BIOL 1050 Biology of Disease (3)
This course focuses on the physiological changes associated with diseases of the major organ systems of the human body. Each system is presented from the perspective of the function of the organ system and how alterations in that organ system function lead to a lack of integration with other organ systems and untimely disease. **GCP Coding: (PNW) (WCOM)**

BIOL 1200 Stream Ecology (4)
This course is an in-depth study and experiential exploration of various freshwater aquatic habitats, as well as the interdisciplinary literature that is associated with each habitat and ecosystem. Pond, wetland, stream, river, and basin -- each habitat is explored, studied, and experienced. Water chemistry, EPA standardized water testing, sampling and evaluating of aquatic invertebrates; analysis of water, watershed, and ecosystem health; reporting our findings to private and state agencies -- these are all vital and important parts of this course. Students will be certified in Missouri Stream Team standards at the end of the course and will be able to start their own Stream Team. There will be multiple field trips, some overnight, to local and regional streams, rivers, and watersheds. Laboratory included.

BIOL 1318 Issues I Biology (1-3)
Deals with biological issues of general interest. May be repeated for credit if content differs. **Prerequisite**: May vary with section.

BIOL 1350 Phage Discovery (4)
This is the first semester of a year-long research-based course that immerses students in authentic and accessible research. Students will work toward finding new bacterial viruses and characterizing them. Students make significant contributions to the field of genomics as they learn how to think like scientists. Laboratory included. **GCP Coding: (PNW) (CRI)**

BIOL 1550 Essentials of Biology I (4)
BIOL 1551 Essentials of Biology I: Lab (1)
An introduction to basic principles of biochemistry, genetics, molecular biology, cellular biology, and evolution. Students will learn how to apply these basic principles to critically think about and communicate current scientific issues. Laboratory required. BIOL 1550 and BIOL 1551 must be taken concurrently. Limited to majors in the sciences or by permission of instructor. **GCP Coding for BIOL 1550: (PNW) (CRI)**

BIOL 1550 Essentials of Biology II (4)
BIOL 1561 Essentials of Biology II: Lab (1)
A survey of living organisms and ecology. Structure, function and biological processes will be covered. Laboratory required. BIOL 1560 and BIOL 1561 must be taken concurrently. **Prerequisites**: BIOL 1550. Limited to majors in the sciences or by permission of instructor.

BIOL 1580 Introduction to Computational Biology (3)
This course introduces students to the origin, rationale, and uses for biological datasets. Students become familiar with navigate public biological databases; learn how the various types of data inform biology, and work with biological data to perform analyses and learn the value of negative and positive controls. Students will use DNA analysis software programs and/or programming language at an introductory level. Offered in spring term. **GCP Coding: (PNW) (CRI)**

BIOL 1610 Anatomy and Physiology I (3)

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BIOL 1040 Human Genetics (3)
Introduces DNA, along with the structure and function of human chromosomes and how hereditary traits are passed on. Emphasis on new findings and technologies. Intended for non-majors. Laboratory included. Offered in the spring semester. **GCP Coding: (PNW) (ETH)**

BIOL 1020 Biology of Animals (3)
BIOL 1021 Biology of Animals: Lab (1)
Introduces the fascinating world of animals, from the tiny water flea to the elephant. Examines the challenges in their lives and the ways they meet them, including the search for food sources and shelter, reproduction, and internal stability. Laboratory required. BIOL 1020 and BIOL 1021 must be taken concurrently. Intended for non-majors. Offered in the fall semester. **GCP Coding for BIOL 1020: (PNW) (CRI)**

BIOL 1030 Biology of Plants (3)
BIOL 1031 Biology of Plants: Lab (1)
Examines plant growth and development, from seed to flower. Plant diversity and ancient and modern uses will be studied, along with care of common garden and household plants. Laboratory required. BIOL 1030 and BIOL 1031 must be taken concurrently. Intended for non-majors. Offered in the spring semester. **GCP Coding for BIOL 1030: (PNW) (OCOM)**

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**Course Descriptions**

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Global Citizenship Program

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<th>Knowledge Areas</th>
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<th>Global Understanding</th>
<th>Physical &amp; Natural World</th>
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<th>Roots of Cultures</th>
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**Global Citizenship Program**

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<th>Skill Areas</th>
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**BIOL - Biology**

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**Prerequisites**

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**GCP Coding**

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Webster University 2019-2020 Undergraduate Studies Catalog
BIOL 1611 Anatomy and Physiology I: Lab (1)
Introduces the structure and function of the human body. Topics include biochemistry, cell biology, skeletal systems (histology, immunology, muscle tissues), neurobiology, and nervous systems. Includes laboratory sections involving mitosis, tissues, and bones. Laboratory required. BIOL 1610 and BIOL 1611 must be taken concurrently. Offered only at Lutheran School of Nursing.

BIOL 1620 Anatomy and Physiology II (3)
BIOL 1621 Anatomy and Physiology II: Lab (1)
Continues BIOL 1610 and includes the remaining major organ systems (cardiovascular, urinary, respiratory, digestive, and endocrine systems). Includes laboratory sections involving cat dissection. Laboratory required. BIOL 1620 and BIOL 1621 must be taken concurrently. Offered only at Lutheran School of Nursing.

BIOL 2010 Evolution (3)
This course covers the development of evolutionary theory, examines the genetic basis of evolution, explores mechanisms of speciation and the construction of phylogeny, and studies various data that contribute to the current understanding of biological evolution that yields the present day diversity of life. Students perform an investigation on an evolutionary topic of choice, and present a critical analysis of the findings. Prerequisites: BIOL 1550 and BIOL 1560, or permission of instructor.

BIOL 2200 Biological Basis of Animal Behavior (3)
Presents the key processes that affect animal behavior (internal mechanisms, development, social interactions, ecology, and evolution) and their significance.

BIOL 2400 Zoology (3)
This course will delve into the evolutionary and ecological perspectives of the group of organisms we call “animals.” Structure function relationships, physiological processes, and the role animals play in our ecosystem will be explored. Prerequisites: BIOL 1550, BIOL 1551, BIOL 1560 and BIOL 1561.

BIOL 3010 Human Anatomy & Physiology (3)
BIOL 3011 Human Anatomy & Physiology I: Lab (1)
An upper division course designed for biology majors familiar with the general principles of biological and chemical sciences. Initial discussions involve the relationships between macromolecules, metabolism, cytology, and histology. This is followed by examinations of the integumentary system, skeletal system, muscular system, and nervous system. Homeostatic regulation is presented as a function of the nervous system. Laboratory sessions involve microscopic examinations of cells and tissues and bones. Laboratory required. BIOL 3010 and 3011 must be taken concurrently. Offered in the fall semester. Prerequisites: BIOL 1550, BIOL 1551 and CHEM 1100, CHEM 1101 or permission of instructor.

BIOL 3020 Human Anatomy & Physiology II (3)
BIOL 3021 Human Anatomy & Physiology II: Lab (1)
An upper division course which follows BIOL 3010. Lecture discussions involve detailed examination of cardiovascular, pulmonary, renal, digestive, endocrine, and gastrointestinal systems. Labs will involve feline dissections of these systems and examination of the musculature. Labs can also involve viewing of dissected human cadavers. Laboratory required. BIOL 3020 and 3021 must be taken concurrently. Offered in the spring semester. Prerequisites: BIOL 3010 and BIOL 3011 or permission of instructor.

BIOL 3050 Genetics (3)
BIOL 3051 Genetics: Lab (1)
This course establishes an understanding of genetic analyses in prokaryotic cells, eukaryotic systems and model organisms, with an emphasis on Mendelian genetics. Topics include transmission genetics, molecular genetics, and population genetics, with a focus on problem solving. Laboratory required. BIOL 3050 and BIOL 3051 must be taken concurrently. Offered in the spring semester. Prerequisites: BIOL 1550, BIOL 1551 and BIOL 1560, BIOL 1561, or permission of instructor.

BIOL 3080 Cell Biology (3)
BIOL 3081 Cell Biology: Lab (1)
Examines cellular structure and function in both eukaryotic and prokaryotic cells. This course provides the foundation for understanding modes of cellular communication, such as channels, receptors, messenger systems, and cell cycle processes. Energy production, storage, and utilization are also discussed. Offered in the spring semester. Prerequisites: BIOL 3080, BIOL 3081 and CHEM 3100 taken concurrently, or permission of instructor.

BIOL 3120 Microbiology (3)
BIOL 3121 Microbiology: Lab (1)
A study of bacteria, viruses, fungi, and protists with respect to microbial structure and function, growth, metabolism, pathogenesis, and methods of disinfection and sterilization. BIOL 3120 and BIOL 3121 must be taken concurrently. Prerequisites: CHEM 2100, BIOL 1550, BIOL 1560 or equivalent.

BIOL 3150 Nutrition (3)
Examines the physiologic importance of all major nutrients on an individual’s health. Effects of both deficiencies and excesses of the nutrients will be studied. The relationship between energy balance (calories) and weight control is emphasized. Prerequisites: Junior standing or permission of instructor.

BIOL 3200 Ecology (3)
BIOL 3201 Ecology: Lab (1)
Defines ecosystems, examines how they function, and how human intervention changes that function. Emphasizes world ecosystems. Laboratory required. BIOL 3200 and BIOL 3201 must be taken concurrently. Offered in the fall semester. Prerequisites: BIOL 1550 and BIOL 1560, or permission of the instructor.

BIOL 3340 Cell Culture (3)
This course takes an in-depth look at the techniques and equipment used in cell and tissue culture. This course provides the student with hands-on experience. Laboratory exercises will be preceded by lectures to provide the rationale behind the methodology. Prerequisites: BIOL 1550, BIOL 1551, BIOL 1560, BIOL 1561, BIOL 3050 and BIOL 3051, Junior standing in BA biology or BS biological sciences or permissions of instructor.

BIOL 3500 Biology and Society (3)
Considers the interaction of culture and values with various medical and biological developments and the perceptions and use of these developments. May be repeated for credit if content differs. Does not count toward biology major. Prerequisite: Junior standing or permission of the instructor.
BIOL 3600 Topics in Biology (1-4)
Provides for in-depth analysis of issues and topics of specialized interest to advanced students in the life sciences. May be repeated for credit if content differs. Prerequisite: Junior standing or permission of the instructor.

BIOL 3700 Plant Physiology (3)
BIOL 3701 Plant Physiology: Lab (1)
Plant physiology is the study of how plants function and grow. This course aims to broaden students’ understanding of how physical, chemical, and biotic factors affect the life of a plant. Emphasis will be placed on water relations, metabolism, and regulation of plant growth and development. Students will be expected to read, present, and discuss research from current scientific articles about plant physiology. Laboratory required. BIOL 3700 must be taken concurrently with BIOL 3701. Prerequisites: BIOL 1560 and CHEM 1110, or permission of the instructor.

BIOL 3800 Medical Terminology (3)
This course provides the student with the building blocks of basic medical terminology. Such information will facilitate learning of scientific and medical principles as they relate to the physiological processes in the human body. The relationship of word parts to their anatomical counterparts will be studied. Rules for combining word parts into complete medical terms will be stressed. Accurate pronunciation and spelling of word parts and complete terms will be emphasized throughout the course. Offered in online format.

BIOL 3900 Journal Club (3)
Keeping up with current scientific knowledge requires reading the latest scientific publications. This journal club course will focus on a specific area of research and delve into recent progress made in this field. Students will gain an in-depth understanding of the principles, techniques, and context of the subject while developing their skills in oral communication. This course can be repeated for credit, as the topics and research papers will differ each time. However, the course can only count one time towards the major. Prerequisites: BIOL 1550 and BIOL 1560, or permission of the instructor.

BIOL 4000 Methods in Molecular Biology (3)
BIOL 4001 Methods in Molecular Biology: Lab (1)
Provides hands-on training in basic techniques used in the analysis of genes at the molecular level. Techniques covered include manipulation of bacterial cloning vectors, restriction mapping, nucleic acid hybridization, PCR, and the use of computers to analyze DNA sequences. BIOL 4000 and BIOL 4001 must be taken concurrently. Prerequisites: BIOL 3080, BIOL 3081, CHEM 3100, CHEM 3101, or permission of instructor.

BIOL 4030 Pathophysiology (3)
Examines the development of disease processes within the cell, organs, systems, and throughout the body. Reviews body organs, systems, and homeostatic mechanisms in detail. Explains the factors that induce and perpetuate pathologic change or provide compensation. Prerequisites: Junior standing and CHEM 2110, or permission of instructor.

BIOL 4050 Gene Expression (3)
Reviews the structure and function of chromosomes, the regulation of gene expression, and the molecular basis of gene mutation. Special topics will include gene regulation during development, the genetic basis of cancer, and the use of transgenic model systems. Prerequisites: BIOL 3050, BIOL 3051, and BIOL 3080, or permission of instructor.

BIOL 4100 Neurobiology (3-4)
A general study of nervous systems, with special reference to the human. Relates structure to function. Prerequisites: BIOL 3010 or CHEM 2110 or equivalent, or permission of instructor.

BIOL 4210 Advanced Physiology I (3)
Course will include discussions of excitable tissues, cardiovascular system, renal function, respiratory system, and fluid/electrolyte/pH balance. Biology majors who take BIOL 4210 must also take BIOL 4220. Taught in first eight weeks of a semester. Prerequisites: BIOL 1620, BIOL 1621 or BIOL 3020, BIOL 3021 or permission of instructor.

BIOL 4220 Advanced Physiology II (3)
Course will include discussions of neuromuscular, endocrine, digestive, reproductive, and immune systems. Biology majors who take BIOL 4210 must also take BIOL 4220. Taught in second eight weeks of a semester. Prerequisites: BIOL 1620, BIOL 1621 or BIOL 3020, BIOL 3021 and BIOL 4210 or permission of instructor.

BIOL 4300 Immunology (3)
Provides the student with a detailed understanding of the mechanisms involved in protecting the body from infections and other potential sources of tissue damage. It examines the workings of the immune system and the interrelationships among its cell types. Prerequisite: BIOL 3080, or permission of instructor.

BIOL 4400 Research Methods (3)
Lecture and discussion of the research process from question formulation to planning, design, methodology analysis, and preparation of a research proposal. Prerequisites: BIOL 1550, BIOL 1551, BIOL 1560, BIOL 1561, BIOL 2010, BIOL 3050, BIOL 3051, CHEM 1100, CHEM 1101, CHEM 1110, CHEM 1111, CHEM 2100 and CHEM 2101. Senior status in BA biology or BS biological sciences, or permission of instructor.

BIOL 4420 Senior Thesis for BA in Biology (4)
Students working towards a BA in biology will enroll in this course to complete their senior research project in the laboratory or field. Completion of the project will culminate with a scientific write-up and oral presentation of research results at a formal meeting of faculty and peers. Students must complete all required coursework for the major, including BIOL 4400 Research Methods, or receive permission of instructor.

BIOL 4430 Senior Thesis for BS in Biological Sciences (4)
Students working towards a BS in biological sciences will enroll in this courses to complete their senior research project in the laboratory or field. Completion of the project will culminate with a scientific write-up in publishable format. Research results will be presented at a formal meeting with faculty and peers. Student must complete all required coursework for the major, including BIOL 4400 Research Methods, or receive permission of instructor.
BIOL 4440 Senior Thesis for BS in Computational Biology (4)
Students working towards a BS in computational biology will enroll in this course to complete their senior research project in the laboratory or field. Completion of the project will culminate with a scientific write-up in publishable format. Research results will be presented at a formal meeting with faculty and peers. Students must complete all required course work for major, including BIOL 4400 Research Methods, or receive permission of instructor. BIOL 4050, and/or BIOL 4800 may be taken concurrently.

BIOL 4500 Virology (3)
Investigates the fundamental processes of viral evolution, classification, infection of host, pathogenesis, and viral replication. The use of viruses in biomedical research will be presented in order to understand the methodologies for the isolation, identification, and detection of viruses. Prerequisites: BIOL 3050, BIOL 3051, BIOL 3080, BIOL 3081, CHEM 3100, or permission of instructor.

BIOL 4600 Seminar in Biology (2)
For senior biology majors.

BIOL 4610 Reading Course (1-4)
May be repeated for credit if content differs. Prerequisites: Permission of the department chair and filing of the official form.

BIOL 4700 Independent Research in Biology I (1-4)
A specialized course for students working on an independent, research-oriented project in a topic of current interest. Students should select among the equivalent courses BIOL 4700/CHEM 4700/PHYS 4700 for the one that is most consistent with their chosen project. For BIOL 4700, the topic should have a primary basis in biology. Also offered during the summer term. May be repeated once for credit if content differs. Prerequisite: Permission of instructor.

BIOL 4710 Independent Research in Biology II (1-4)
A specialized course for students working on an independent, research-oriented project in a topic of current interest. Students should select among the equivalent courses BIOL 4710/CHEM 4710/PHYS 4710 for the one that is most consistent with their chosen project. For BIOL 4710, the topic should have a primary basis in biology. Also offered during the summer term. May be repeated once for credit if content differs. Prerequisite: Permission of instructor.

BIOL 4800 Computational Biology (4)
This course reinforces students’ understanding of the uses for large biological datasets, with a focus on using simple scripts to manipulate and analyze data, and introduces the use of current programming language in data analysis. This is a combines lecture/lab experience in a computer classroom, where students participate to access, assess and perform computational analyses of biological datasets. Students navigate various public biological databases, analyze data, and discuss the statistical and/or biological significance of the results. Offered in the spring semester. Prerequisites: BIOL 1580, COSC 1560, BIOL 3050, and one of the following MATH 3610, STAT 3100, or MATH 3200, or permission from the instructor.