3 Credits

Formal analysis of genetic and ecological mechanisms producing evolutionary change; special topics include speciation, ecological constraints, adaptive radiations, paleontology, biogeography, the origin of life, molecular evolution, and human evolution.

Attributes: HNRS – Honors Course Designator

Prerequisite: BI 311 with D- or better or BI 311H with D- or better

Equivalent to: BI 445

BI 450, ^MARINE BIOLOGY AND ECOLOGY, 15 Credits

A comprehensive lecture and laboratory introduction to the flora and fauna of the marine environment approached from the level of the organism to ecosystem. Ecological patterns and processes characteristic of marine communities will be emphasized. Lec/lab. Taught at Hatfield Marine Science Center, Newport, OR. (Writing Intensive Course)

Attributes: CWIC – Core, Skills, WIC

Prerequisite: (BI 370 with D- or better or BI 370H with D- or better) and (ST 351 [D-] or ST 351H [D-])

Recommended: ST 352

Available via Ecampus

BI 451, FUNCTIONAL ANATOMY OF THE HUMAN MUSCULAR SYSTEM, 4 Credits

In-depth dissection of the orientation, innervation, and functional significance of muscles and muscle groups. Topics include muscle identification, joint anatomy and variation of human form. BI 451 student expectations include vascularization and detailed joint anatomy. The laboratory component will consist of the dissection of the muscular anatomy of a human cadaver. Lab fee. Lec/lab.

Prerequisite: ((BI 231 with D- or better and BI 241 [D-]) or (BI 331 [D-] and BI 341 [D-])) and ((BI 232 [D-] and BI 242 [D-]) or (BI 332 [D-] and BI 342 [D-])) and ((BI 233 [D-] and BI 243 [D-]) or (BI 333 [D-] and BI 343 [D-]))

Equivalent to: Z 451

BI 454, EVOLUTIONARY GENOMICS, 3 Credits

Examines the evolutionary forces that have produced such varied and complex genomes across the tree of life. The processes by which genomes can be structured, maintained, and remodeled (by nature or by humans) are explored through scientific literature. Special emphasis will be given to recent technological advances in genomics, along with their potential impacts on individuals and society.

Prerequisite: BI 311 with D- or better or BI 311H with D- or better

BI 456, PHYLOGENETICS, 4 Credits

Explores the theory and practice of modern phylogenetic analysis. Emphasis placed on tree reconstruction algorithms, assessment of statistical support, and contemporary issues in phylogenetics. Lab will focus on the use of phylogenetic software and the analysis of molecular data sets. Lec/lab.

Prerequisite: (ST 351 with D- or better or ST 351H with D- or better) and (ST 352 (may be taken concurrently) [D-] or ST 411 (may be taken concurrently) [D-]) and (BI 311 [D-] or BI 311H [D-] or BI 445 [D-] or BI 445H [D-])

BI 481, BIOGEOGRAPHY, 3 Credits

Biogeography is the study of the distribution of biodiversity. We focus on abiotic (geological, climatological) and biotic (ecological, evolutionary) factors that govern diversity across space and through time, emphasizing assembly of communities, global change, and conservation in today's rapidly changing world. The course format includes lecture, computer-based activities, and discussion. Offered winter term in odd years.

Prerequisite: BI 370 with D- or better or BI 370H with D- or better

Equivalent to: Z 481

BI 483, POPULATION BIOLOGY, 3 Credits

Theoretical and empirical views of the structure and function of populations from across the tree of life, emphasizing the integration of ecological and evolutionary approaches. Lec.

Prerequisite: (MTH 241 with D- or better or MTH 251 with D- or better or MTH 251H with D- or better or MTH 227 with D- or better) and (ST 351 [D-] or ST 351H [D-]) and (ST 352 (may be taken concurrently) [D-] or ST 411 (may be taken concurrently) [D-]) and (BI 311 [D-] or BI 311H [D-] or BI 370 [D-] or BI 370H [D-])

Available via Ecampus

BI 485, MONSTER BIOLOGY, 3 Credits

Scientists seek to explain what exists and why things are. An alternative approach is to ask why things are not. Biological and physical laws are used to critically and rigorously assess why monsters from literature, television and film are not possible in the real world.

Prerequisite: (BI 311 (may be taken concurrently) with D- or better or BI 311H (may be taken concurrently) with D- or better) and (BI 370 (may be taken concurrently) [D-] or BI 370H (may be taken concurrently) [D-])

BI 495, DISEASE ECOLOGY, 3 Credits

An introduction to disease ecology—the study of disease processes in natural populations and communities. The course focuses on (I) the role parasites play in the ecology and evolution of animal populations, including humans; and (II) the relevance of ecological and evolutionary considerations in managing infectious diseases.

Prerequisite: BI 370 with C- or better or BI 370H with C- or better

BI 498, SENIOR BIOLOGY FIELD TEST, 0 Credits

A comprehensive, two-hour exam to assess the biological knowledge of Biology and Zoology seniors. Students must complete the exam in their final undergraduate term or during spring term if graduating during summer when it is not offered. A pass will be given to all students who complete the exam. More details at <http://ib.oregonstate.edu/advising/MFT-info>.

Available via Ecampus

BI 499, SPECIAL TOPICS, 0-16 Credits

Topics and credits vary.

Equivalent to: BI 499H

This course is repeatable for 16 credits.

BI 499H, SPECIAL TOPICS, 1-16 Credits

Topics and credits vary.

Attributes: HNRS – Honors Course Designator

Equivalent to: BI 499

This course is repeatable for 16 credits.

General Science (GS)

GS 199, SPECIAL STUDIES, 1-16 Credits

Equivalent to: BHS 199

This course is repeatable for 16 credits.

GS 399, SPECIAL TOPICS, 1-16 Credits

This course is repeatable for 16 credits.

GS 401, RESEARCH, 1-16 Credits

Equivalent to: BHS 401

This course is repeatable for 16 credits.

GS 403, THESIS, 1-16 Credits

Equivalent to: BHS 403

This course is repeatable for 16 credits.

GS 405, READING AND CONFERENCE, 1-16 Credits

Equivalent to: BHS 405

This course is repeatable for 16 credits.

GS 407, SEMINAR, 1-16 Credits

One-credit sections. Graded P/N.

Equivalent to: BHS 407

This course is repeatable for 16 credits.

GS 410, SCIENCE INTERNSHIP, 1-12 Credits

Supervised scientific work experience at selected cooperating institutions, agencies, laboratories, or companies. Graded P/N.

Equivalent to: BHS 410

This course is repeatable for 12 credits.

Integrative Biology (IB)

IB 501, RESEARCH, 1-16 Credits

Graduate-level research completed under faculty supervision.

Equivalent to: Z 501

This course is repeatable for 16 credits.

IB 503, THESIS, 1-16 Credits

Master's thesis, completed under faculty supervision.

Equivalent to: Z 503

This course is repeatable for 999 credits.

IB 505, READING AND CONFERENCE, 1-16 Credits

For graduate students working toward a master's degree. After arrangements with individual faculty, readings and discussions on topics of mutual interest.

Equivalent to: Z 505

This course is repeatable for 16 credits.

IB 506, PROJECTS: OUTREACH, 1-16 Credits

Graded P/N.

Equivalent to: BI 506

This course is repeatable for 16 credits.

IB 507, SEMINAR, 1-16 Credits

Graded P/N.

Equivalent to: Z 507

This course is repeatable for 16 credits.

IB 510, INTERNSHIP, 1-16 Credits

Equivalent to: Z 510

This course is repeatable for 16 credits.

IB 511, INTEGRATIVE BIOLOGY GRADUATE STUDENT ORIENTATION, 2 Credits

Introduction to the graduate program in Integrative Biology and at OSU in general. Class introduces students to various skills for success in graduate school and beyond. Exploration of career options for those holding a degree in IB are explored. Graded P/N.

IB 512, INTEGRATIVE BIOLOGY GTA TRAINING AND DEVELOPMENT, 1 Credit

Provides instructional support and professional development for first year graduate teaching assistants (GTAs) in Integrative Biology. Focuses on developing a foundation for quality instruction, facilitation, and leadership as GTAs and professionals. Best practices, skills, theory and knowledge necessary for effective teaching, facilitation, and assessment of student learning are explored.

This course is repeatable for 3 credits.

IB 513, GRANT WRITING AND ETHICS, 3 Credits

Participants will write and submit a grant proposal by the end of the term. We discuss the main components of a typical grant proposal. Participants read and critique proposal drafts written by participants. Ethical issues are discussed as they are encountered.

Equivalent to: Z 585

This course is repeatable for 6 credits.

IB 515, SCIENCE COMMUNICATION: MAKING YOUR SCIENCE MATTER, 2 Credits

A practical, hands-on course designed to help science graduate students build knowledge and skills for engaging with audiences beyond their scientific peers. The science of science communication, the cultures of journalism and public policy, the changing roles of scientists in society, and science advocacy will be explored through lectures, invited talks, in-class discussions and exercises.

IB 518, SCIENCE AND POLICY, 2 Credits

An introduction to the science-policy interface in a 'post-truth' society. The formulation of state and federal public policy is examined, as well as and role of science and scientist in informing policy, management decisions and public understanding. Current topics are emphasized.

IB 522, COMPARATIVE/FUNCTIONAL VERTEBRATE ANATOMY, 5 Credits

Phylogenetically-based study of the form and function of vertebrate organ systems, including integumentary, musculoskeletal, cardiopulmonary, digestive, and sensory. Lab emphasizes comparative form through dissection, and function through non-invasive experimentation. Lec/lab.

Equivalent to: Z 522

IB 523, ENVIRONMENTAL PHYSIOLOGY, 3 Credits

Comparative environmental physiology of animals with emphasis on adaptations to such aspects of the physical environment as temperature, water, ions, and gases. Consideration given to interactions between physiology and environment that influence the local and geographic distribution of animals.

Equivalent to: Z 523

IB 525, EMBRYOLOGY AND DEVELOPMENT, 5 Credits

An integrated molecular, cellular and whole organism approach. Comparative embryonic development from gametogenesis, body axis specification, pattern formation and organogenesis. Experimental approaches uncovering cellular interactions, regulation of gene expression, and cellular differentiation. Lab emphasizes experimental comparative developmental biology and embryology. Lab fee. Lec/lab.

Equivalent to: Z 525

IB 527, PALEOBIOLOGY, 0-4 Credits

Fossils provide a direct window into the evolution, extinction, and ecology of past life on Earth. A process-based study of the marine and terrestrial fossil record is taken to explore the topics of preservation, macroevolution, extinction of biotas, biomechanics, paleoecology, and climate change. Required laboratory and weekend field trip.

Equivalent to: BI 527

IB 531, VERTEBRATE PHYSIOLOGY I, 4 Credits

Systems/concepts covered include motor reflexes, autonomic nervous system, digestion/metabolism, renal and osmoregulatory, endocrine and reproductive systems. First in IB 531, IB 532 series.

IB 532, VERTEBRATE PHYSIOLOGY II, 3 Credits

Systems/concepts covered include blood, immune, lymphatic, cardiovascular, and pulmonary. Second in the IB 531, IB 532 series.

Equivalent to: Z 532

IB 538, BEHAVIORAL NEUROBIOLOGY, 3 Credits

An introduction to the neurobiological basis of animal behavior. Examines behavior in the context of sensory physiology, motor control, neural circuitry, and cellular processes. Lec.

Equivalent to: Z 538

IB 540, INSECT PHYSIOLOGY, 3 Credits

Fundamentals of insect physiology from the behavioral to the molecular level. Cellular physiology and hormonal control of molting, metamorphosis and reproduction. Overview of body functions: respiration, circulation, digestion, metabolism, and osmoregulation. Physiological basis of behavior: muscles and flight, structure and functions of the nervous system, sensory physiology and chemical communication. The contributions of insect physiology to general physiological principles and biorational methods of insect pest control are discussed.

Equivalent to: Z 540

IB 545, EVOLUTION, 3 Credits

Formal analysis of genetic and ecological mechanisms producing evolutionary change; special topics include speciation, ecological constraints, adaptive radiations, paleontology, biogeography, the origin of life, molecular evolution, and human evolution.

Equivalent to: BI 545

IB 551, FUNCTIONAL ANATOMY OF THE HUMAN MUSCULAR SYSTEM, 4 Credits

In-depth dissection of the orientation, innervation, and functional significance of muscles and muscle groups. Topics include muscle identification, joint anatomy and variation of human form. IB 551 student expectations include vascularization and detailed joint anatomy. The laboratory component will consist of the dissection of the muscular anatomy of a human cadaver. Lab fee. Lec/lab.

Equivalent to: BI 551

Recommended: ((BI 231 and 241) or (BI 331 and 341)) and ((BI 232 and 242) or (BI 332 and 342)) and ((BI 233 and 243) or (BI 333 and 343))

IB 554, EVOLUTIONARY GENOMICS, 3 Credits

Examines the evolutionary forces that have produced such varied and complex genomes across the tree of life. The processes by which genomes can be structured, maintained, and remodeled (by nature or by humans) are explored through scientific literature. Special emphasis will be given to recent technological advances in genomics, along with their potential impacts on individuals and society.

IB 556, PHYLOGENETICS, 4 Credits

Explores the theory and practice of modern phylogenetic analysis. Emphasis placed on tree reconstruction algorithms, assessment of statistical support, and contemporary issues in phylogenetics. Lab will focus on the use of phylogenetic software and the analysis of molecular data sets. Lec/lab.

Equivalent to: BI 556

IB 561, MARINE AND ESTUARINE INVERTEBRATE ZOOLOGY, 4 Credits

Comparative survey of eight major invertebrate phyla and many lesser-known phyla. Areas of emphasis will be 1) invertebrate identification, 2) natural history (diversity, habitat, feeding, behavior), and 3) comparative anatomy (adaptive significance of morphological structures).

Laboratories and field trips will strongly supplement lecture material. Lec/lab. Taught at Hatfield Marine Science Center.

Equivalent to: Z 561

IB 573, HERPETOLOGY, 3 Credits

World families and distribution of amphibians and non-avian sauropods; evolution, population biology, life histories, current literature.

Equivalent to: Z 573

IB 574, SYSTEMATIC HERPETOLOGY, 2 Credits

A survey of the phylogenetic diversity of amphibians and reptiles of the United States. Identification through the use of keys will be stressed.

Field trip fee. Lab fee. Lec/lab.

Equivalent to: Z 574

IB 577, AQUATIC ENTOMOLOGY, 4 Credits

Biology, ecology, collection, and identification of aquatic insects. Two required Saturday field trips. Lec/lab.

Equivalent to: Z 577

IB 581, BIOGEOGRAPHY, 3 Credits

Biogeography is the study of the distribution of biodiversity. We focus on abiotic (geological, climatological) and biotic (ecological, evolutionary) factors that govern diversity across space and through time, emphasizing assembly of communities, global change, and conservation in today's rapidly changing world. The course format includes lecture, computer-based activities, and discussion. Offered winter term in odd years.

Equivalent to: BI 581

IB 583, POPULATION BIOLOGY, 3 Credits

Theoretical and empirical views of the structure and function of populations from across the tree of life, emphasizing the integration of ecological and evolutionary approaches. Lec.

Equivalent to: BI 583

IB 592, THEORETICAL ECOLOGY, 4 Credits

A treatment of the central concepts of theoretical ecology, with emphasis on the analysis and modeling of single populations and multispecies communities. Topics include discrete- and continuous-time models of population growth, stochastic and deterministic processes, and the response of populations and communities to pulse and press perturbations.

Equivalent to: BI 592

IB 593, BEHAVIORAL ECOLOGY, 5 Credits

Behavioral ecology with emphasis on both theoretical and empirical approaches. Offered alternate years.

Equivalent to: Z 593

IB 594, COMMUNITY ECOLOGY, 5 Credits

Theory and analysis of multispecies associations. Emphasis on extent to which existing ecological theory is supported by natural phenomena. Course considers how biotic and abiotic mechanisms interact to regulate community organization and stability in marine, freshwater, and terrestrial habitats. Offered alternate years.

Equivalent to: Z 594

IB 595, DISEASE ECOLOGY, 3 Credits

An introduction to disease ecology—the study of disease processes in natural populations and communities. The course focuses on (I) the role parasites play in the ecology and evolution of animal populations, including humans; and (II) the relevance of ecological and evolutionary considerations in managing infectious diseases.

Equivalent to: BI 595

IB 599, SPECIAL TOPICS, 1-16 Credits

Topics and credits vary. Grading mode TBA. Taught at Hatfield Marine Science Center and Corvallis campus.

Equivalent to: Z 599

This course is repeatable for 16 credits.

IB 601, RESEARCH, 1-16 Credits

Doctoral-level research under faculty supervision. Graded P/N.

Equivalent to: Z 601

This course is repeatable for 16 credits.

IB 603, THESIS, 1-16 Credits

Doctoral thesis completed under faculty supervision.

Equivalent to: Z 603

This course is repeatable for 999 credits.

IB 605, READING AND CONFERENCE, 1-16 Credits

For graduate students working toward doctoral degree. After arrangements with individual faculty, readings and discussions on topics of mutual interest.

Equivalent to: Z 605

This course is repeatable for 16 credits.

Microbiology (MB)**MB 110, ORIENTATION TO MICROBIOLOGY, 1 Credit**

Introduction of incoming microbiology students to college life with an emphasis on faculties, facilities, services, and curricula in microbiology. Exposure to career opportunities in microbiology. Graded P/N.

MB 201, LABORATORY SKILLS, 1-16 Credits

These credits are designed for students who are doing experiential learning in a research laboratory on campus, performing basic laboratory tasks that are not elevated to the level of an independent research project. Graded P/N.

This course is repeatable for 16 credits.

MB 230, *INTRODUCTORY MICROBIOLOGY, 4 Credits

Microbiology as it affects our everyday lives. The impact of microorganisms on health, food/water sanitation, environment, industry, and genetic engineering. Lec/lab. (Bacc Core Course)

Attributes: CPBS – Core, Pers, Biological Science

Equivalent to: MB 230H

Available via Ecampus

MB 255, *ALLIED HEALTH MICROBIOLOGY, 4 Credits

General properties of cellular microbes and viruses, microbial biochemistry and genetics, pathogenesis and disease, immunity, and microbial infections. Lecture and lab emphasis is on medical microbiology, infectious diseases, and public health. Not intended for biological sciences majors. Lec/lab. CROSSLISTED as BHS 255/MB 255.

Attributes: CPBS – Core, Pers, Biological Science

Equivalent to: BHS 255

Available via Ecampus

MB 290, SUCCESS IN MICROBIOLOGY, 1 Credit

Science skills, science literacy, ethics, and professional development to build a successful career in Microbiology. Learn the process of research, access and analyze primary literature, evaluate user-generated science content, practice professional skills, and identify and plan for experience-building opportunities such as jobs, research and internships. Sophomore standing or higher.

MB 299, SPECIAL TOPICS, 1-16 Credits

May be repeated for credit when topic varies.

Equivalent to: MB 299H

This course is repeatable for 16 credits.

MB 299H, SPECIAL TOPICS, 1-16 Credits

May be repeated for credit when topic varies.

Attributes: HNRS – Honors Course Designator

Equivalent to: MB 299

This course is repeatable for 16 credits.

MB 302, GENERAL MICROBIOLOGY, 3 Credits

Emphasis on cytology, physiology, virology, growth and control of growth with coverage of the role of microorganisms in nature, in disease, and as useful tools.

Prerequisite: (CH 332 with C- or better or CH 335 with C- or better) and ((BI 212 with C- or better or BI 212H with C- or better) and (BI 213 [C-] or BI 213H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-]) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-])))

Available via Ecampus

MB 303, GENERAL MICROBIOLOGY LABORATORY, 2 Credits

Development of laboratory techniques; exercises designed to reinforce concepts covered in MB 302. MB 302 is a prereq that may be taken prior to or concurrently with MB 303. Lec/lab.

Prerequisite: MB 302 (may be taken concurrently) with D- or better

Equivalent to: MB 303H

Recommended: Two terms organic chemistry

MB 310, BACTERIAL MOLECULAR GENETICS, 3 Credits

Introductory concepts of bacterial molecular genetics. Topics include DNA replication, mutation, DNA repair, DNA recombination, transposons, bacteriophages, genetic manipulation, and gene regulation.

Prerequisite: MB 302 with D- or better and (BB 314 [D-] or BB 314H [D-]) and (BB 450 [D-] or BB 490 [D-]) and (BB 451 (may be taken concurrently) [D-] or BB 491 (may be taken concurrently) [D-])

Equivalent to: MB 306

MB 311, ^MOLECULAR MICROBIOLOGY LAB: A WRITING INTENSIVE COURSE, 3 Credits

Scientific writing, laboratory notebook composition, experimental design, and laboratory experiments in bacterial molecular biology. (Writing Intensive Course)

Attributes: CWIC – Core, Skills, WIC

Prerequisite: (MB 303 with D- or better or MB 303H with D- or better) and MB 310 (may be taken concurrently) [D-]

Equivalent to: MB 307

MB 312, BACTERIAL PHYSIOLOGY AND METABOLISM, 3 Credits

Molecular structure and function, macromolecular assembly, energy production and use, and cellular growth.

Prerequisite: MB 310 with D- or better and BB 451 [D-]

Equivalent to: MB 304

Recommended: BB 450

MB 314, AQUATIC MICROBIOLOGY, 3 Credits

A survey of the diversity, ecology, and physiology of microbes in aquatic systems, with emphasis on their roles in food webs, chemical cycling, and human health. Provides the background knowledge and quantitative/analytical skills necessary to interpret and critique current and historical research in the fields of general aquatic microbiology.

Prerequisite: (CH 231 with D- or better or CH 231H with D- or better or CH 121 with D- or better) and (CH 232 [D-] or CH 232H [D-] or CH 122 [D-]) and (CH 233 [D-] or CH 233H [D-] or CH 123 [D-])

MB 320, HUMAN BACTERIOLOGY, 4 Credits

Properties of bacteria, their biology, pathogenesis and concern to society. Emphasis on the role of bacteria in human health and disease. CROSSLISTED as BHS 320/MB 320.

Prerequisite: (BI 204 with C- or better and BI 205 [C-] and BI 206 [C-]) or ((BI 211 [C-] or BI 211H [C-]) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-]))

Equivalent to: BHS 320

Available via Ecampus

MB 330, *DISEASE AND SOCIETY, 3 Credits

Infectious disease has many effects on the development of society, and likewise, human interactions affect the development of disease. The course examines these interactions with a focus on the role of race, class, and economic status in the development of epidemics. (Bacc Core Course)

Attributes: CPDP – Core, Perspective, Difference/Power/Discrimination

Available via Ecampus

MB 340, HUMAN VIROLOGY, 4 Credits

Properties of viruses, their biology, pathogenesis and concern to society. Emphasis on viruses causing human disease. CROSSLISTED as BHS 340/MB 340.

Prerequisite: (BI 204 with C- or better and BI 205 [C-] and BI 206 [C-]) or ((BI 211 [C-] or BI 211H [C-]) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-]))

Equivalent to: BHS 340

Available via Ecampus

MB 385, ^EMERGING INFECTIOUS DISEASES AND EPIDEMICS, 3 Credits

Emerging and reemerging infectious disease is a contemporary global issue of great concern. To understand and evaluate the issue, the course covers germ theory, disease history and ecology, microbial pathogenesis and the immune response, historic plagues, and the biological, environmental, population and social changes that contribute to disease emergence. (Writing Intensive Course)

Attributes: CWIC – Core, Skills, WIC

Prerequisite: ((BI 211 with D- or better or BI 211H with D- or better) and (BI 212 [D-] or BI 212H [D-]) and (BI 213 [D-] or BI 213H [D-])) or ((BI 221 [D-] or BI 221H [D-]) and (BI 222 [D-] or BI 222H [D-]) and (BI 223 [D-] or BI 223H [D-]))

Equivalent to: BI 385

MB 399, SPECIAL TOPICS, 1-16 Credits

Equivalent to: MB 399H

This course is repeatable for 16 credits.

MB 399H, SPECIAL TOPICS, 1-16 Credits

Attributes: HNRS – Honors Course Designator

Equivalent to: MB 399

This course is repeatable for 16 credits.

MB 401, RESEARCH, 1-16 Credits

This course is repeatable for 16 credits.

MB 403, THESIS, 1-16 Credits

This course is repeatable for 16 credits.

MB 405, READING AND CONFERENCE, 1-16 Credits

Conference: Instruction in microbiology.

This course is repeatable for 16 credits.

MB 406, SPECIAL PROJECTS, 1-16 Credits

Reading and Conference/Instructor in Microbiology.

This course is repeatable for 16 credits.

MB 407, SEMINAR, 1-16 Credits

Graded P/N.

This course is repeatable for 16 credits.

MB 410, OCCUPATIONAL INTERNSHIP, 1-10 Credits

Supervised work experience at selected cooperating institutions, agencies, laboratories, clinics or companies. Maximum of 10 credits allowed but no more than 3 credits may be used to satisfy microbiology major requirement of 36 credits. Graded P/N.

This course is repeatable for 10 credits.

MB 416, IMMUNOLOGY, 3 Credits

Basic theory and applications of immunochemistry, immunogenetics, and cellular immunology. Examination of immunologically related diseases.

Prerequisite: BB 450 with D- or better or BB 490 with D- or better

MB 417, IMMUNOLOGY LABORATORY, 2 Credits

Laboratory on the applications of current immunological techniques.

Prerequisite: (MB 303 with D- or better or MB 303H with D- or better) and MB 416 (may be taken concurrently) [D-]

MB 420, MICROBIAL GENOMES, BIOGEOCHEMISTRY, AND DIVERSITY, 3 Credits

A survey of microbial diversity from the earliest lifeforms to the modern role of bacteria and archaea in global biogeochemical cycles.

Topics covered include molecular evolution, microbial genomics, biochemical diversity, and metabolic pathways that adapt cells to extreme environments. Particular emphasis is placed on marine systems, from photosynthesis in surface waters to life in the ocean crust.

Prerequisite: BB 451 with D- or better

MB 422, AQUATIC MICROBIOLOGY LABORATORY, 2 Credits

Examine patterns of microbiological communities and how those patterns relate to environmental factors. Collect and process samples, analyze the resultant data and present those results. Focus on the microbial ecology of freshwater and marine systems as a foundation for discovery and learning using current analytical techniques.

Prerequisite: MB 303 with D- or better

Corequisites: MB 314

MB 430, BACTERIAL PATHOGENESIS, 3 Credits

Bacteria pathogenic for humans, emphasizing the structural, physiological and genetic mechanisms of pathogenesis. Role of the immune system in pathogenesis and protection.

Prerequisite: MB 302 with D- or better and MB 310 [D-] and (BB 451 [D-] or BB 491 [D-])

MB 434, VIROLOGY, 3 Credits

Properties of viruses, their biology and pathogenesis. Emphasis on viruses causing human disease.

Prerequisite: ((BB 450 with D- or better or BB 450H with D- or better) and (BB 451 [D-] or BB 451H [D-])) or (BB 490 [D-] and BB 491 [D-] and BB 492 [D-])

MB 435, PATHOGENIC MICROBES LABORATORY, 2 Credits

Laboratory experiments to illustrate concepts presented in MB 430 and/or MB 434, focusing on pathogenic microorganisms.

Prerequisite: (MB 303 with D- or better or MB 303H with D- or better) and MB 302 [D-] and (MB 430 (may be taken concurrently) [D-] or MB 434 (may be taken concurrently) [D-])

MB 436, THE HUMAN MICROBIOME, 3 Credits

Examines the biodiversity, function, and medical importance of the communities of microorganisms that inhabit the human body. A diverse array of topics will be discussed, including how the human microbiome is studied, case studies of specific aspects of the human microbiome, and emerging theories of how the microbiome influences human health.

Prerequisite: BI 314 with D- or better or BB 314 with D- or better or BI 314H with D- or better or MB 302 with D- or better

MB 440, FOOD MICROBIOLOGY, 3 Credits

Role of microorganisms in food spoilage, infection, and intoxication; also basic principles in contamination control and germicidal treatment during processing, preparing, and distributing food for consumption.

Prerequisite: MB 302 with D- or better

MB 441, FOOD MICROBIOLOGY LABORATORY, 2 Credits

Laboratory techniques to accompany MB 440/MB 540.

Prerequisite: (MB 303 with D- or better or MB 303H with D- or better) and MB 440 (may be taken concurrently) [D-]

Recommended: MB 302

MB 448, MICROBIAL ECOLOGY, 3 Credits

A comparison of soil sediments and freshwater as microbial habitats. Discussion of the role of microorganisms in nutrient cycles, effects of microbial activity on plant and animal life.

Prerequisite: MB 302 with D- or better

MB 456, MICROBIAL GENETICS AND BIOTECHNOLOGY, 3 Credits

General biology of natural, genetically engineered, and composite plasmids. Major topics include extrachromosomal DNA replication, plasmid transmission, insertion elements, transposons, gene expression, and recombinant DNA vectors. Biotechnological applications and molecular genetic tools are emphasized.

Prerequisite: MB 302 with D- or better and (BB 450 [D-] or BB 490 [D-]) and (BB 451 [D-] or BB 491 [D-]) and (MB 310 [D-] or BB 492 [D-])

MB 479, FERMENTATION MICROBIOLOGY, 3 Credits

An introduction to industrial microbiology with a focus on the physiology of fermentation and use of microorganisms for the production of food ingredients, fermented foods, and beverages. FST students need to take BB 350 and MB students need to take BB 450 for their respective majors. CROSSLISTED as FST 479/MB 479 and FST 579/MB 579.

Prerequisite: ((BI 212 with C- or better or BI 212H with C- or better) or ((BI 221 with C- or better or BI 221H with C- or better) and (BI 223 [C-] or BI 223H [C-]))) and CH 331 [C-] and CH 332 [C-] and (BB 350 [D-] or BB 450 [D-]) and MB 302 [D-]

Equivalent to: FST 479

MB 480, GENERAL PARASITOLOGY, 3 Credits

Covers a broad overview of parasitology with emphasis on medical parasitology. Explores important groups and host/parasite relationships among all taxa from invertebrates to vertebrates, including mammals.

Prerequisite: ((BI 211 with D- or better or BI 211H with D- or better) and (BI 212 [D-] or BI 212H [D-]) and (BI 213 [D-] or BI 213H [D-])) or ((BI 221 [D-] or BI 221H [D-]) and (BI 222 [D-] or BI 222H [D-]) and (BI 223 [D-] or BI 223H [D-])) or (BI 204 [D-] and BI 205 [D-] and BI 206 [D-])

Available via Ecampus

MB 490, MICROBIOLOGY CAPSTONE EXPERIENCE, 2 Credits

Capstone experience for microbiology students to practice professional skills necessary to sustain a career in science. Students will work in teams to analyze research data and communicate this analysis, in addition to explore career opportunities and learn how to successfully compete for jobs. Graded P/N.

Prerequisite: MB 302 with D- or better

MB 491, FISH DISEASES IN CONSERVATION BIOLOGY AND AQUACULTURE, 3 Credits

Introduction to diseases of fish including pathogens important to aquaculture and ornamental industries as well as to wild fish populations and conservation programs. CROSSLISTED as FW 491/MB 491 and FW 591/MB 591.

Equivalent to: FW 491

Recommended: 9 credits of upper-division fisheries or biology.

MB 496, FISH DISEASES IN CONSERVATION BIOLOGY AND AQUACULTURE LAB, 2 Credits

This laboratory complements lectures in FW/MB 491/591, with students learning basic necropsy techniques; identification of bacterial, viral and metazoan pathogens; and molecular identification methods.

CROSSLISTED as FW 496/MB 496 and FW 596/MB 596.

Equivalent to: FW 496

Recommended: MB 303 or other upper-division laboratory course.

MB 499, SPECIAL TOPICS, 0-16 Credits

This course is repeatable for 16 credits.

Recommended: One term of biology

MB 501, RESEARCH, 1-16 Credits

This course is repeatable for 16 credits.

MB 503, THESIS, 1-16 Credits

This course is repeatable for 999 credits.

MB 505, READING AND CONFERENCE, 1-16 Credits

This course is repeatable for 16 credits.

MB 506, SPECIAL PROJECTS, 1-6 Credits

This course is repeatable for 6 credits.

MB 507, SEMINAR, 1 Credit

Graded P/N.

This course is repeatable for 99 credits.

MB 510, INTERNSHIP, 1-16 Credits

This course is repeatable for 16 credits.

MB 511, SCIENTIFIC SKILLS, 1 Credit

Foundational skills for success in graduate school. Students will also become familiar with ongoing research programs in three active programs in the Microbiology Program.

MB 512, HIGHLIGHTS OF MICROBIOLOGY, 1 Credit

Designed for students to gain familiarity with the history of microbiology through reading, reviewing and writing about great papers in the field. Students also meet the Microbiology Program faculty and students, and learn about some of the research in the Microbiology Program through attending colloquium.

MB 513, MICROBIAL SYSTEMS, 3 Credits

Presentation of a modern view of microbiology through the lens of microbes' influences on our planet's habitats and inhabitants. Discusses current research and the use of advanced techniques to illustrate how microbiology is contributing to many cross-disciplinary problems that can involve engineering, public health, sociology, ecology, geology, etc.

MB 516, IMMUNOLOGY, 3 Credits

Basic theory and applications of immunochemistry, immunogenetics, and cellular immunology. Examination of immunologically related diseases.

Recommended: BB 450 or BB 490

MB 517, IMMUNOLOGY LABORATORY, 2 Credits

Laboratory on the applications of current immunological techniques.

Recommended: (MB 303 or MB 303H) and completion or concurrent enrollment in MB 516

MB 520, MICROBIAL GENOMES, BIOGEOCHEMISTRY, AND DIVERSITY, 3 Credits

A survey of microbial diversity from the earliest lifeforms to the modern role of bacteria and archaea in global biogeochemical cycles. Topics covered include molecular evolution, microbial genomics, biochemical diversity, and metabolic pathways that adapt cells to extreme environments. Particular emphasis is placed on marine systems, from photosynthesis in surface waters to life in the ocean crust.

Recommended: BB 451 or BB 551

MB 522, AQUATIC MICROBIOLOGY LAB, 2 Credits

Examine patterns of microbiological communities and how those patterns relate to environmental factors. Collect and process samples, analyze the resultant data and present those results. Focus on the microbial ecology of freshwater and marine systems as a foundation for discovery and learning using current analytical techniques.

MB 530, BACTERIAL PATHOGENESIS, 3 Credits

Bacteria pathogenic for humans, emphasizing the structural, physiological and genetic mechanisms of pathogenesis. Role of the immune system in pathogenesis and protection.

Recommended: MB 302 and MB 310 and (BB 451 or BB 491)

MB 534, VIROLOGY, 3 Credits

Properties of viruses, their biology and pathogenesis. Emphasis on viruses causing human disease.

Recommended: ((BB 450 or BB 450H) and (BB 451 or BB 451H)) or (BB 490 and BB 491 and BB 492)

MB 540, FOOD MICROBIOLOGY, 3 Credits

Role of microorganisms in food spoilage, infection, and intoxication; also basic principles in contamination control and germicidal treatment during processing, preparing, and distributing food for consumption.

Recommended: MB 302

MB 541, FOOD MICROBIOLOGY LABORATORY, 2 Credits

Laboratory techniques to accompany MB 440/MB 540.

Prerequisite: MB 540 (may be taken concurrently) with C or better

Recommended: MB 302 and MB 303

MB 548, MICROBIAL ECOLOGY, 3 Credits

A comparison of soil sediments and freshwater as microbial habitats. Discussion of the role of microorganisms in nutrient cycles, effects of microbial activity on plant and animal life.

Recommended: MB 302

MB 555, BIOLOGY OF THE PROKARYOTES, 3 Credits

An integrative graduate course examining bacterial and archaeal life at different levels of biological organization, emphasizing current research and analysis of primary literature. The various life styles of prokaryotes are the common theme of the course. Topics include biofilms, cooperation and communication, development, stress responses, metabolic interactions involved in global nutrient cycling. Offered every even year in winter term.

Recommended: BB 450 and MB 310 and MB 312

MB 556, MICROBIAL GENETICS AND BIOTECHNOLOGY, 3 Credits

General biology of natural, genetically engineered, and composite plasmids. Major topics include extrachromosomal DNA replication, plasmid transmission, insertion elements, transposons, gene expression, and recombinant DNA vectors. Biotechnological applications and molecular genetic tools are emphasized.

Recommended: MB 302 and (BB 450 or BB 490) and (BB 451 or BB 491) and (MB 310 or BB 492)

MB 579, FERMENTATION MICROBIOLOGY, 3 Credits

An introduction to industrial microbiology with a focus on the physiology of fermentation and use of microorganisms for the production of food ingredients, fermented foods, and beverages. CROSSLISTED as FST 479/MB 479 and FST 579/MB 579.

Equivalent to: FST 579

Recommended: ((BI 212 or BI 212H) or ((BI 221 or BI 221H) and (BI 223 or BI 223H))) and CH 331, CH 332, (BB 350 or BB 450) and MB 302

MB 580, GENERAL PARASITOLOGY, 3 Credits

Covers a broad overview of parasitology with emphasis on medical parasitology. Explores important groups and host/parasite relationships among all taxa from invertebrates to vertebrates, including mammals.

Available via Ecampus

MB 591, FISH DISEASES IN CONSERVATION BIOLOGY AND AQUACULTURE, 3 Credits

Introduction to diseases of fish including pathogens important to aquaculture and ornamental industries as well as to wild fish populations and conservation programs. CROSSLISTED as FW 491/MB 491 and FW 591/MB 591.

Equivalent to: FW 591

Recommended: 9 credits of upper-division fisheries or biology.

MB 596, FISH DISEASES IN CONSERVATION BIOLOGY AND AQUACULTURE LAB, 2 Credits

This laboratory complements lectures in FW/MB 491/591, with students learning basic necropsy techniques; identification of bacterial, viral and metazoan pathogens; and molecular identification methods. CROSSLISTED as FW 496/MB 496 and FW 596/MB 596.

Equivalent to: FW 596

Recommended: MB 303 or other upper-division laboratory course.

MB 599, SELECTED TOPICS, 0-6 Credits

This course is repeatable for 24 credits.

MB 601, RESEARCH, 1-16 Credits

This course is repeatable for 16 credits.

MB 603, THESIS, 1-16 Credits

This course is repeatable for 999 credits.

MB 605, READING AND CONFERENCE, 1-16 Credits

This course is repeatable for 16 credits.

MB 607, SEMINAR, 1 Credit

Graded P/N.

This course is repeatable for 99 credits.

MB 610, INTERNSHIP, 1-9 Credits

This course is repeatable for 16 credits.

MB 668, MICROBIAL BIOINFORMATICS AND GENOME EVOLUTION, 4 Credits

Theoretical and practical issues in microbial genome sequencing and annotation, with an emphasis on evolutionary theory and comparative analysis of microbial genome sequences. Metabolic prediction from genomes, with a population genetics perspective on comparative microbial genomics. Exploration of applications of genomics and allied tools to microbial populations, including metagenomics, metaproteomics, and metatranscriptomics.

Equivalent to: MCB 668

MB 699, SPECIAL TOPICS, 0-16 Credits

Lec/lab.

This course is repeatable for 16 credits.

Zoology (Z)

Z 349, *BIODIVERSITY: CAUSES, CONSEQUENCES, AND CONSERVATION, 3 Credits

The earth's biodiversity is a precious inheritance that is threatened by an unprecedented extinction crisis. This course examines the evolutionary and ecological processes that have created this unique diversity of life, the importance of biodiversity in maintaining the earth's ecosystems, and methods used to conserve biodiversity for future generations. (Bacc Core Course)

Attributes: CSGI – Core, Synth, Global Issues

Equivalent to: BI 349

Available via Ecampus

Z 350, ANIMAL BEHAVIOR, 3 Credits

Concepts of behavior; sensory receptors, internal mechanisms governing responses; learning and habituation; social organization and communication.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Equivalent to: BI 350

Available via Ecampus

Z 361, INVERTEBRATE BIOLOGY, 3 Credits

Exploration of the diversity and evolutionary relationships among major invertebrate phyla with an emphasis on morphological features, functional aspects, and life history for each phylum.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Z 362, INVERTEBRATE BIOLOGY LABORATORY, 2 Credits

Morphology and anatomy of representative invertebrates introduced in Z 361; diversity within phyla. Study is by dissections and both microscopic and macroscopic examination; field trip fee. Lab fee. Lec/lab.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) and Z 361 (may be taken concurrently) [C-]

Z 364, DIVERSITY OF LIFE: INVERTEBRATES, 5 Credits

Exploration of the diversity and evolutionary relationships among major invertebrate groups with an emphasis on building and interpreting phylogenetic trees as well as comparing and contrasting morphology, function, and life history within each group. Laboratory activities build scientific skills by exploring current hypotheses and tools for the study of invertebrate evolution.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Available via Ecampus

Z 365, BIOLOGY OF INSECTS, 4 Credits

Introduction to the study of insects, focusing on the biological attributes responsible for the success and dominance of insects. Emphasis on taxonomy, morphology, behavior, ecology, and coevolutionary interrelationships. Required field trips. Lec/lab.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Z 371, VERTEBRATE BIOLOGY, 3 Credits

Overview of vertebrate origins and phylogeny integrating several disciplines (anatomy, ecology, genetics, developmental biology, physiology, behavior, and evolution) to explore the structural and functional adaptations and evolutionary history of vertebrates. Lec.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Recommended: Completion or concurrent enrollment in Z 372

Z 372, VERTEBRATE BIOLOGY LABORATORY, 2 Credits

Classification, identification, and natural history of vertebrates. Includes laboratory examination of specimens and frequent field trips (fee charged) emphasizing Oregon fauna. Lab fee.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-]) and Z 371 (may be taken concurrently) [D-]

Z 374, DIVERSITY OF LIFE: VERTEBRATES, 5 Credits

Examination of vertebrate origins and phylogeny, integrating several disciplines (molecular biology, anatomy, behavioral ecology, and evolution). Emphasizes critical thinking and the scientific process to explore the structural/functional adaptations and evolutionary history of vertebrates. Laboratory activities build scientific skills by exploring current hypotheses and tools for the study of vertebrate evolution.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Z 422, COMPARATIVE/FUNCTIONAL VERTEBRATE ANATOMY, 5 Credits

Phylogenetically-based study of the form and function of vertebrate organ systems, including integumentary, musculoskeletal, cardiopulmonary, digestive, and sensory. Lab emphasizes comparative form through dissection, and function through non-invasive experimentation. Lec/lab.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) and (CH 332 (may be taken concurrently) [D-] or CH 335 (may be taken concurrently) [D-])

Z 423, ENVIRONMENTAL PHYSIOLOGY, 3 Credits

Comparative environmental physiology of animals with emphasis on adaptations to such aspects of the physical environment as temperature, water, ions, and gases. Consideration given to interactions between physiology and environment that influence the local and geographic distribution of animals.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-]) and (CH 123 [C-] or (CH 233 [C-] or CH 233H [C-]) and (CH 263 [C-] or CH 263H [C-]))

Available via Ecampus

Z 425, EMBRYOLOGY AND DEVELOPMENT, 5 Credits

An integrated molecular, cellular and whole organism approach. Comparative embryonic development from gametogenesis, body axis specification, pattern formation and organogenesis. Experimental approaches uncovering cellular interactions, regulation of gene expression, and cellular differentiation. Lab emphasizes experimental comparative developmental biology and embryology. Lab fee. Lec/lab.

Prerequisite: (BI 311 with D- or better or BI 311H with D- or better) and (BI 314 [D-] or BI 314H [D-] or BB 314 [D-] or BB 314H [D-])

Z 431, VERTEBRATE PHYSIOLOGY I, 4 Credits

Systems/concepts covered include motor reflexes, autonomic nervous system, digestion/metabolism, renal and osmoregulatory, endocrine and reproductive systems. First in Z 431, Z 432/Z 442 series. Lec/rec.

Prerequisite: (((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-]))) and (CH 332 (may be taken concurrently) [C-] or CH 335 (may be taken concurrently) [C-])

Z 432, VERTEBRATE PHYSIOLOGY II, 3 Credits

Systems/concepts covered include blood, immune, lymphatic, cardiovascular, and pulmonary. Second in the Z431, 432/442 series.

Prerequisite: Z 431 with C- or better

Z 438, BEHAVIORAL NEUROBIOLOGY, 3 Credits

An introduction to the neurobiological basis of animal behavior. Examines behavior in the context of sensory physiology, motor control, neural circuitry, and cellular processes. Lec.

Prerequisite: (((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])) and (CH 123 [C-] or (CH 233 [C-] or CH 233H [C-]) and (CH 263 [C-] or CH 263H [C-]))

Z 442, VERTEBRATE PHYSIOLOGY LABORATORY, 2 Credits

Experiments and exercises in vertebrate physiology covering systems studied in Z 431 and Z 432. Available to Biology majors. Lab fee.

Prerequisite: Z 431 with C- or better and Z 432 (may be taken concurrently) [C-]

Z 461, MARINE AND ESTUARINE INVERTEBRATE ZOOLOGY, 4 Credits

Comparative survey of eight major invertebrate phyla and many lesser-known phyla. Areas of emphasis will be 1) invertebrate identification, 2) natural history (diversity, habitat, feeding, behavior), and 3) comparative anatomy (adaptive significance of morphological structures).

Laboratories and field trips will strongly supplement lecture material. Lec/lab. Taught at Hatfield Marine Science Center.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Z 473, HERPETOLOGY, 4 Credits

Exploration of global herpetofauna focusing on taxa of the Pacific Northwest of North America. Identification and natural history of amphibians and reptiles are emphasized, along with a phylogenetic framework, to explore and discuss ideas involving their behavior, evolution, ecology, and conservation. Student projects examine important topics in the field.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Available via Ecampus

Z 477, AQUATIC ENTOMOLOGY, 4 Credits

Biology, ecology, collection, and identification of aquatic insects. Two required Saturday field trips. Lec/lab.

Prerequisite: ((BI 211 with C- or better or BI 211H with C- or better) and (BI 212 [C-] or BI 212H [C-]) and (BI 213 [C-] or BI 213H [C-])) or ((BI 221 [C-] or BI 221H [C-]) and (BI 222 [C-] or BI 222H [C-]) and (BI 223 [C-] or BI 223H [C-])) or (BI 204 [C-] and BI 205 [C-] and BI 206 [C-])

Z 499, SPECIAL TOPICS, 0-16 Credits

Topics and credits vary.

Equivalent to: Z 499H

This course is repeatable for 16 credits.

Z 499H, SPECIAL TOPICS, 1-16 Credits

Topics and credits vary.

Equivalent to: Z 499

This course is repeatable for 16 credits.